# UrbanIxD: Exploring Human Interactions for the Hybrid City

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# Declaration

I hereby declare that the work presented in this thesis has not been submitted for any other degree or professional qualification, and that it is the result of my own independent work.

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Date

# Abstract

With the vision of ubiquitous computing becoming increasingly realised, a need is identified to create a better understanding of the relationship between person, place, and technology in the urban environment. The aim of this research in the field of Urban Interaction Design is to investigate how people's emotional person-place relationships with personally meaningful places in their city of residence, can inform the design of technological devices and services that augment this urban lived experience in the hybrid city of the near future.

Based on insights from social science studies of place attachment and research focusing on technology mediating the emotional experience of and in the urban environment, a holistic, human-centred bottom-up approach is taken. It investigates the full range of experiences-in-place and emotions from which emotional person-place relationships in the city develop. Using a three-staged, multimethod approach consisting of a Walking & Talking interview and two sedentary interviews with (speculative) evaluative map techniques, 45 emotional person-place relationships of eight residents of Edinburgh are investigated. This resulted in a taxonomy of 16 types of emotional experience-in-place, and identified potential for capturing, representing, consuming, and sharing emotional person-place relationship data based on different types of positive and negative emotional experience-in-place, different types of representations and sensorial experiences, the closeness of social relationships and shared interests, and to support the self-regulation of emotions.

These main findings informed the design of a suite of three speculative design fictions in the form of two short films and a comic, to further explore this design space. These authentic, personally relevant, and provocative conversation pieces successfully engaged residents of Edinburgh in three focus groups on a human, personal level in an informed discussion, enabling critical reflection on current practices and interactions, and speculation about possible future scenarios for this unfamiliar design space.

This contributed to a set of design guidelines for emotional experience-in-place. It serves as a framework for urban interaction designers to understand the context of, identify potential for, and inform the design of technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future.

## Publications Associated with this Research

Stals, S. (2017). Exploring Emotion, Affect and Technology in the Urban Environment. In *Proceedings of the 2017 ACM Conference Companion Publication on Designing Interactive Systems*, 404–406. Edinburgh, United Kingdom (DIS 2017). https://doi.org/10.1145/3064857.3079172

Stals, S., Smyth, M., & Mival, O. (2017). Exploring People's Emotional Bond with Places in the City: A Pilot Study. In *Proceedings of the 2017 ACM Conference Companion Publication on Designing Interactive System,* 207–212. Edinburgh, United Kingdom (DIS 2017). https://doi.org/10.1145/3064857.3079147

Stals, S., Smyth, M., & Mival, O. (2017). Sharing & Exploring Quantified-Self Data on In-Place Experiences and Emotions. In *CHI 2017 Workshop on Human Factors in Computing Systems: Quantified Data and Social Relationships*, 1-6. Denver, United States (CHI 2017). https://openlab.ncl.ac.uk/datarelationships/accepted-papers/

Stals, S., Smyth, M., & Mival, O. (2018). Capturing, Exploring, and Sharing People's Emotional Bond with Places in the City using Emotion Maps. *Airea: Arts & Interdisciplinary Research - Computational Tools and Digital Methods in Creative Practices*, *1*, 47–62. http://journals.ed.ac.uk/airea/article/view/2799/3871

Stals, S., Smyth, M., & Mival, O. (2019). UrbanixD: From Ethnography to Speculative Design Fictions for the Hybrid City. In *Proceedings of the ACM Halfway to the Future Symposium 2019*, 1–10. Nottingham, United Kingdom (HttF 2019). https://doi.org/10.1145/3363384.3363486

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# Chapter 1: Introduction

## 1.1 Background and aims

With Weiser's (1999) vision of ubiquitous computing becoming increasingly realised through the proliferation of sensors, urban screens, smart city solutions, Internet of Things technologies, the Quantified-Self movement, and mobile and wearable technologies like smartphones and smartwatches, a new technological layer is being added to the urban environment (Dourish & Bell, 2007; Weiser, 1991). These technological devices and layers of digital data in the urban environment are creating a hybrid city in which the physical and digital world come together (Smyth, Helgason, & Brynskov, 2013). This technological layer offers new possibilities to interact with, track, capture, share and augment our experience of the urban environment. Complementary to the traditional technology-driven, top-down smart city approach which operates at a city-scale and focuses on increasing the efficiency of urban infrastructures, the field of Urban Interaction Design takes a human-centred, bottom-up, human-scale design approach. It aims to identify the needs, desires, routines, behaviours, and experiences of people in the urban environment to inform the design of innovative technological devices and services for the hybrid city of the (near) future. Rather than efficiency, the focus is on city making; people as engaged citizens actively using technology to create pleasant cities economically, socially and culturally. To this end, there is a need to create a better understanding of the relationship between person, place, and technology in the urban environment (Hill, 2013).

In the field of Urban Interaction Design there has been an increased focus on emotion and affect to create a better understanding of people's personal, individual experience of the urban environment, and to inform how technology could play a role in augmenting this urban lived experience. Numerous social science studies have been conducted on the concept of place attachment, i.e., people's emotional bond with personally meaningful places (Gustafson, 2001a; Lewicka, 2011b; Manzo, 2005, 2014; Masso et al., 2019; Scannell & Gifford, 2010, 2014, 2017). Literature in the field of Urban Interaction Design also investigates and leverages people's emotional experience of the urban environment (Aspinall et al., 2015; Matassa et al., 2013; Matassa & Rapp, 2015; Nold, 2004, 2009; Quercia et al., 2014; Tilley et al., 2017). Based on a critical analysis of these works, to use emotion and affect to create a better

understanding of the relationship between person, place, and technology, it is argued that the places that are meaningful to people on a personal level provide a suitable lens for further investigation. Because it are these personally meaningful places that a person has a strong emotional bond with (Gustafson, 2001a; Manzo, 2005; Scannell & Gifford, 2010). Place attachment to these personally meaningful places in the urban environment develops from the combination of personally significant experiences-in-place and the emotions (Manzo, 2005, 2014). There is a trend in social science studies of place attachment to take a holistic approach (Gustafson, 2001a; Manzo, 2005; Relph, 1976; Scannell & Gifford, 2017). Informed by this, it is argued that a holistic approach should be taken to create a better understanding of the relationship between person, place, and technology in the urban environment. Thus, the full range of meaningful experiences and emotions related to all types of personally meaningful places in the urban environment should be taken into account. The aim of this thesis is to investigate how people's emotional person-place relationships with personally meaningful places in the urban environment can inform the design of technological devices and services for the hybrid city of the near future. In particular, the focus will be on the personally meaningful experiences-in-place and emotions related those personally meaningful places in the city of residence, from which emotional person-place relationships develop.

## 1.2   Research Questions

To achieve the overall aim of creating a better understanding of the relationship between person, place, and technology in the urban environment, this thesis in the field of Urban Interaction Design investigates the following research question:

***How can people's personal emotional relationships with their own personally meaningful places in the urban environment, and in particular their personally meaningful experiences-in-place and emotions connected to their personally significant places in their city of residence, inform the design of technological devices and services for the hybrid city of the near future?***

To answer this overall research question, the following sub-questions have been formulated:

**Research Question 1:** *How are people's personal emotional place meanings (i.e., their personally meaningful experiences-in-place and emotions) connected to their own personally significant places in the urban environment?*

**Research Question 2***: How can these personal emotional meanings of place be represented and communicated?*

**Research Question 3:** *What is the relevance of these emotional person-place relationships to other people?*

**Research Question 4:** *How can people's personal, emotional relationships with personally meaningful places in the urban environment inform the design of future technological devices and services for the hybrid city of the near future?*

Through answering these research questions, this thesis will make the following contributions to the field of Urban Interaction Design:

- It applies a novel, holistic approach in the field of Urban Interaction Design to create a better understanding of emotional person-place relationships in the urban environment. This approach combines the positive and negative experience-in-place and emotions related to different types of personally meaningful places in the urban environment. This resulted in a taxonomy of 16 types of emotional experience-in-place that people have within their city of residence. It validates and refines existing frameworks of place attachment and provide guidance for the design of new technological devices and services for the hybrid city of the near future.

- The use of the Walking & Talking method to inform the design and creation of a suite of speculative design fictions that are authentic and personally relevant. The Walking & Talking method produces rich, contextualised, and intimate data regarding people's emotional person-place relationships with personally meaningful places in their city of residence. The resulting speculative design fictions informed the design of future technological devices and services by engaging non-expert citizens in a discussion on a personal, human level regarding the complex relationship between person, place, and technology in

the hybrid city of the near future. This resulted in a set of design guidelines for urban interaction designers aiming to design technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future.

## 1.3   Summary of Research and Research Outcomes

The overall research design can be illustrated using the Double Diamond model (Norman, 2013), which consists of four phases: discover, define, develop, and deliver (Figure 1-1).
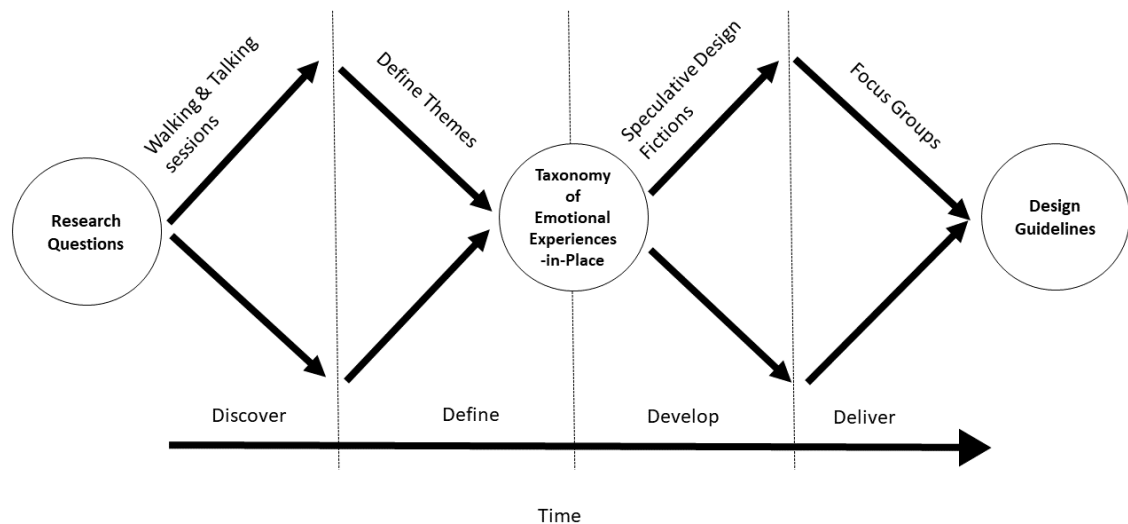


*Figure 1-1- Research Design as Double Diamond Model.*

Phase 1 – Discover-phase: Walking & Talking sessions

In the discover-phase, Walking & Talking sessions consisting of a three-stage multimethod approach were used to answer Research Questions 1, 2, and 3.  In the first stage, an evaluative map technique in a sedentary semi-structured interview is used to identify the personally meaningful places on a map of the city of residence and determine the route for the walking interview in the second stage. In the second stage, the Walking & Talking method, an in-situ walking interview between a participant and an observer, was used to elicit intimate, rich, and contextualized qualitative data

regarding the participants' personal experiences-in-place and emotions connected to their personally significant places in the city.

Phase 2 – Define: Defining Themes in the Data Corpus

After recruiting participants using a networking procedure, the study was conducted in the city of Edinburgh (United Kingdom) over a nine-month period from November 2016 to July 2017. The emotional person-place relationships of eight participants with 45 personally meaningful places in their city of residence were investigated. In this define-phase, video recordings of the Walking & Talking sessions were transcribed and the data corpus is analysed using a grounded theory approach (Charmaz, 2009). This resulted in the identification and definition of seven themes. These are divided in two overarching themes, namely a Taxonomy of Emotional Experiences-in-Place, and Opportunities for Technology to capture, represent, consume, and share emotional person-place relationships.

Phase 3 – Develop: Crafting a Suite of Speculative Design Fictions

Based on the themes and main findings defined in the previous phase, in the development phase the focus is on exploring the design space of the hybrid city of the near future. A Speculative Design approach with a Critical Design lens was taken to create a suite of three Speculative Design Fictions in the form of two short films and a comic, to address Research Question 4.

Phase 4 – Deliver: Focus Groups with Residents of Edinburgh

In the fourth and final phase of the Double Diamond model, the delivery phase, a series of focus groups is conducted over a period of three weeks in August 2019 with in total 16 residents of Edinburgh, to gather their responses to this suite of three speculative design fictions. This enabled non-expert citizens of Edinburgh to engage in an informed discussion with the researcher. These discussions enabled reflection on current practices and interactions regarding their emotional person-place relationships

with personally meaningful places in the urban environment. In addition, it enabled speculation about possible future scenarios of how technology could augment this urban lived experience in a hybrid city of the near future. Audio and video recordings of the focus groups were transcribed, and analysed using thematic analysis (Braun & Clarke, 2006; Clarke & Braun, 2019).

Responses to the design fictions validated and refined the main findings of the thesis, and informed potential design, social, and negative implications for each of the possible future scenarios. This created a better understanding of the relationship between person, place, and technology in the urban environment. The result is a set of design guidelines for urban interaction designers aiming to design technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future (i.e., Research Question 4).

## 1.4   Thesis structure

In this section, the structure of the thesis will be presented, and a short description for each chapter of the thesis will be provided. The thesis consists of eight chapters, namely 1. Introduction, 2. Literature Review, 3. Methodology, 4. Walking & Talking in the Urban Environment, 5. Speculative Design Fictions, 6. Focus Groups, 7. Discussion, 8. Conclusion.

Chapter 1 – Introduction: introduces the field of Urban Interaction Design, highlighting gaps in the literature regarding emotional person-place relationships in the urban environment. The research aims and research questions are articulated, and the contributions to knowledge this thesis will make to the field of Urban Interaction Design are identified.

Chapter 2 – Literature Review: provides a critical analysis of the trends and themes in the relevant literature in urban studies, place attachment, and Urban Interaction Design. The key terms and concepts in those fields are also discussed. Knowledge gaps in the literature are identified and the research questions are formulated accordingly.

Chapter 3 – Methodology: the rationale for the research approach and the lens through which the data analysis occurs, as well as the methods used to answer the research questions, are discussed.

Chapter 4 – Walking & Talking in the Urban Environment: the operationalisation and fine-tuning of the methods, the rationale and procedures for data analysis, and the results of the Walking & Talking sessions are discussed, which contribute to answering Research Questions 1, 2, and 3, which contribute to answering Research Questions 1, 2, and 3. A taxonomy of 16 types of emotional experiences-in-place is formulated and opportunities and motivations for technology to capture, represent, consume, and share emotional person-place relationships in the urban environment are identified.

Chapter 5 – Speculative Design Fictions: a literature review on speculative design is provided along with the rationale for a speculative design approach, using a critical design lens to create a suite of speculative design fictions to address Research Question 4.

Chapter 6 – Focus Groups: the suite of Speculative Design Fictions is discussed in a series of three focus groups with Edinburgh residents. The resulting set of design guidelines for urban interaction designers is presented and discussed.

Chapter 7 – Discussion: the main findings and answers to the research questions are discussed and positioned within existing literature. The implications, strengths and limitations of the research are also discussed.

Chapter 8 – Conclusion: the research questions and how this thesis has addressed them are summarised and reiterated, the contributions of this work to the field of Urban Interaction Design are identified, and opportunities for future work are discussed.

# Chapter 2: Literature review

This chapter provides a critical analysis of the trends and themes in the relevant literature in urban studies, place attachment, and Urban Interaction Design. It discusses the key terms and concepts in those fields and identifies knowledge gaps in the literature from which the research questions are formulated accordingly.

## 2.1 Urbanisation

Cities have always been centres where the flows of people, goods, culture, knowledge, and wealth have come together (Hustwit, 2011). As the world's population grows and continues to urbanise, more and more cities are becoming powerhouses, economically, socially and culturally, on both a national and global scale (Provoost, 2012; United Nations, 2019). However, this influx of people brings challenges to the sustainable design, development, and management of cities. At the same time, globalisation and technological developments in the field of information and communication technologies (ICT) are making the world a smaller place. After the internet wave and the mobile wave, the third wave of technological globalisation known as the Internet of Things (IoT), will see this internet connectivity spread even further into the fabric of the urban environment. Not only people, but anything from sensors to objects within the urban environment will become interconnected (Hill, 2013).

Government institutions, urban planners, and architects are looking at this technological development as part of the solution to be able to deal with the increasing challenges that cities face caused by this rapid population growth and urbanisation. This technology has the potential to help design, develop and manage cities and its services and infrastructures in a sustainable way (Hustwit, 2011). At the same time, this new technological layer also offers the citizens living in cities the opportunity to create new opportunities, at an individual level as well as community level, to make the most of the economic, social, and cultural benefits that living in a city has to offer, and to create cities that are pleasant to live in, work in and play in (Hill, 2013).

## 2.2 Urban Studies: Understanding and designing the urban environment

In order for these technological solutions to be effective, there is a need to understand the urban environment in which these technologies will be deployed. In this section, models used in urban studies by urban planners, architects, geographers, environmental psychologists, and sociologists to understand the urban environment and plan, design, and develop within this design space, will be discussed. It reveals an emerging trend of moving from a top-down approach to a bottom-up approach. In addition, there is an increasing focus on emotion to understand people's relationship with and experience of the urban environment, which can be used to inform the (re)design of urban space.

Since the 1950s, urban literature has assessed the subjective meaning and experience of urban places and the patterns of behaviour and interactions that can occur in these places, particularly in the fields of urban planning, human geography, environmental psychology, and architecture. The studies in these fields take an approach similar to Urban Interaction Design and seek to uncover the needs, desires, rituals, routines, behaviours, and experiences of people in the urban environment to inform the (re)design of urban space. Therefore, the methodologies that have been used and the insights that have been gained in those fields are also relevant for Urban Interaction Design. De Lange (2013) identified three dominant epistemological foundations theorising the "hybrid" nature of cities in urban literature over the last 100 years from, 1920 until 2020; the ecosystem view, the cognition view and the affective view (de Lange, 2013). It should be noted that de Lange uses a different, more broad notion of hybrid here, namely seeing the city as a hybrid form, a (re)combination of two or more distinctive elements, which still influences how cities are viewed, planned, and created today.

### 2.2.1 Ecosystem model

The ecosystem view conceptualizes the city as a closed ecosystem in which people compete for space and resources and is reflective of the top-down approach taken when designing these cities  (Park & Burgess, 1925; Provoost, 2012). The view of the city was one of a range of specialised functions that originated from the city's specific spatial qualities (namely high density and layout) and demographics (namely a high

number of socially heterogeneous inhabitants). This resulted in the formation of specific functional concentric urban zones (de Lange, 2010, 2013), as shown in Figure 2-1: the central business district, an industrial zone, a working class housing zone, a middle class residential zone and a high class residential area also known as the commuter zone.
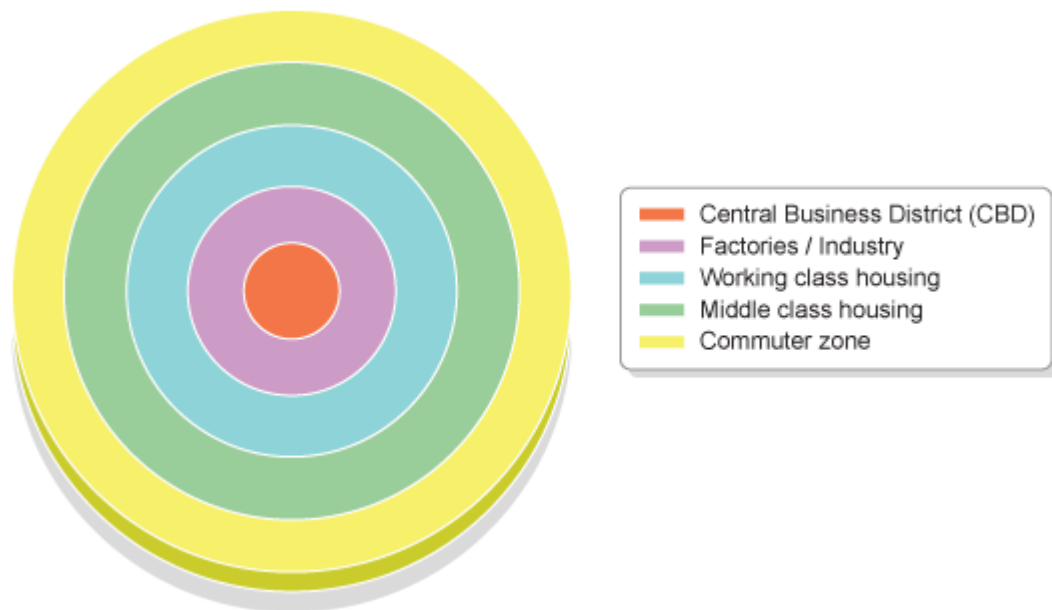


*Figure 2-1 - Burgess' concentric zone model of the city (BBC, 2014).*

In the ecosystem model, a person's relationship with the urban environment and other people was strictly utilitarian and social ties were limited to long-term social relations tied to fixed locations. This ecosystem model offered a very limited view of the emotions that could be experienced in the urban environment; only negative emotions were related to life in a city, like permanent instability, crisis, self-destruction, alienation, and fear of an angry mob (de Lange, 2013; Park & Burgess, 1925).

### 2.2.2 Cognitive model

The cognitive model tries to bridge spatial and mental domains by focusing on people's perceptions, sensory experiences, and cognitive mental experiences and understanding of cities (de Lange, 2013). Urban planner Kevin Lynch explored how residents experience their cities at the level of visual sensory impressions and cognitive understanding (Lynch, 1960). Lynch compared three American cities, Boston, Jersey, and Los Angeles, based on their legibility, i.e., the extent to which the urban landscape

can be "read", that is, recognised and organised by people into a coherent pattern. This is often also referred to as the "visibility" or "imageability" of the urban environment, i.e., its ability to evoke an image. Lynch would ask people to walk around a specific area and then draw a map from memory afterwards. The aggregation and analysis of these personal psychogeographies into more collective and universal interpretations resulted in so called "mental maps" or "images" of the city. These images consisted of generally visible and recognisable visual elements. Lynch (1960) identified five visual elements or building blocks in these mental maps of the urban environment: paths, edges, districts, nodes and landmarks (Figure 2-2).
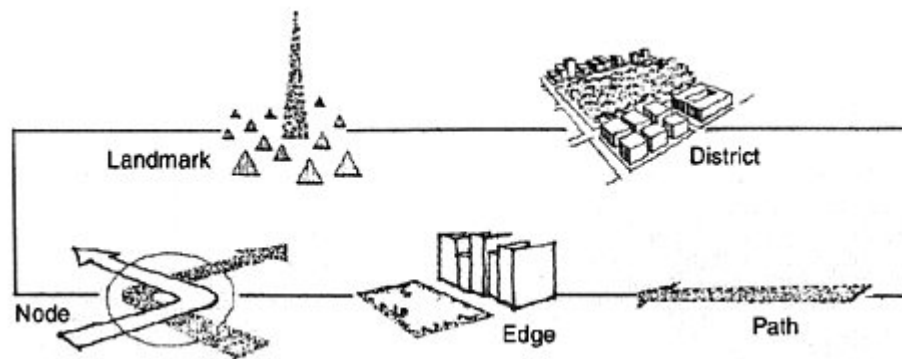


*Figure 2-2 – The five recognisable visual elements that are the building blocks of the image of the city: Landmarks, Districts, Nodes, Edges, Paths (Lynch, 1960).*

Lynch investigated how those visual elements are related and structured to compose mental maps of the urban environment, and how people use those mental maps to orient themselves and navigate through the urban environment (de Lange, 2013; Lewicka, 2011b; Lynch, 1960).

However, the emotions related to the experience of the urban environment formed an underlying motivation for the use of these mental maps. The city was seen as a place where one got lost, and these mental maps could be used to reduce the fear of disorientation, reduce stress, increase feelings of personal safety, and increase a sense of control. More importantly, however, is that unlike the top-down ecosystem view, Lynch takes a bottom-up, human-centred approach to urban planning which emphasises human agency (de Lange, 2013; Lewicka, 2011b; Lynch, 1960).

### 2.2.3 Affective model

Where Lynch focused on the conscious, cognitive understanding of place in relation to orientation and navigation, human geographer Relph (1976) takes a more holistic approach to understanding place. Relph's phenomenology of place is a holistic interpretive study of place and the human experience of place, which aims to reveal events, meanings and experiences that can occur in a person's everyday life, but that typically take place below the level of conscious awareness (Relph, 1976). According to Relph, a place consists of three basic components: firstly the physical setting, secondly the activities, situations and events that take place in this physical setting, and thirdly the individual meanings and group meanings created through people's experiences and intentions in a place. Relph (1976) defined place attachment as an authentic and emotional bond with an environment, which satisfies a fundamental human need to belong to both the place and the people in it. He also defined a range of seven stages of insideness and outsideness on a continuum along which places can, often unconsciously, be experienced. It ranges from 'no sense of belonging to a place and no integration in the community', to 'a high sense of belonging to a place and being fully integrated in the community' (Relph, 1976; Sandin, 2003; Seamon & Sowers, 2008). This conceptual framework is one of the first which takes a holistic, interdisciplinary approach to understanding place attachment in all of its dimensions. It incorporates a sociological and cognitive understanding of place, as well as the individual's emotional experience of a place, in relationship to the architecture of the physical setting of place. It is human centred at the level of the individual, who is seen as an active agent in their relationship with place and emotional experience of place. It provides a language to discuss place attachment and people's emotional experience of place, which is still relevant today (Lewicka, 2011b; Relph, 1976; Sandin, 2003; Seamon, 2019b; Seamon & Sowers, 2008).

Similar to Relph, human geographer Tuan (1977) emphasised the importance of the human experience, feelings and aesthetic response to place. A focus on the experience of a place considers people's sensation, perception, and conception of reality. Where Relph focused mostly on different levels of belonging, Tuan distinguished between sense of place and rootedness. Sense of place is described as an awareness of a positive feeling for a place, and rootedness as a feeling of being home. Tuan described

a wide variety of positive emotional relationships that people can have with places, like attachment to the homeland, sense of security, pleasure, intimacy, and spiritual connections with places. Tuan coined the term ***topophilia***, or love of place, which highlights the emotional component of the person-place relationship. Compared to the cognitive view which limited the emotional experience of the urban environment to a small set of negative emotions, this led to a more positive view of affect and emotion. It acknowledged that people can also have positive experiences and emotional relationships with a variety of places in the urban environment (de Lange, 2013; Scannell & Gifford, 2010; Tuan, 1977).

Relph also discussed how places are changing, and what the consequences might be for our emotional experience of place and personal wellbeing if the emotional person-place relationship is lost. Both Relph and Tuan consider place to be a bounded entity with a unique identity and historic continuity (Lewicka, 2011b). With the increasing mobility and globalisation of the world, Relph (1976) warned of what he called ***placelessness***; the increased homogeneity of places and the eradication of distinctive, cultural, authentic, significant places, leading to disappearing sense of place (e.g., houses in a suburban neighbourhood which are all exactly the same). A similar concern was expressed by Augé (1995), who noticed that a standardised, Western architecture style spreading around the globe is leading to the increase of ***non-places***. That is, places without relational or historical identity that do not integrate with existing places and cultural and historical context of the country or city they are in (e.g. airports, shopping malls, hotel rooms) (Augé, 1995). Ultimately, this commercial and architectural uniformity could lead to standardised landscapes without significant places. This would lead to an increasingly similar experience of places and cities as they would have lost their culture and identity. In addition, if people are unable to create or maintain relationships with places, this could lead to a place experience of outsideness and a decreased personal emotional bond with a place.  This could have negative consequences for people's personal identity and social, psychological, and physical well-being (Augé, 1995; Lewicka, 2011b; Manzo, 2005; Relph, 1976; Rollero & Piccoli, 2010; Scannell & Gifford, 2010).

## 2.3 Toward a grassroots bottom-up approach in urban design

In urban studies, the goal of understanding how people experience the physical and social dimensions of urban places on an emotional level is to inform the design, redesign, and creation of the physical environment of cities and urban spaces that people enjoy living in. Particularly in the fields of urban planning and architecture, this led to an increased focus on people's individual emotional experience of the urban environment and trend towards a grassroots, bottom-up approach centred on people's sensorial experiences of the urban environment. In the 1950s, the artistic activist group Situationist International studied the effects of the geographical environment on the emotions and behaviour of individuals, known as ***psychogeography*** (Debord, 1955). It uses unorganised and spontaneous wanderings through an unknown area of the city (i.e., dérive), the resulting subjective, alternative maps (i.e., détournement) are a protest against a single, definitive and institutionalised method of mapping and viewing the city from a top-down perspective by government institutions and urban planners at the time (Angus et al., 2008; Baber, 2010; Beekmans, 2012; Daniilidisa, 2016; Debord, 1955; Leahu, Schwenk, & Sengers, 2008; Sandin, 2003; Wark, 2011).

Jane Jacobs' (1961) critique of urban planning in the United States was one of the first studies to advocate a grassroots, bottom-up approach to urban planning as opposed to the top-down approach typically taken by urban planners at the time. Jacobs acknowledged the importance of observing the city at street level. For example, stressing the significance of sidewalks in keeping the city safe in a time when the rise of the automotive industry, particularly in the United States, was influential in the way cities were being designed around the car. Sidewalks were observed to increase social connectedness, which improved feelings of safety, social connectedness, and a sense of trust among locals in the neighbourhood. However, city planners perceived areas where people hang out on the sidewalk as unsafe slums. Insights like these highlighted the disconnect between the top-down view that urban planners had of the city at the time, and the bottom-up view and experiences of the people in the street. There are clear parallels here with the current smart city discussion; on one hand the top-down, technology and infrastructure-centred view of the city by industry and government institutions versus the bottom-up, human-centred view of the city as advocated in the field of urban interaction design (Jacobs, 1961; Seamon, 2019a).

Like Jacobs, architect Jan Gehl also advocates for studying the city at the human scale as opposed to the traditional top-down view (Gehl, 2010, 2011; Gehl & Svarre, 2013). He highlights the importance of studying the urban landscape through the five human senses, and the importance of movement through the urban environment, which should be by walking through the city as opposed to using the car. Similar to Whyte (1980), Gehl argues that the success of the design of the physical properties of public places in urban environments should be measured at the pedestrian level. Like Relph, Gehl looks at the different types of activities that occur in urban places, as an important element of how people emotionally experience a place. The relation between the activities and the spatial properties of urban places form an indication of the performance or success of the public place and will lead to a reinforcing process of attracting more people. If the physical elements within the square are designed well, people will not only stop at an activity, but also stay in the space and spend time there. These are measures of the success of the design of public urban place (Andreani & Sayegh, 2017; Dalsgaard, 2013; Gehl, 2010, 2011; Gehl & Svarre, 2013; Smyth & Helgason, 2015).

Whyte (1980) takes a grassroots observational approach similar to Jacobs (1961) when investigating the usability of urban public places. Whyte used observations focused on uncovering people's behavioural and interactional patterns in order to inform the design of public places. Whyte aimed to identify the specific characteristics of the physical and social setting of public urban places (e.g. sunlight, seating, selling point for food), which caused people to prefer the use of a specific public place such as a square, over other public places of the same types (Whyte, 1980).

Architect Christopher Alexander's (1977) work on pattern language shows how architecture connects people to their surroundings in many different ways, most of which are subconscious. Like Relph, Alexander employed a method of phenomenology of place resulting in a theory of places. He identifies underlying design principles for the organisation of the physical dimension of places, that underlie the human experience (Alexander, Ishikawa, & Silverstein, 1977; Alexander, 2004). In particular, Alexander describes design patterns for physical spaces which have the ability to make it easy for spaces to convert into meaningful places. These design patterns create places that people enjoy being in and therefore have a high potential for an emotional people-place

bond to be developed (i.e., place attachment). Alexander describes a wide variety of patterns of design problems and solutions for different types of spaces on different scales of spatiality. The main idea behind this is the assumption that these design pattern in places, evoke the same emotions across different people (Alexander, 2004; Lewicka, 2011). Another important aspect of this pattern language is that it enables urban planners and other professionals to redesign the urban landscape, as well as enabling and empowering ordinary people to work with their neighbours to improve their own city, neighbourhood, house, or room (Alexander, 2004; Alexander et al., 1977; Lewicka, 2011b; Seamon, 2007).

How to investigate, understand, and design cities is an ongoing challenge. Inspired by these classic urban studies, urban planners and architects now incorporate bottom-up approaches to understand how people experience cities and urban places and to inform their design. The research methods employed in those classic urban studies as well as the insights they revealed, are still used and relevant today (Frederick, 2017; Mikoleit & Pürckhauer, 2011; Montgomery, 2013; Speck, 2013). They have led to a multifaceted approach to urban planning called placemaking, in which the local communities now have a say and play an active role in the design of urban spaces. They contribute to the creation of public places in their neighbourhood that have a positive effect on people's emotional experience of the urban environment and their health, happiness, and well-being.

Tactical Urbanism (Lydon, Bartman, Garcia, Preston, & Woudstra, 2016; Lydon & Garcia, 2015) takes this approach of placemaking one step further. Like the activist approach by the psychogeographers of Situationist International, and Alexander's design patterns, it aims to empower citizens to (temporarily) take control of the public places in their neighbourhood using design, design-thinking, and small-scale urban interventions with a community focus and realistic goals. This bottom-up approach uses temporary interventions as a catalyst for long-term change (Lydon et al., 2016; Lydon & Garcia, 2015). In New York for example, on Park(ing) Day Times Square was reclaimed from cars for one day by and for pedestrians and street artists. They used inexpensive roadblocks, paint, and beach chairs to turn it into a car-free park for a day (Figure 2-3). This resulted in Times Square eventually being officially repurposed and redesigned as a car-free

activity zone for street performers, tourists and pedestrians, with proper, permanent benches and tables.



*Figure 2-3 – Times Square before and during Park(ing) (Lydon & Garcia, 2015).*

Another tactic used is "Yarn bombing", the act of personalising or customising a public place to make a public place look more appealing and inviting. This is achieved by decorating features in the urban landscape such as lampposts, bike racks, public benches or statues, with brightly-coloured knitted or crocheted covers (Figure 2-4).



*Figure 2-4 - Yarn bombing of a bicycle stand (Lydon & Garcia, 2015).*

In the next section will be discussed how the adding of a new technological layer to the already existing infrastructure of the city opens up new opportunities for investigating, understanding and augmenting people's urban lived experience.

## 2.4 Smart Cities vs Smart Citizens

With a new technological layer being added to the existing infrastructure of the city, two complementary approaches for the design of technological devices and services in the urban environment will be discussed. First, the smart city vision, which takes a technology-driven, top-down approach on a city scale, with a focus on efficiency. Second, the smart citizen approach adopted in the field of Urban Interaction Design, which aligns with the trends in urban studies towards a complementary, bottom-up, human-centred design approach at the human scale.

### 2.4.1 Ubiquitous computing

In 1991, Mark Weiser published a visionary and influential paper in which he described his vision for computing in the twenty-first century (Weiser, 1991). Although mostly focused on technology in the home and workplace, Weiser's vision was one where computing would move away from the computer on people's desks, spreading into the very fabric of the physical environment around us. Computers and other technological devices should fit into the environment rather than forcing humans to enter theirs. The idea was that this ubiquitous technology of invisible computing would weave itself into the fabric of our everyday life. It would not demand focus or attention, but rather fade and disappear into the background until it would become indistinguishable from the environment itself. Weiser envisioned that ***ubiquitous computing*** would be for personal use to make our lives more efficient, especially in the workplace.

Weiser's vision of ubiquitous computing has become increasingly realised with the new technological layer being added to the existing infrastructure of the city (Dourish & Bell, 2007; Weiser, 1991). Not just through the proliferation of so-called smart technologies in homes (i.e., smart homes) and buildings (e.g. smart offices and smart buildings) (Schnädelbach et al., 2017; Weiser, 1991), but also through the urban environment with a variety of sensors (de Azambuja, Lheureux-de-Freitas, Moreira, & Macadar, 2014; Guerrache, Aldabbagh, & Kanjo, 2016; Kuznetsov, Davis, Paulos, Gross, & Cheung, 2011; Mavoa, Oliver, Kerr, Doherty, & Witten, 2013; Resch, Mittlboeck, Girardin, Britter, & Ratti, 2009; Resch, Summa, Sagl, Zeile, & Exner, 2015; Somov, Dupont, & Giaffreda, 2013; Zeile, Resch, Loidl, Petutschnig, & Dörrzapf, 2016), cameras, and urban screens being embedded in the physical environment (Behrens, Valkanova, gen. Schieck, &

Brumby, 2014; Foth, Brynskov, & Ojala, 2015; Foth et al., 2014). Also, objects in the urban environment itself can now be scanned through Quick Response (QR) codes, allowing people to scan locations and objects to acquire additional information. The vision of IoT takes this one step further. Objects are equipped with unique Radio-Frequency Identification (RFID) chips, which can be read and tracked, and access the internet to communicate with one another. This leads to an ambient intelligent wireless network where objects, places and people can knowingly and unknowingly interact. This brings further opportunities to augment physical space and has the power to reshape cities and the way we experience the urban environment (Benyon, 2014b).

Also, the people living in and moving through cities are carrying a host of mobile technologies with them, such as smartphones and MP3 players, as well as wearable quantified-self technologies such as smartwatches and activity trackers (Birenboim, Dijst, Scheepers, Poelman, & Helbich, 2019; Li, Froehlich, Larsen, Grevet, & Ramirez, 2013; Matassa, 2013; Picard, 2014; Rooksby, Rost, Morrison, & Chalmers, 2014). In the next two sections, these two different visions identified in the literature on how to design for this new technological layer will be discussed.

### 2.4.2 Traditional Smart City Vision

With the vision of ubiquitous computing (Weiser, 1991; Weiser & Brown, 1997) becoming increasingly realised, a wide range of information and communication technologies have been deployed in the urban environment. This opens up new opportunities to investigate, capture, track, measure, quantify, augment, and share the urban lived experience.

Traditional smart city visions are often adopted by commercial endeavours and government institutions. Government institutions around the world are looking at the technological developments in information and communication technologies as part of the solution to deal with the increasing challenges that cities face caused by rapid population growth and urbanisation. These smart city solutions have the potential to help design, develop and manage cities in a sustainable way. An example of such a traditional smart city vision would be the incorportation of sensors in the fabric of the urban environment (e.g. in roads and traffic lights) to sense and adjust in real-time traffic flows to reduce traffic congestion (Somov et al., 2013).

But what exactly is a smart city? Due to the many companies and government institutions developing their own smart city strategies, frameworks, and solutions, and the breadth of technologies that have been implemented under the smart city label, there are many different definitions for smart cities. The lack of a clear and universally agreed upon definition, and in particular what exactly it is that makes a smart city "smart", is well documented in the literature (Albino, Berardi, & Dangelico, 2015; Allwinkle & Cruickshank, 2011; Dameri, 2013; Deakin & Waer, 2013; Eremia, Toma, & Sanduleac, 2017; Hill, 2013; Hollands, 2008). For example, Albino et al. (2015) define smart cities as "initiatives [that] try to improve urban performance by using data, information and information technologies to provide more efficient services to citizens, to monitor and optimize existing infrastructure, to increase collaboration among different economic actors, and to encourage innovative business models in both the private and public sectors"(p.8). Not even the word "smart city" itself is agreed upon, with alternative and related terms being used such as "Intelligent City", "Digital City", "Wired City", "Networked City", "Ubiquitous City", "Sustainable City", "Entrepreneurial City", "Sentient City", "Hybrid City" and "Urban Internet of Things" (Albino et al., 2015; Allwinkle & Cruickshank, 2011; Camero & Alba, 2019; Greenfield, 2006; Hemment & Townsend, 2013; Hollands, 2008; Shepard, 2009; Smyth, Helgason, & Brynskov, 2013; Thrift, 2014; Townsend, 2014).

Rather than providing a single, universally agreed upon definition, many studies in the literature have taken a more practical approach and attempted to identify the overall key elements of these definitions of smart cities. Unfortunately, due to the multidisciplinary approach to smart cities, even agreeing upon which elements of the smart city are key turns out to be problematic. Different fields tend to highlight different aspects of the smart city as key elements, which is also reflected in the many alternative and related terms used for naming smart cities (Albino et al., 2015; Allwinkle & Cruickshank, 2011; Eremia et al., 2017; Hollands, 2008). For example, Holland's (2008) widely cited definition of the "intelligent city" highlights the use of ICTs in the urban environment to bring people together to enhance the innovation, learning, knowledge, and problem solving as a key element. However, this not considered key in other frameworks. For example, key elements of the so-called "Sustainable City", "Green City" or "Eco City" take a slightly different perspective of the

smart city, and stress the importance of the impact on the environment (Camero & Alba, 2019).

To position this thesis in the existing literature, when using the term ***smart city*** in this work, it will refer to the traditional smart city vision typically adopted by commercial endeavours in industry and government institutions (Gruppo Telecom Italia, 2014; Zaffiro, Bracuto, Brynskov, & Smyth, 2015). This thesis is situated in the field of Urban Interaction Design, and the key elements of a smart city as outlined by Hill (2013) are widely cited by literature in the field, such as Hemment and Townsend's (2013) work on Smart Citizens (Hemment & Townsend, 2013), and Greenfield's (2006, 2013) critical analysis of the smart city concept. Hill (2013) focuses on the question of what it is that makes a smart city smart. It highlights an important difference in traditional smart city visions that assert the "smartness" of these cities in the monitoring, analytical and decision-making capabilities of the technology. In comparison, researchers, practitioners and designers in the field of Urban Interaction Design argue that it is people living in these cities and actively using these technologies who make a city smart. The five key elements of the traditional smart city vision, as identified by Hill (2013), are based on a critical analysis of the different smart city visions of ICT companies such Cisco, IBM, Intel, Siemens, and Microsoft:

1) Its technology-driven, top-down approach which operates on an urban scale.

2) In line with Weiser's vision of ubiquitous computing, this technology is invisible (or at least it aims to be invisible) and is working in the background (Weiser, 1991; Weiser & Brown, 1997).

3) The technology of the city management system is in control of the real-time monitoring and adjusting of urban processes (Figure 2-5)(Greenfield, 2006, 2013; Hemment & Townsend, 2013; Hill, 2013; Somov et al., 2013; Townsend, 2014).

4) The focus is on managing urban infrastructures such as the electricity grid, water supply, and traffic flow (Figure 2-6)(Greenfield, 2006, 2013; Hemment & Townsend, 2013; Somov et al., 2013; Townsend, 2014).

5) The focus on efficiency. The reason that these smart city systems are in control, is to increase the efficiency and productivity of its infrastructures and urban processes

(Greenfield, 2006, 2013; Hemment & Townsend, 2013; Somov et al., 2013; Townsend, 2014).



*Figure 2-5 - IBM's Urban Control Centre in Rio de Janeiro (Gillman, 2013).*
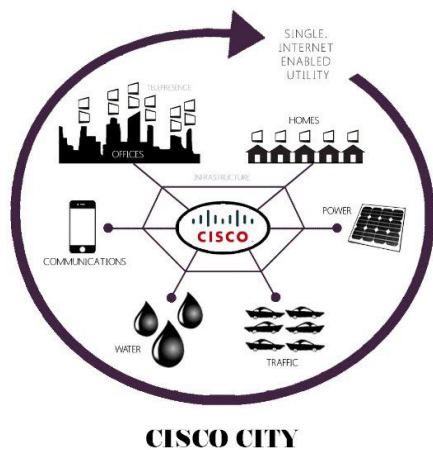


*Figure 2-6 - Cisco's Smart city solution for New Songdo City (Chelliah, 2013).*

However, with the rise of these traditional smart city visions, a shift is taking place in their design, planning, development, and construction. Where traditionally

government institutions lead this work, for smart cities this has been shifting towards the commercial sector. For large tech companies such as Intel, Cisco, Siemens, Microsoft and IBM, deploying these cities-in-a-box solutions constitutes commercial products. These are catered to people with middle to high incomes who have the means to pay for the cutting-edge technological infrastructure and services provided by the smart city. It ignores entire classes of people, especially in Asia and Africa, who cannot afford to live in these cities (Provoost, 2012; United Nations, 2019). It highlights how the smart city vision views the citizens living in these cities, namely as consumers.

Furthermore, for companies such as Cisco, the value of the company is directly linked to the volume of internet traffic (Gruppo Telecom Italia, 2014; Hill, 2013; Zaffiro et al., 2015). These smart cities will be both major producers and consumers of Big Data, and all this data will be moved around using the technological infrastructure provided by that same company. As Hill (2013) identified, this could lead to the tech industry having an unhealthy amount of control over cities, echoing concerns and developments in cities in the 1960s. For example, in the United States the automotive industry was accused of covertly coercing cities into expanding the road networks at the expense of other means of transportation (Hill, 2013; Provoost, 2012; Zaffiro et al., 2015). In addition, these cities-in-a-box are mainly produced by large western technology corporations and architecture firms (Hill, 2013; Provoost, 2012). This could potentially lead to an increase of placelessness as argued by Relph (1976) and non-places as argued by Auge (1995), as these urban designs are standardised and have no cultural or historical context with the country or region they are being deployed in. This could have a detrimental effect on people's emotional relationships with places, people's identities, the identity of places, and the well-being of people living in these smart cities. However, the main criticism of the smart city, is the ill-defined notion of "smartness", which will be addressed in more detail in the next section.

### 2.4.3   Urban Interaction Design and Smart Citizens

The smart city visions outlined in the previous section have received wide criticism from academics and practitioners alike because of the top-down matter in which they are imposed on the people living in urban environments, the ill-defined notion of "smartness", and their view of people as passive consumers, nodes, or sensors in a

network. Additionally, the proposition of simplified technological fixes to complex urban problems, focusing too much on the efficiency of urban processes and infrastructures, and lack of understanding of the context of place are highlighted (de Lange, 2013; Greenfield, 2006, 2013; Hemment & Townsend, 2013; Hill, 2013).

Introducing new technological infrastructures into the urban environment is nothing new, and they are typically implemented in a top-down manner following instructions from government institutions (Dourish & Bell, 2007). For example, consider water pipes or the electricity grid.  However, there was a clear rationale for introducing these urban infrastructures, like providing clean drinking water to improve public health and reduce the spread of diseases. Critics of the smart city vision point out that we, as humankind, do not make cities to make efficient buildings and infrastructures. We make cities to come together and create wealth, culture, and more people. Smart buildings, smart vehicles and other smart technologies, services and infrastructures should first and foremost be seen as enablers to deal with increasing population numbers and urbanisation, not as commercial drivers for profit and building smart cities themselves (Hill, 2013; Provoost, 2012).

Top-down technology-driven solutions ignore the active role and everyday life of the people inhabiting the city. Based on the lessons learned in urban studies as outlined in Sections 2.2 and 2.3, and insights in computing-related fields such as Human-Computer Interaction and User Experience Design (Benyon, 2014a; Norman, 2013; Rogers, 2006), there is a growing realization that the that technological devices and services for smart cities should not be imposed on people and their everyday lives in the urban environment they inhabit. Instead, ***Urban Interaction Design (UrbanIxD)*** (also referred to as Urban Informatics or Urban Human-Computer Interaction (Urban HCI)) takes a bottom-up, human-centred design approach. It aims to identify the needs, desires, routines, rituals, human activities, behaviours and experiences of people in the urban environment, in order to inform the design of innovative technological devices and services for the smart city of the (near) future (Smyth et al., 2015; Smyth et al., 2013; UrbanIxD, 2014). Thus, rather than imposing technological solutions in a top-down fashion on its citizens, urban interaction design aims to develop a better understanding of the relationship between people, place and technology, in order to investigate how

technology could augment the urban lived experience. This ensures that the new technological devices and services fit the needs, desires, routines and behaviours of people and their everyday lives in the city. Or as Weiser (1991) put it, it aims to weave these technological devices and services to fit into the fabric of everyday life. To that end, urban interaction design operates at the human scale, i.e., the level of the community and the individual, unlike the smart city vision which operates at an urban level (Dalsgaard, 2013; Smyth & Helgason, 2015; Smyth, Helgason, Brynskov, et al., 2013; UrbanIxD, 2014).

Furthermore, while technology develops and changes quickly, the needs, desires, routines, rituals, human activities, behaviours and experiences of people in the urban environment that the technology aims to support tend to remain relatively stable over time. As Hill (2013), among others, points out, technology such as in smart homes develops quickly. But what the traditional smart city visions fail to understand, is that in comparison, the meaning of home remains stable over a longer period of time and only changes slowly (Dourish & Bell, 2007; Hill, 2013; McCullough, 2004; Smyth, Helgason, Brynskov, et al., 2013; Smyth et al., 2015).

In contrast to traditional smart city visions, urban interaction design views people living in cities as active, engaged citizens (Hemment & Townsend, 2013; Hill, 2013). Unlike Weiser's vision of ubiquitous computing where technology is calmly running in the background, urban interaction design envisions people in control of the technological devices and services for smart cities and the Big Data generated by this technology, as well as actively engaging with it in innovative, exciting and stimulating ways (Gaver, 2019; Hemment & Townsend, 2013; Hill, 2013; Rogers, 2006; Shepard, 2009). Because using technology to make urban processes more efficient does not make the city "smart", it is the people living there that use these new technologies to shape the city in expected and unexpected ways that make it smart. Hemment and Townsend (2013) and Hill (2013), therefore, call for a move away from the focus on technology and urban infrastructures, and instead a focus on the ***smart citizens*** or active, engaged citizens that inhabit the urban environment.

It is not only the physical environment of the city that has been equipped with monitors, cameras, screens, and sensors. Objects in the urban environment, smart

homes and smart buildings are being equipped with RFID-chips to create an Urban IoT. Also, the people inhabiting the city currently carry around a wide range of mobile devices like smartphones, smartwatches, tablets, cameras, and MP3 players. The traditional smart city vision focuses too much on efficiency, but that is not the only reason that people want to live in cities. People want to make the most of the economic, social, and cultural benefits that living in a city has to offer. People use technological devices and services for *city making*, i.e., people as engaged citizens using technology to create pleasant cities to work, live, play, create wealth, culture and attract more people (Hemment & Townsend, 2013; Hill, 2013).

For example, the Serendipitor smartphone application was built as part of the Sentient City Survival Kit project by MIT (Shepard, 2009). It is a navigation system which instructs users to perform certain movements and actions along an otherwise optimized and efficient route. It is designed to introduce small detours and minor interruptions in order to maintain consciousness of what happens along the way, instead of blindly following the navigation system. In a similar project, the Stereopublic smartphone application, created as part of an art project, navigates users through the city based on the lack of noise along the route (Sweeney, 2013). The app enables users to tag their quiet spaces in the city and asks them to make a thirty second audio recording of the place, which cannot be interrupted. The idea is that by participating, stopping, and pausing during a busy day in the city, those thirty seconds provide a dedicated moment of quiet time and relaxation. Other examples include iSee, which provides a web-based interface to map of all the locations of CCTV surveillance cameras in the city, allowing people to plan a route from A to B along the path of least surveillance (Greenfield & Shepard, 2007; Monahan, 2006). Dampbusters is a citizen sensing project which uses low-tech sensing technologies to enable citizens to collect, share, and act on the dampness levels in their own housing to improve their home environment (Balestrini et al., 2017). Smartphone apps like Sunny Pubs or Pints In The Sun allow the user to check which beer gardens will be sunny at what time of the day (PIKE, 2015).

These are all examples of what Coyne (2010) refers to as the *tuning* of place. If place is about the way people inhabit, interact, socialise, and remember, Coyne argues that tuning connects to the urban lived experience of temporal and spatial adjustments.

Smartphones and other pervasive, ubiquitous technologies allow people to tune in to different layers of data, to finely tune their relationship with people and places. This is done through spatial and temporal adjustments, to improve everyday experiences in and of the urban environment. By making small, incremental adjustments similar to the tuning of a musical instrument, we can adjust, tweak, synchronise, personalise, and tune our interactions and emotional experience, with each other and the urban environment. These technological devices and services enable us to tune-in to an emotional experience of and in the urban environment, which conversely also influences our moods (Coyne, 2010, 2016a).

People also use a host of personal informatics tools in the form of wearable Quantified-Self sensors such as smartwatches and activity trackers to collect data and measure and quantify more personal aspects of their everyday lives in the city. Popular metrics to track and share include  physical activity (e.g. running apps like Nike+), diets (e.g. MyFitnessPal), moods and emotions (e.g. MoodPanda, ComfortZones, EmotionMap), and memories (e.g. Memoir, UMap) (Blom et al., 2010; Elsden, 2014; Huang et al., 2015; Li et al., 2013; Matassa, 2013; Stals et al., 2017a). Typically, the goal is to use this personal data to gain self-knowledge, self-insight and to promote positive attitudes, behaviours and improve wellbeing.

All these devices and services create a ***hybrid city*** in which the physical world of the urban environment and the digital world in the form of increasing layers of different digital data come together (Smyth, Helgason, & Brynskov, 2013; Smyth et al., 2015). It offers interesting new opportunities to investigate, view, shape, interact with, and augment our experience of the urban environment, which is constantly being created and re-created at the intersection of people, place and technology (Dourish & Bell, 2007; Smyth & Helgason, 2011; Stals, Smyth, & IJsselsteijn, 2014).

In recent years, the clear-cut distinction between traditional top-down approaches and bottom-up approaches has been contested in the context of their practices and representational agencies (Lee, Offenhuber, Xavier, & Ratti, 2015; Nold, 2018; Offenhuber & Lee, 2012; Picon & Ratti, 2017; Quercia, Schifanella, et al., 2014; Wang, 2016; Zeile et al., 2016). These two design approaches are now viewed as complementary, acknowledging the strengths and weaknesses in each approach and the

more complete, overall picture that can be provided with their combination. For example, smart city solutions can discover general patterns in big data sets at an urban level, which can lack the detail necessary at a street level. Urban HCI approaches like UrbanIxD can provide richer and more detailed data and insights because they focus at the level of the individual person or the community, but the methods used and insights gained in this approach can be difficult to scale up or generalise to an urban scale (Wang, 2016). This has resulted in more recent approaches attempting to combine a human-centred, bottom-up design with a more traditional smart city, top-down approach (Krivý, 2018; Nold, 2018; Offenhuber & Lee, 2012; Picon, 2015, 2017; Picon & Ratti, 2017; Ratti, 2010; Resch et al., 2015; Shoval, Schvimer, & Tamir, 2018).

Currently, urban planners and architects also make use of new technological developments to find how people perceive their static and dynamic urban surroundings and the emotions they evoke in people. The Urban Emotions-project (Resch et al., 2015) tries to obtain this data in real-time using people in the street as human sensors by measuring their objective arousal levels using wearable wristband sensors. Participants simultaneously ground truth this data by registering their subjective emotional experiences using a smartphone app as they move through the urban environment. This data is then combined and correlated with crowdsourced, geo-located social media data in the form of Tweets and Flickr photos. This data is visualised in an attempt to incorporate human's emotional responses to the urban environment into the urban planning process (Nold, 2018; Shoval et al., 2018; Ujang & Zakariya, 2015; Zeile, Resch, Exner, & Sagl, 2015; Zeile et al., 2016).

Both the traditional smart city vision as well as human-centred, bottom-up design approaches such as UrbanIxD agree that technology can be used to investigate, capture, track, measure, quantify, share, and augment people's experiences of the urban environment, but they tend to do so for different reasons, namely efficiency and city making. Or, as architect Cedric Price (1979) already provocatively pointed out in the 1960s regarding the influence of developing technology on architecture, "Technology is the answer, but what was the question?". UrbanIxD focuses on investigating what the needs, interactions, and experiences of people in the urban environment are and uses

those to inform the design of new technological devices and services for smart cities of the (near) future.

The next section will describe how this new technological layer has increased the need to create a better understanding of the relationship between person, place, and technology. Like the urban literature studying the subjective meaning and emotional experience of urban places and human interactions in the urban environment since the 1950s (see Section 2.2), there is also an increased focus on emotion in the field of UrbanIxD to create a better understanding of the urban environment, and to inform the design of technological devices and services to augment the urban lived experience

## 2.5   Emotion and Affect in Urban Interaction Design

The previous section outlined how Weiser's vision of ubiquitous computing is becoming increasingly realised; a new technological layer is being added to the existing infrastructure of the urban environment. With this, there is a growing need to better understand the relationship between people, place, and technology in the urban environment.

### 2.5.1   Need for a better understanding of the relationship between person, place, and technology in the urban environment

With technology spreading throughout everyday life in the urban environment, there is a need to create a better understanding of the relationship between person, place, and technology (Boehner, DePaula, Dourish, & Sengers, 2007; Dourish & Bell, 2007; Hemment & Townsend, 2013; Hill, 2013; Smyth, Helgason, & Brynskov, 2013; Stals et al., 2014). This is not limited to the way that people should interact with this new technological layer; Weiser's vision of ubiquitous computing is one of seamless interaction with technology running quietly and invisible in the background. As highlighted in the previous section, this vision received criticism from experts in Urban HCI and User Experience Design such as Rogers (2006), Shepard (2009), Hill (2013), and Hemment and Townsend (2013), who argued that people living in the city should not be viewed as passive nodes in a network, but as engaged and smart citizens who actively use these technologies for city making.

In addition, it is important to realise that not all (urban) places are the same (Hill, 2013), they have different physical, social, and cultural contexts which affect the

meanings of and interactions in and with these places (Brewer & Dourish, 2008; Dourish & Bell, 2007). Dourish and Bell (2007) argued that for the design of these new emerging technologies, the ways in which we encounter, experience, and engage in activities in the urban environment (i.e., the infrastructure of experience), and the way in which we can interact with these technologies in infrastructure (i.e., experience of infrastructure), should be considered. The relationship between those two elements is recursive, as infrastructure give meaning to experience and experience gives meaning to infrastructure. It is one of the first papers in HCI which urges for creating a better understanding of relationship between person, place, and technology, and uses insights from urban studies such as architecture to inform the design of new technological devices and services for hybrid cities and smart cities. Because those fields have experience with incorporating new technological layers into the infrastructure of the city (e.g. electricity grid, water pipers, Wi-Fi) (Dourish & Bell, 2007; McCullough, 2001, 2004).

As highlighted in the classic urban studies in Sections 2.2 and 2.3, moving and the type of movement (e.g., walking versus taking the subway) through the urban environment are considered to be an important aspect of the urban experience. It provides a sense of how the city is structured and how it can be navigated through the combination of social and spatial knowledge (Dourish & Bell, 2007; Lynch, 1960). Movement through the city also plays an important role in the process of creating places that are meaningful to people on a more individual level. It leads to encountering new places and people and undertaking activities in those places that could lead to them potentially becoming personally significant. Revisiting and repeated use of places enables people to engage in a variety of experiences, which leads to the addition of many facets and layers of meaning. This illustrates the main point made by Dourish and Bell (2007), namely that place is not just organised physically, but also socially and culturally. The city already exhibits many layers of infrastructure which shape our coherent experience and make it meaningful in different ways, relating to human activities. This means that technological infrastructure and services need to be understood as operating in this context (Dourish & Bell, 2007).

Secondly, there is the need to think architecturally about the technologies that will be developed for, and deployed in, the urban environment (Dourish & Bell, 2007). Architecture focuses on the boundaries and transitions of places on the human scale, and their intersection with human and social practice. Like Rogers (2006) and Chalmers and Galani (2004), Dourish and Bell (2007) oppose Weiser's seamless technology for place and argue for what is called *seamful interaction*. Rather than erasing boundaries between places and contexts which can actually cause a technology to fail due to a lack of context awareness, seamful interaction acknowledges and highlights the differences between places, physically, socially, and culturally. It aims to create an understanding of these different contexts and how the new technological layer might support those (Brewer & Dourish, 2008; Chalmers & Galani, 2004; Dourish & Bell, 2007; Greenfield, 2006; Rogers, 2006, 2019).

Architect Malcom McCullough (2001, 2004, 2013) also tries to bridge the gap between technology and the urban environment by using insights from architecture to inform the design of this new technological layer. Inspired by Alexander et al.'s (1977) pattern language , McCullough creates a *typology of situated interactions* (McCullough, 2001, 2004, 2013). A topology is a set of recurrent situations, configurations in the digital layer, which provide a good starting point for ubiquitous computing by suggesting how certain technologies could be used to start facilitating these common situations in everyday life. McCullough divides these typologies of situated interactions over four types of places, the workplace, the home, the town, and on the road. These latter two are particularly relevant in the context of this thesis, as these are typically (semi)public urban places. More important than these four types of places, are the activities and experiences that McCullough lists that people can have in these urban places. In the workplace there are places for thinking, presenting to groups, collaborating within groups, negotiating, documenting, officiating, crafting, associating, learning, cultivating, and watching or monitoring. The home has places for sheltering, recharging the body, resting, congregating with local support networks, and metering. In the town, there are places for socialising (i.e., eating, drinking, and talking), gathering, cruising (i.e., people watching and being seen), belonging, shopping, sporting or playing (i.e., embodied play), attending cultural productions, commemorating, and rituals. On the road, there are places for visiting (i.e., gazing or

touring), hoteling (i.e., being home away from home), adventuring, driving, and walking (i.e., places at the human scale) (McCullough, 2001, 2004, 2013)**.** He then elaborates on the characteristics of each of these places in terms of technologies that can be used there and the impact they have on the activities that people undertake and the experiences they have.

McCullough himself classifies his list of typologies as a naïve first attempt, which is indeed neither exhaustive nor complete, but does not expect the list to change drastically either. However, these situated interactions are not equally important or as frequently occurring in different cities across the world, or across individual people. In addition, it supports the approach to focus on the experiences that people have in urban places, highlighting the many different experiences that people can have in an urban place (e.g., a coffee place is not just for buying coffee, but also a place to meet up with friends, or go on a date). McCullough correctly points out that the list of used technologies is very likely to change as the rate at which technology develops is quite high in comparison. However, since McCullough takes a human-centred design approach and attempts to move away from specific technology, the list of situated interactions provides a good starting point for further research in the field of Urban Interaction Design (Benyon, 2014b; Dourish & Bell, 2007; McCullough, 2001, 2004, 2013).

This new technological layer also causes people to reencounter physical places, with these new technologies needing to be interwoven with the existing physical structure of a place(Dourish & Bell, 2007). These new technologies might provide wireless, Virtual Reality, or Augmented Reality experiences, but will still need to be experienced in and through an existing physical place which developers of these technologies often seem to forget. An example is the safety problems caused by the popular location-based urban augmented reality game Pokémon Go, with game content appearing across the road from the player's location, tempting players to cross busy streets while not paying full attention to their surroundings (Colley et al., 2017; Paavilainen et al., 2017).

The final conclusion by Dourish and Bell (2007), is that there already is a complex interaction between person, place, and technology in the urban environment. The

places in which these new technologies are being deployed are not stable, uniform, nor given. Furthermore, the technologies can destabilise and transform the interactions within this relationship. They have the ability to reconfigure between the local and the global, and have the ability to create both connections and boundaries (Bassoli, Brewer, Dourish, Martin, & Mainwaring, 2007; Benyon, 2014b; Dourish & Bell, 2007; Ito, Okabe, & Matsuda, 2005).

The new technologies being deployed in the urban environment thus enable urban places to be experienced in different ways. They enable new types of interactions within these places with other people, with technology and with the place itself, potentially allowing new personally significant emotional person-place relationships to be formed. What follows from this, Dourish and Bell argue, is that the goal for these new technologies should not be to simply design for settings, but for the processes which cause practice and meaning to evolve. The focus should thus be on people's experiences of and in the urban environment (Dourish & Bell, 2007).

The main points made by Dourish and Bell (2007) are still relevant today. Early work in the field of UrbanIxD focused on understanding and making these social and physical boundaries visible. For example, how technology could augment the experience of moving through the urban environment via public transport systems such as the bus (Yoo, Zimmerman, & Hirsch, 2013), train (Camacho, Foth & Rakotonirainy, 2013), or subway (Bassoli et al., 2007), by enabling individuals to explore and interact with the physical and social contexts.

Other early HCI studies of the urban environment focused on people's relationships with the social context of place, and how technology could be used to create or maintain social relationships in (semi)public urban places such as coffee shops, pubs, restaurants, parks, and squares. Lofland (1998) states that our experience of a place is based upon one's social relationships in that place. Paulos and Goodman (2004) argue that the way we perceive a place is dominated by the people we share that place with. This is especially important in public places as these are used to create and maintain social ties (Foth & Sanders, 2008). Consequently, a lot of technological applications seek to support the creation and maintenance of these social ties. People increasingly use (mobile) social networks to arrange the way they come together and interact in

public places (Humphreys, 2010). Foursquare, Facebook and Snapchat enable a person to "check in" at places so their friends can see where they are and potentially arrange a meetup (Haimson & Tang, 2017; Hsiao & Dillahunt, 2017; Lindqvist, Cranshaw, Wiese, Hong, & Zimmerman, 2011). Dating app Tinder enables exploring the social profiles of strangers living in the designated area, to get in touch and arrange a romantic meet up (Birnholtz, Shklovski, Handel, & Toch, 2015; Tyson, Perta, Haddadi, & Seto, 2016).

### 2.5.2 Focus on emotion to create a better understanding of the relationship between person, place, and technology in the urban environment.

Urban HCI studies in the 1990s and early 2000s tend to focus on a specific place (i.e., physical context) or a specific group of people (i.e., social context), and use technology to make the boundaries and characteristics of these specific places or groups of people visible. What all these early endeavours in the field of Urban Interaction Design have in common is that they address the different experiences that people have in the urban environment. In recent years, there has been an increased focus in this field on emotion and affect, to create a better understanding of people's personal, individual experience of the urban environment, and to inform how technology could play a role in augmenting people's urban lived experience (Stals, Smyth, & Mival, 2018).
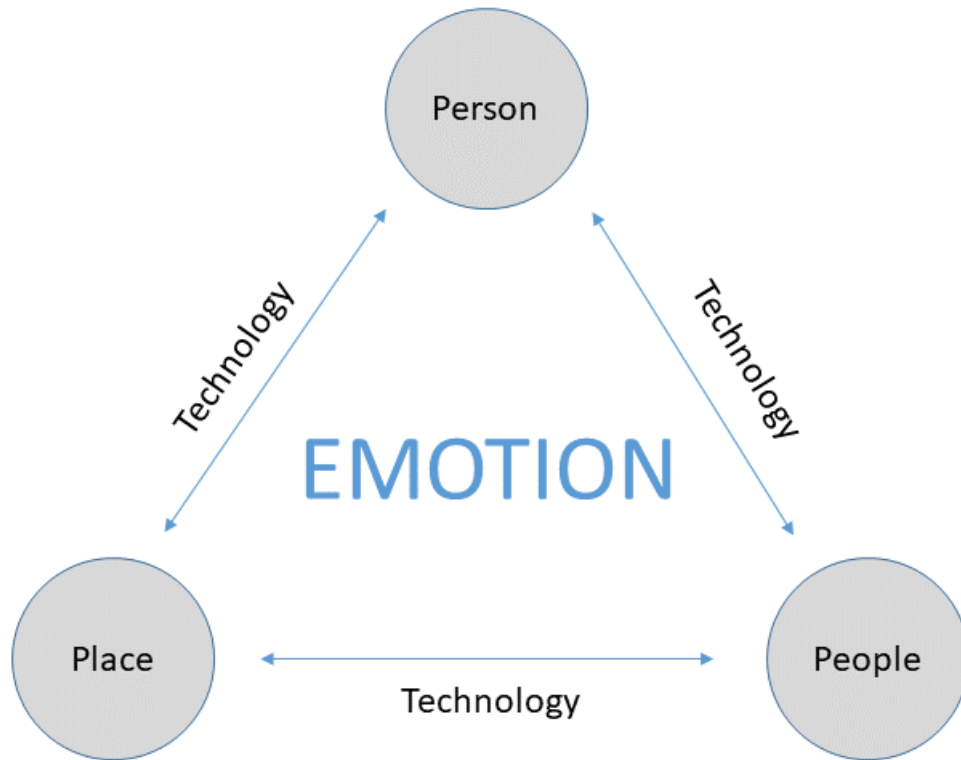
*Figure 2-7 - Focus on emotion to create a better understanding of the relationship between person, place, and technology in the urban environment*

De Lange for example, argues that emotion and affect have largely been absent in the smart city discussion. According to de Lange, the smart city needs to be more sensitive to affect, arguing that it does not appeal to the emotions and as a result insufficiently engages citizens. However, this view does not fit in the traditional smart city visions where the focus is on technology, and the people inhabiting a city are typically considered to be nodes in a network, walking sensors or consumers of services. They are not seen as active, emotional human beings with wishes, needs, and desires that can experience the urban environment in a certain way. Therefore, it has no need to be engaging for the people living in the smart city. However, this argument does point to emotion and affect as way to engage smart citizens with the hybrid city (Stals et al., 2018). In addition, affective computing points to emotion, affect and emotional intelligence as a different kind of intelligence about the world (i.e., different from a logical, rational intelligence). This could be the missing component when considering what is truly smart about cities (de Lange 2013; Picard 2000). De Lange (2013) sketches a framework for the affective smart city in which affect and emotions are given a central

role in the design of future cities. Here, smart city solutions depart from people's emotional attachment, or lack thereof, to shared, emotionally charged issues in the community. For example, air pollution, which is typically the sort of problem a traditional smart city solution would aim to address. However, these solutions ignore the fact that air pollution is not just an environmental problem, it also concerns and worries people in the community or at an individual level. It can spur people into taking action, for example by spreading sensors in their community to measure air pollution in the places that they care about (Kuznetsov et al., 2011; Kuznetsov & Paulos, 2010; Li et al., 2013; Nold, 2017). This would also provide a sense of ownership over the collected data, encouraging people to take responsibility and act upon it. It can also be seen as a way to exchange something of value with the world and other people (de Lange, 2013; Stals et al., 2017b, 2018).

The idea proposed by de Lange is that the typical problems that smart cities try to solve are also emotionally charged topics that people care about. An approach that plays into these emotions, like urban gaming, could be successful in getting citizens and other stakeholders more involved in resolving particular urban issues, and get people more engaged in the smart city discussion in general (de Lange, 2015a, 2015b). From an Urban Interaction Design perspective, this is an interesting point to make It suggests that there could be potential for technological devices and services that utilise the emotions related to places and experiences to engage smart citizens with the hybrid city and improve the wellbeing of people living there. Also in other research in the field of UrbanIxD has pointed to emotion and affect to augment and create a better understanding of the urban lived experience. Matassa and Simeoni (2014) consider smart cities as places where people and mobile and wearable technologies should cohabit in a synergic way. They point to feelings, affections and moods as the features that are currently missing to successfully define and transform a city into a hybrid (Matassa & Simeoni, 2014).

### 2.5.3   Focus on Safety

Many research projects focus on different feelings of safety in the urban environment to inform the design of mobile devices or wearable Quantified-Self technology to increase people's feelings of safety, or to inform the (re)design of urban places. One of

the first studies in Urban Interaction Design to address the emotions related to places and experiences was the familiar stranger study by Paulos and Goodman (2004). Based on the concept of the ***familiar stranger*** (i.e., an individual we regularly observe in public places but do not know and do not interact with), the study investigated people's relationships with familiar strangers and the influence of familiarity of places and strangers on people's feelings of anxiety and discomfort in public places. This informed the design of an interface for a speculative mobile phone app and a dedicated wearable device (Figure 2-8). Alongside using mobile sensors and sensors embedded in the physical urban environment (e.g., in bus stops and park benches), it can identify and quantify a person's familiarity with their current place and the people around them to reduce feelings of anxiety, stress, and discomfort. This added a personalised layer of data with information of both the physical and social dimension of each place to reduce feelings of anxiety caused by unfamiliar places and strangers in the urban environment (Paulos & Goodman, 2004).
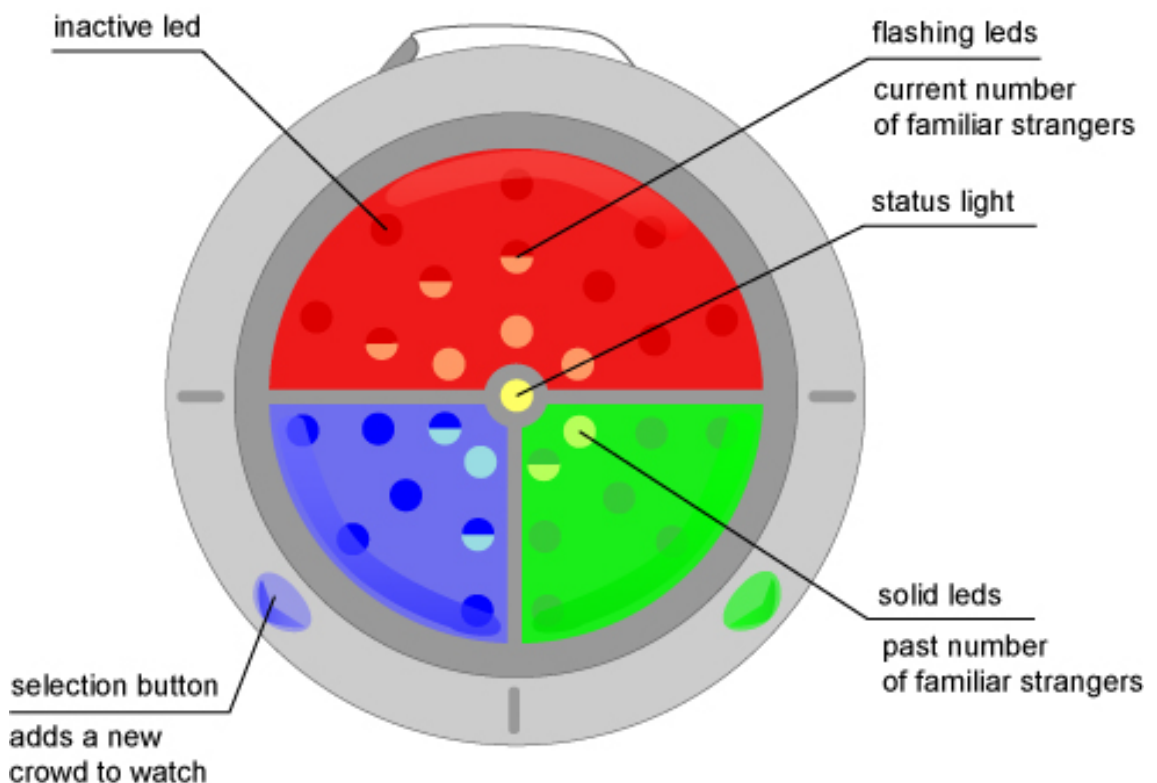


*Figure 2-8 - Design of the interface and dedicated Jabberwocky mobile device to reduce feelings of anxiety and discomfort in public places (Paulos & Goodman, 2004).*

Similar research has investigated the potential for mobile technology to help users manage their personal feelings of safety in the urban environment (Blom et al., 2010; Satchell & Foth, 2010, 2011a, 2011b). The results of these ethnographic studies indicated that men and women equally fear for their personal safety when traversing the city at night. Based on existing coping mechanisms using mobile technology, Satchell and Foth (2011a, 2011b) advocate the design of a dedicated safety device that would maintain the male macho stereotype that currently prevents men from effectively using personal safety devices in the same way women do by providing (the illusion of) social connectedness. Similarly, Blom et al. (2010) designed a mobile application for women enabling them to tag unsafe places and see where nearby friends and police stations are on a map. What is interesting about these studies is it shows that technology could be used to increase safety in the urban environment not only by ensuring physical safety, but also by reducing personal, subjectively experienced feelings of unsafety (Blom et al., 2010; Satchell & Foth, 2010, 2011a, 2011b). Interestingly, women did not use the application as expected and the researchers found no evidence of the service contributing to increased levels of feeling safe and secure. Contrary to the researchers' expectations, the application was mostly used during the day, and women used the tag system to tag places they liked, enjoyed, and where they felt comfortable. The real time map was used to see which friends were close by to facilitate social meetings. The researchers provide no further explanation of these results, but unexpected use of the technological applications and the narrow focus on negative emotional experiences of feeling unsafe in the urban environment indicate the need to create a better understanding of the emotional relationship between person, place, and technology (Blom et al., 2010).

Other projects have focused on using mobile devices and wearable Quantified-Self technology to inform urban planning and improve traffic safety by utilising aggregated arousal level data of cyclists in the city. In the Emocycling project (Nuñez et al., 2018; Zeile et al., 2015, 2016), urban planners equipped participants with wearable technology to measure physiological data in combination with a GoPro-camera and a GPS-tracker. It automatically geolocated and detected stress levels caused by danger spots in the traffic infrastructure that urban planners need to redesign (Resch et al.,

2015; Resch, Summa, Zeile, & Strube, 2016; Zeile & Resch, 2018; Zeile et al., 2015, 2016).

## 2.6 Place Attachment: Emotional Person-Place Relationships as a lens for further investigation

Research has not been limited to feelings of safety alone. In the fields of architecture and urban planning, researchers have used a mobile, wireless EEG headsets to record and analyse the emotional experience of a group of student walkers (Aspinall et al., 2015) and older, healthy walkers of 65 years or older (Neale et al., 2017; Tilley et al., 2017), in different types of urban places such as busy shopping streets, quiet urban places, and urban green spaces. Results show the restorative effects of walking in urban green spaces evidenced in real-time neural responses of these groups of walkers. This shows that the urban green spaces are mood-enhancing environments for walking or for other forms of physical or reflective activity, which could result in stress relief and lifting low moods (Aspinall et al., 2015; Neale et al., 2017; Tilley et al., 2017). Many studies have focused on specific types of places such as green spaces (Aspinall et al., 2015; Moulay, Ujang, Maulan, & Ismail, 2018) or supermarkets (El Mawass & Kanjo, 2013), specific groups of people such as women (Blom et al., 2010) or elderly people (Neale et al., 2017; Tilley et al., 2017), children (Chawla, 1992; Korpela, KyttÄ, & Hartig, 2002; ter Avest & Bakker, 2017), specific events or experiences such as nights out (Satchell & Foth, 2011b) or surviving (natural) disasters (Knez et al., 2018; Satchell & Foth, 2011a), or a specific type of emotion such as safety (Blom et al., 2010; Satchell & Foth, 2010; Zeile et al., 2016).

Other more explorative studies aim to consider the full range of emotions and experiences in the urban environment from which emotional person-place relationships develop. This includes both positive and negative experiences and emotions that people have in the urban environment on a day-to-day basis, to obtain a better understanding of the emotions and experiences related to places in the city and how technology could play a role in augmenting this urban lived experience (Stals et al., 2018). Artist and computer scientist Christian Nold (2004, 2009) investigated the full range of people's emotional relationships with places in the urban environment, by measuring their arousal levels as they walked freely through the city (Nold, 2004, 2009). Participants were equipped with a wearable GPS locator and a biometric sensor

attached to their fingers which measured their Galvanic Skin Response (i.e., sweat levels). This data was subsequently overlaid on a map of the city, showing peaks of arousal levels at certain locations along their walking route (Figure 2-9).
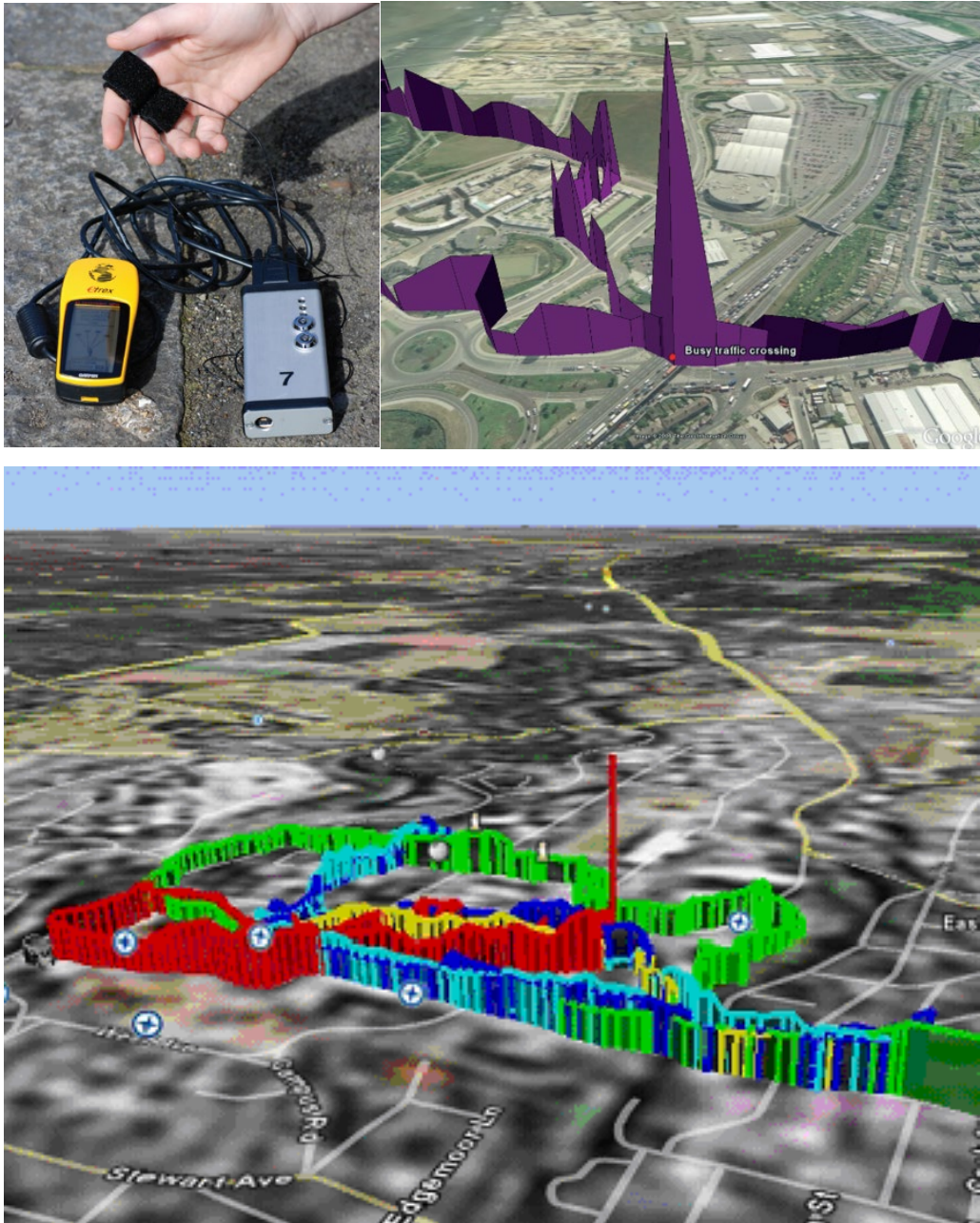


*Figure 2-9 – Top: GSR equipment, GPS locator and data logger used by Nold (2009), and individual arousal map showing a peak where the participant had to cross a busy road. Bottom: Aggregated arousal map, with each colour representing the path through the city and arousal levels of one participant (Nold, 2009).*

Each participant was asked to interpret and contextualise their own data after the walk, which were subsequently combined and visualised into what Nold called an

annotated *emotion map* of the city (Figure 2-10). These annotations indicate why peaks in arousal levels occurred (i.e., technically these maps are arousal map, as arousal levels were measured and subsequently visualised). Although some places showed peaks in arousal levels (in bright red) because of the specific environmental characteristics like traffic or architecture, these emotion maps were also filled with personal stories and memories, indicating people's strong and meaningful personal, emotional connection with certain places in the city (Nold, 2004, 2007, 2009; Stals et al., 2018).



*Figure 2-10 – Part of Nold's emotion map of San Francisco (Nold, 2009). For the full emotion map see (Nold, 2007).*

As can be seen in Figure 2-10, this part of the emotion map of San Francisco not only shows increased arousal levels evoked by characteristics of physical context of the place (e.g., "started walking up hill") or the social context of place (e.g., encountering "naked sunbathers in Dolores Park"). The emotion map also shows arousal levels evoked by people's individual, personal relationship with urban places (e.g., "Remembered Lee's birthday party") based on personal stories, memories, and

meaningful experiences. It also shows that technology can detect people's personal emotional relationships with urban places. What makes this work interesting is that it combines multiple layers of data, namely the locations of places, and the personal stories and emotions (i.e., in the form of arousal levels) related to those places. Nold was particularly interested in how new mobile, wearable, ubiquitous computing technologies could be used to collect arousal data regarding these emotional relationships with urban places, and how these multiple layers of data in the hybrid city could best be represented and visualised in emotion maps. This resulted in many different types of visually beautiful emotions maps attempting to illustrate these layers of data based on existing cartography techniques (see Figure 2-11 and Figure 2-12).
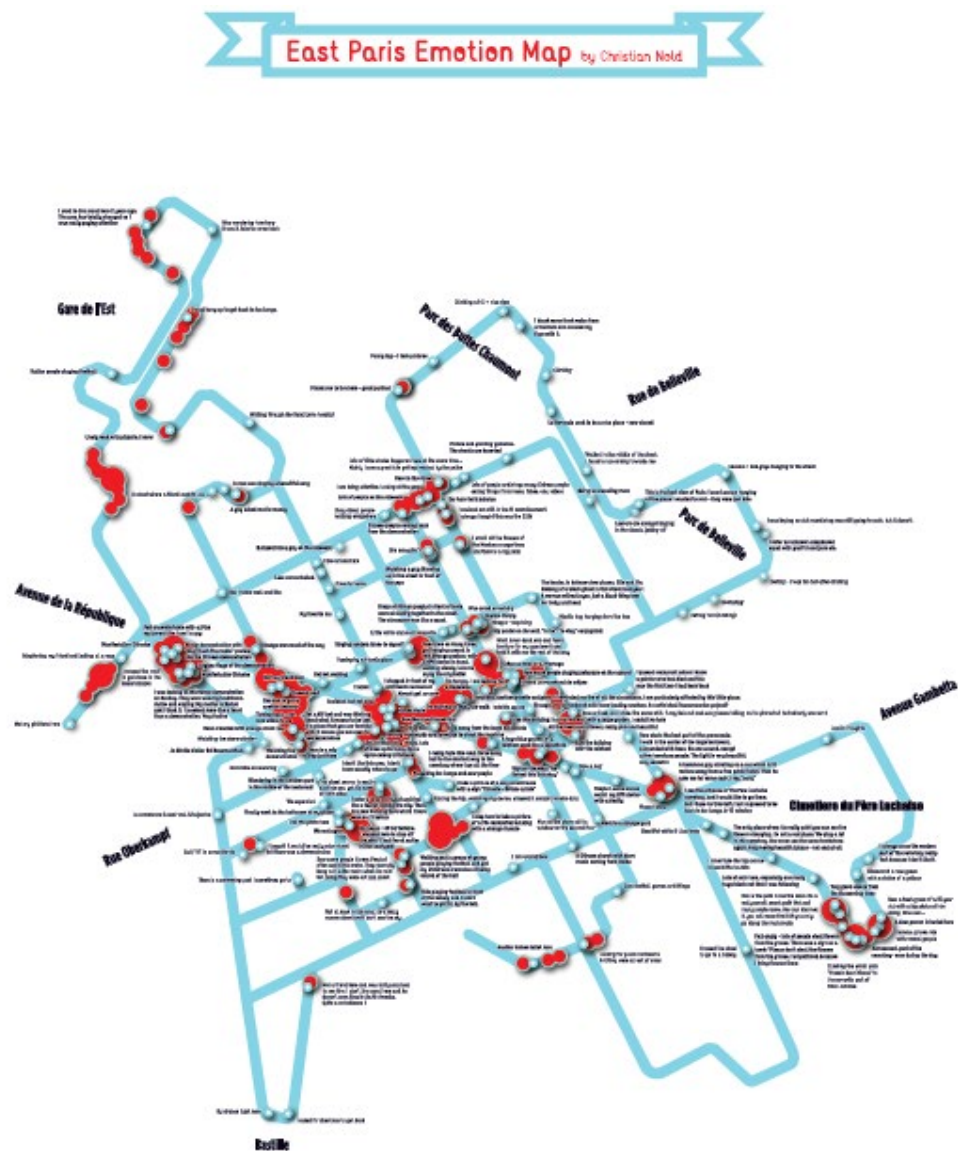


***Figure 2-11 - Paris emotion map based on the visualisation techiques used in maps for metro systems (Nold, 2008).***
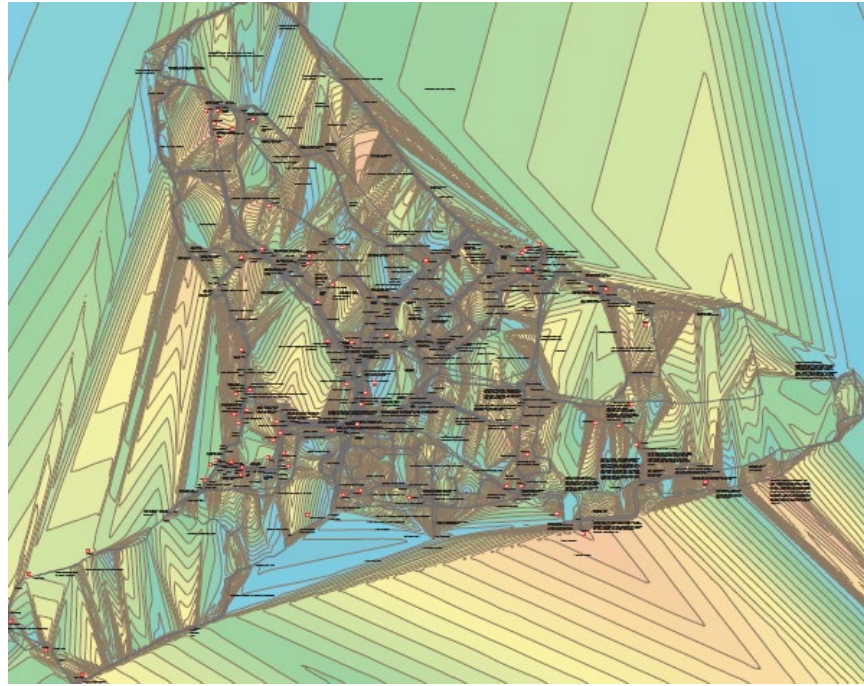
*Figure 2-12 - Greenwich emotion map based on a visualisation technique used in cartography to indicate height differences (Nold, 2006).*

Nold's focus was on experimenting with different types of visualisations for his emotion maps, but unfortunately no further analysis or categorisation of this data on emotional person-place relationships was carried out (Frodsham, 2015; Nold, 2004, 2009; Stals et al., 2018).

Inspired by Nold's work on bio-mapping (Nold, 2004) and emotional cartography (Nold, 2009) and the rise of the Quantified-Self movement (Li et al., 2013), there is an increased interest in exploring how mobile and wearable and Quantified-Self technology could be used to investigate people's emotional experiences of urban places. Also, how to represent this personal data using emotion maps to augment and create a better understanding of the urban lived experience. Emotion maps have been used to visualise stress hotspots in supermarkets (El Mawass & Kanjo, 2013), investigating how people's feelings in places are affected by environmental factors like air pollution, noise, greenery, and aesthetic beauty (Guerrache et al., 2016; MacKerron & Mourato, 2012; Quercia, O'Hare, & Cramer, 2014; Quercia, Schifanella, et al., 2014), and people's emotional feelings of different typologies of places such as restaurants, museums and stores (Mody, Willis, & Kerstein, 2009), or cafés, gardens, and supermarkets (Al-barrak, Kanjo, & Younis, 2017; Al-Husain, Kanjo, & Chamberlain,

2013; El Mawass & Kanjo, 2013; Kanjo, Al-Husain, & Chamberlain, 2015). For example, Al-Husain et al. (2013) integrated wearable biosensors with mobile phones to understand and track how people react to different urban environmental factors (e.g., noise level, illumination, and population density). They used this data to create an emotional layer over a geographical map of the city. These emotion maps could then potentially be used to recommend places to people that evoke a specific emotional experiences based on physical and social characteristics of that urban place (Al-Barrak & Kanjo, 2013; Al-barrak et al., 2017; Candeia, Figueiredo, Andrade, & Quercia, 2017).

Such data collected by mobile or wearable devices or a Quantified-Self system could potentially be used to enhance and augment a specific individual's experience of the urban environment. This can be done by complementing aggregated emotion data of multiple people gathered using a more top-down, crowdsourcing approach, with personal emotion data from a bottom-up, human-centred design approach. For example, Quercia et al. (2014) aimed to improve the experience of walking routes through the urban environment as provided by traditional route planners, by accounting for the emotional responses that the physical characteristics of places evoke in people (Quercia, O'Hare, et al., 2014; Quercia, Schifanella, et al., 2014). This was done by crowdsourcing geotagged pictures from Google Streetview and Flickr and performing (sentiment) analysis on metadata such as number of pictures in a certain area, number of views, comments, and tags. This data was subsequently used to successfully determine more quiet, beautiful, or happy walking routes in the cities of London and Boston. A future improvement proposed to such recommender systems, would be to include personalisation options that would consider an individual's personal history with a place (Quercia, Aiello, Schifanella, & Davies, 2015; Quercia, O'Hare, et al., 2014; Quercia, Schifanella, et al., 2014). This suggests that there is potential for research focusing on people's personal emotional relationship with urban places. This personal emotion data could potentially be collected using mobile or wearable Quantified-Self technology or Personal Informatics tools as proposed by Matassa and Rapp (2015), who designed and tested a low-fidelity prototype of such a system for cyclists called UMap. UMap aims to enhance an individual's remembering process by connecting personal experiences with the places in which they took place. This system in situ alerts the cyclist to their personal emotional connection with a

place. This acts as a memory trigger and a cue for reminiscing to strengthen the emotional bond between cyclists and their personally significant urban places (Matassa, 2013, 2015a; Matassa & Rapp, 2015; Matassa et al., 2013; Matassa & Simeoni, 2014; Stals et al., 2018).

However, the main goal of most of the research outlined above, appears to focus on the mapping and visualisation of urban emotion data (Resch et al., 2016), and on emotions that are currently evoked by the physical and social dimensions of the place itself. Feelings evoked by people's personal emotional bond with places in the urban environment based on personal memories and experiences are typically not taken into account (Matassa & Rapp, 2015). In fact, as Matassa (2013, 2015b) also concludes, there is a lack of academic studies in the field of Urban Interaction Design and commercial technological devices and services that address and leverage the personal connection between an individual's memories, experiences and emotions, and urban places (Matassa, 2013, 2015b; Matassa & Rapp, 2015; Stals, 2017; Stals et al., 2014; Stals, Smyth, & Mival, 2017a; Stals et al., 2018).

### 2.6.1 Definitions of Place Attachment and Place-related Concepts

In the social sciences however, research in various fields such as human- and cultural geography and environmental- and social psychology has centred on various person-place related concepts, in particular on the personal, emotional bond between a person and their meaningful places. This has resulted in a diversity of definitions, concepts and frameworks. This diversity on one hand reflects the growing interest in people-place relationships in various fields, but when it comes to the theory of people's relationships with place, it also shows we are still stuck in definitional questions and attempts to fit together various place related concepts such as place attachment, place identity, place dependence, sense of place, and place meaning (Lewicka, 2011; Manzo & Devine-Wright, 2014; Scannell & Gifford, 2010; Smith, 2015).

In this section the definitions and relationships between these related concepts of person-place relationships as used in this thesis, will be discussed. This thesis will focus on people's personal, emotional relationship with their own significant places in the city. To position it in the existing literature on place attachment, the tripartite organising framework for place attachment, as suggested by Scannell and Gifford

(2010), will be used. This ***PPP-framework*** (Scannell & Gifford, 2010) revolves around the three main dimensions of place attachment, namely Place, Person and Psychological Process. This PPP-framework was chosen because it considers classic studies of place attachment, such as the work by Relph (1976) and Tuan (1977) who provided theoretical conceptualisations and an initial understanding of place attachment as already discussed in the section 2.2. It also takes into account more recent studies of place attachment particularly relevant to this thesis, such as Gustafson's (2001a) work on the different place meanings of places that people get emotionally attached to on a personal level throughout their lifetime, and Manzo's work (2005, 2014) on the positive and negative experiences and emotions from which these emotional person-place relationships develop with range of different types of places. The PPP-framework is robust enough to incorporate all the main dimensions of place attachment identified in existing literature (i.e., person, place and psychological processes), and the many more specific definitions and frameworks of place attachment from different fields. Simultaneously, it enables researchers to situate their own domain-specific or topic-specific definitions of place attachment within the wider literature, and encourages the consideration of who is attached, what they are attached to, and how (psychologically) they are expressing and experiencing their attachment (Scannell & Gifford, 2014). Furthermore, at the time of writing, it is identified as the most up-to-date, generally accepted framework of place attachment by multiple review papers. As such is widely cited by key researchers on place attachment (e.g. Hernández et al., 2014; Lewicka, 2011b; Manzo & Devine-Wright, 2014).

***Place*** is often defined in the literature as a meaningful location (Lewicka, 2011b), where place meaning develops from people's positive and negative experiences and emotions in those places (Gustafson, 2001a; Manzo, 2005, 2014). This can result in ***place attachment***. Many definitions of place attachment exist, but the most commonly accepted definitions describe it as a multidimensional concept which characterises the emotional bonding between individuals and their important places, with emotion being the key component in this person-place relationship (Lewicka, 2011b; Low & Altman, 1992; Scannell & Gifford, 2010). ***Emotions*** are defined as affective states which are consciously experienced and have an apparent object or cause (Boehner et

al., 2007; Coyne, 2016a; de Lange, 2013; Norman, 2004; Westerink, Krans, & Ouwerkerk, 2011; Westerink, Ouwerkerk, Overbeek, Pasveer, & de Ruyter, 2008). Boehner et al. (2007) point to place as a site where emotion is the product of interaction, culturally mediated, socially constructed, and subjectively experienced, which is situated in time and location and constantly dynamically moving and changing. Emotions can be expressed voluntarily and involuntarily by communicating behavioural reactions (e.g. avoidance or approach), expressive reactions (e.g. facial or vocal), psychophysiological reactions (e.g. heart rate, galvanic skin response, brainwaves) and subjective assessments (e.g. self-reports identifying or rating emotions) (de Lange, 2013; Picard, 2000; Westerink et al., 2008).

### 2.6.2   A Theoretical Framework for Place Attachment: The PPP-Framework

The PPP-framework, shown in Figure 2-13, proposes a three-dimensional framework of place attachment that structures the variety of definitions in literature on place attachment and highlights and structures the three dimensions of the concept (person, place, and process) that are involved in the bonding between a person and a place.
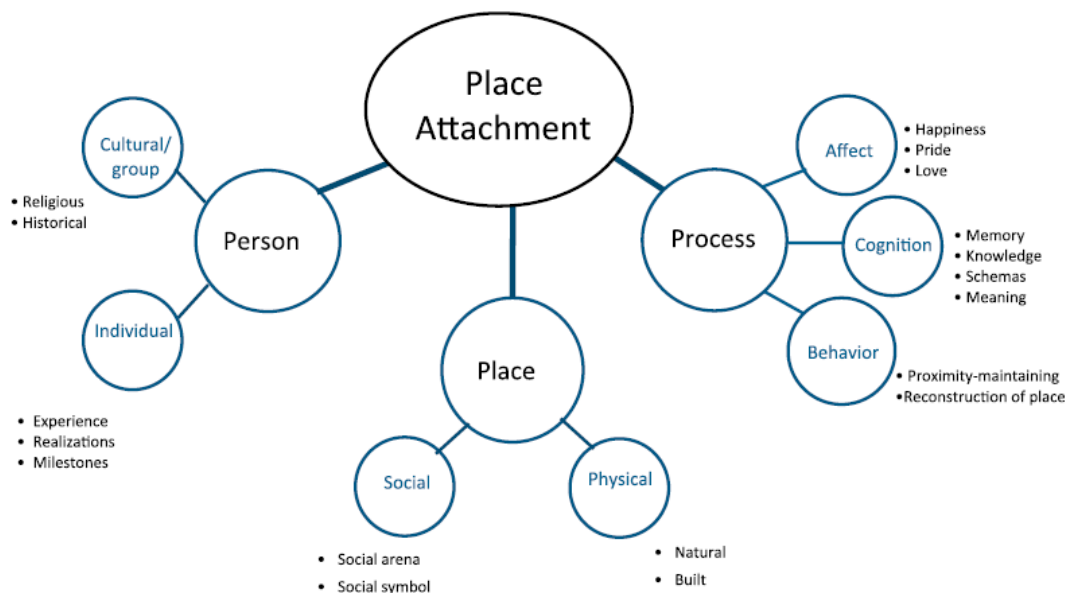


*Figure 2-13- Theoretical PPP-framework of place attachment (Scannell & Gifford, 2010).*

It describes place attachment as an emotional bond or relationship between an individual or a group, and a place. This place can vary in terms of spatial level, degree of specificity and the social and physical characteristics of the place. Place attachment

is expressed and experienced through affective, cognitive, and behavioural psychological processes (Lewicka, 2011b; Manzo & Devine-Wright, 2014; Scannell & Gifford, 2010, 2014).

Shumaker and Taylor (1983) were the first to provide a definition for place attachment as "a positive affective bond or association between individuals and their residential environment" (Shumaker & Taylor, 1983, p.233). The names and definitions for the term have accumulated since and the multitude of operationalisations in quantitative and qualitative research of this construct give it a slightly different theoretical meaning every time. However, researchers nowadays define place attachment as a multidimensional concept that characterises the emotional relationship between individuals and their important places, and they identify emotion or affect as the key component of place attachment (Low & Altman, 1992; Giuliani, 2003; Scannell & Gifford, 2010, 2014; Lewicka, 2011, Shumaker & Taylor, 1983).

**The Person-dimension of the PPP-framework**

The Person-dimension is concerned with who is attached to a place, and the differences in levels of attachment and experiences of place that can occur between people, similar to Relph's seven stages of insideness and outsideness (Relph, 1976; Lewicka, 2011). Place attachment can occur at an individual level and be based on individual meanings (e.g., personal experiences), and at a group level based on collective meanings (e.g., cultural or religious meanings), or both. Place attachment is found to be stronger in places that evoke personal memories (Gustafson, 2001a; Lewicka, 2011b; Manzo, 2003, 2005, 2014; Manzo & Devine-Wright, 2014; Scannell & Gifford, 2010; Sixsmith, 1986; Twigger-Ross & Uzzell, 1996). Place becomes meaningful from personally important experiences like memorable events, milestones and realisations in a person's life. For example the place where a person met their partner (Manzo, 2005), and which can be strongly connected to the person's life journey or life path (Gustafson, 2001a). So, it is not just the places themselves that are significant, but what Manzo (2005) calls the "experiences-in-place" which make a place personally meaningful (see Section 2.6.4). These individual experiences form the basis for a person's attachment to a place and the creation of meaningful places in a person's life, which contribute to a stable sense of self-identity. These studies focus on a person's

individual attachment to their own personally significant places, and will be discussed in more detail in the remainder of this section and in Section 2.6.4 (Gustafson, 2001a; Manzo, 2005; Manzo & Devine-Wright, 2014; Scannell & Gifford, 2010; Twigger-Ross & Uzzell, 1996).

At the group level, people can become attached to places that have a shared (often symbolic) meaning to members of a particular group. This can be based on religion, culture, history, or socio-political aspects and can be passed on from generation to generation. For example, Jerusalem is a holy city for Jews, Christians and Muslims. In a similar way, culture links members to a place through shared historical experiences, values, and symbols (Lewicka, 2011b; Mazumdar & Mazumdar, 2004; Scannell & Gifford, 2010). People can also become attached to a place based on their socio-demographic and socio-political aspects like sex, age, race, and sexual orientation. Women, for example, are more attached to places in general than men, and place attachment in general increases with age (Hidalgo & Hernandez, 2001; Manzo, 2005; Scannell & Gifford, 2010, 2014).

**The Place-dimension of the PPP-framework**

What is it about a place that a person (or a group of people) is attached to? This dimension deals with the nature of the place that a person connects with and what the attachment is to. The key aspect of place is that it has a social and a physical dimension, which both play a role in the experience of and overall attachment to a place, and in making the place meaningful (Hidalgo & Hernandez, 2001; Lewicka, 2011b; Scannell & Gifford, 2010; Shumaker & Taylor, 1983).

The types of places that a person can form a relationship with can take a broad range of physical settings. . Places can be natural non-residential environments like forests, lakes and parks or built urban environments, and have different scales and spatial levels (e.g. a house, neighbourhood, city, country, or the world) and have different environmental and temporal conditions depending on weather, season, and time of day (Gustafson, 2001a). Also, the level of specificity is important when it comes to attachment to the physical dimension of place. People who are more attached to a specific place, for example Edinburgh Castle, than a specific class of places, such as historic buildings, are less willing to substitute their place for another. On the other

hand, people who are more attached to a class of places are more likely to have visited other historic buildings (Williams et al., 2002; Scannell & Gifford, 2010).

The physical characteristics of a place can also provide resources or functionality to support a person's goals or intended use. In this case, people become attached because they value the specific activities that the physical characteristics of the place facilitate (i.e., **place dependence** or **functional place attachment**), and the relationship is built upon successful goal pursuit (Raymond, Brown & Weber, 2010; Stokols & Shumaker, 1981). Place attachment to physical characteristics can occur in a whole range of physical settings, for example streets and buildings in the urban environment as well as natural environments such as lakes, parks, woods, and mountains (Manzo, 2003, 2005). These physical characteristics can contribute to what Relph (1976) called the **identity of place** and is also closely related to Twigger-Ross and Uzzell's (1996) concept of place identity, as well as what Gustafson (2001a) calls place-related self-identity. Specific physical characteristics of a place, such as the Eiffel Tower in Paris or Edinburgh Castle in Edinburgh, can provide a distinctiveness from other places to which people can get attached, called physical place attachment or physical rootedness (Relph, 1976; Scannell & Gifford, 2010; Twigger-Ross & Uzzell, 1996).

A city is not just a structured physical environment filled with buildings, streets, and squares. These places are inhabited by people and therefore a lot of social interactions take place in them. People use places to create and maintain social ties. This can be with family members in the home, neighbours in the neighbourhood, with friends in the pub or even with strangers in (semi) public places like the street or in the park. Our perception of a place is dominated by the people we share those places with (Paulos & Goodman, 2004). And our experience of a place is based upon our social relationships within it (Lofland, 1998). People are attached to places that facilitate social relationships and group identity. Social place attachment or "bondedness" thus consists of social ties, belongingness to the neighbourhood, and familiarity with fellow residents. It is sometimes compared to community, which is defined as "a complex system of friendship and kinship networks and formal and informal associational ties rooted in family life and on-going social processes" (Scannell & Gifford, 2010, p.4). If the social place attachment with the place where one lives weak, it can lead to an

experience of place that Relph (1976) described as (existential) outsideness (i.e., alienation).

Both the physical and the social dimension of place contribute to the overall emotional relationship between a person and a place (Hidalgo & Hernandez, 2001). If the physical or social features of a place are more important for the overall bonding with a place, depends on the type of the place (urban, natural, etc.), the level of spatiality of the place that is under investigation (house, neighbourhood, city, country, etc.), and the type of participants under investigation (e.g. locals or visitors, gender, age groups) (Hidalgo & Hernandez, 2001; Lewicka, 2011b; Scannell & Gifford, 2010). Most of the research and literature on place attachment is quantitative, meaning it focuses on measuring the strength of people's relationship to a variety of places. It focuses on the spatial level of the neighbourhood, but people living in a city are more attached to the house and the city in comparison (Gustafson, 2001a; Hidalgo & Hernandez, 2001; Lewicka, 2011; Scannell & Gifford, 2010). Qualitative research into place attachment, however, aims to provide insight into the different meaning of places for people, and why places become personally meaningful (Gustafson, 2001a; Stedman, 2003; Lewicka, 2011). This will be discussed in more detail in the next section.

**The Psychological Process Dimension of the PPP-framework**

Little is known about the processes through which people become attached to places beyond certain socio-demographic or environmental predictors (Lewicka, 2011b). Time spent has consistently been found as the best predictor of place attachment. Building size (e.g., high rises) is a negative predictor of place attachment, and home ownership is a positive predictor. But having predictors of place attachment is not the same as understanding the processes leading to place attachment (Lewicka, 2011b). The psychological process dimension of the PPP-framework describes the processes that contribute to individuals and groups creating a relationship with a place, and the nature of the psychological interactions that occur in the places that are important to them. The three psychological processes of place through which place attachment is expressed and experienced are affect, cognition and behaviour. Together they form what is referred to in the literature as a ***sense of place*** (Figure 2-14) (Jorgensen &

Stedman, 2001; Scannell & Gifford, 2010). It encompasses other place-related concepts such as meaning of place, place dependence, and place identity.
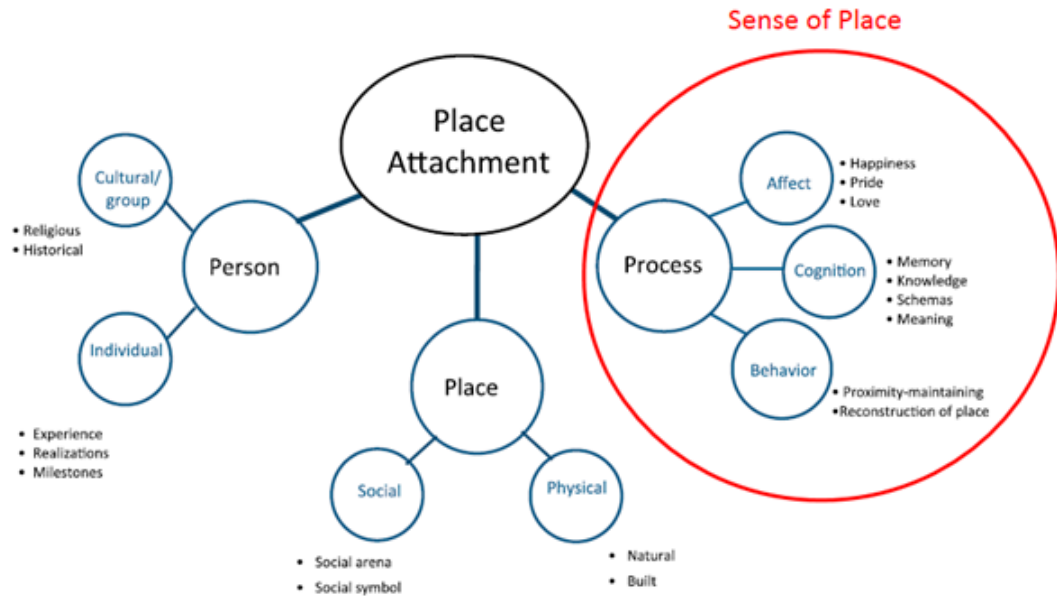


*Figure 2-14 - Sense of Place in the PPP-framework (Scannell & Gifford, 2010).*

Cognition component: Memory, Knowledge, Schemas, and Meaning

The relationship between a person and a place includes a cognitive component. People can create a place meaning through their own memories of past experiences in places and connect it to their personal identity, as well as having different types of knowledge or beliefs about a place (for example cultural or navigational knowledge or place affordances) which make a place meaningful. For example, Lynch's work focuses on the cognitive level of place attachment, with local people's knowledge and mental maps about the urban environment enabling them to navigate city (Imbe et al., 2010; Lynch, 1960)

For people's own personal memories and experience, place attachment can either be related to the specific place where that memory or experience occurred or result in a place attachment to a specific category or type of place. For example, when a person has a personally significant experience in a harbour, this can result in the person forming a personal, emotional relationship with that specific harbour. However, it can also result in that person becoming emotionally attached to harbours in general. A

favourite place may be a kind of place schema of place-related knowledge and beliefs that represent the special character of a place and a person's personal connection to it. This is called ***generic place dependence*** (Scannell & Gifford, 2010, 2014).

Related to this, Proshansky et al. (1983) coined the term ***place identity***, a term also used by Twigger-Ross and Uzzell (1996) to describe a person's self-definitions that are derived from a relationship with a personally meaningful place. It describes how a special, distinctive characteristic of the physical or social dimension of place, and the person's relationship with that personally meaningful place, can play a role in representing who that person is on a personal level and how people define themselves as a person (i.e., personal identity) (Lewicka, 2011b; Scannell & Gifford, 2010; Trąbka, 2019; Twigger-Ross & Uzzell, 1996; Ujang & Zakariya, 2015).

<u>Behavioural component: Intentions & Commitment</u>

At the behavioural level, person's attachment to a place is expressed through their actions. A typical behaviour instance of this is proximity-maintaining behaviour, which is mainly characterized by a person staying physically close to this place. However, this does not mean a person has to stay close to this place all the time, but can be expressed through travelling there (e.g. Muslims undertaking a pilgrimage to Mecca) or repeatedly visiting (Hidalgo & Hernandez, 2001; Whyte, 1980). Other behaviours that express a person's connection to a place is intending and committing to the physical reconstruction of a place, e.g. after a disaster has destroyed it. This is often driven by feelings of nostalgia and for a desire to restore place meaning (Bonaiuto, Alves, De Dominicis, & Petruccelli, 2016; Ujang & Zakariya, 2015; Zheng, Zhang, Guo, Zhang, & Qian, 2019). Another form of behaviour occurs when people are forced to move from a building or neighbourhood, and then attempt to preserve their emotional bond to the original place by moving to a similar building or neighbourhood (i.e., place dependence) (Scannell & Gifford, 2010). Territorial-like behaviour is another form, and this typically occurs in (semi) public places like parks, pubs, and sacred places. This can be expressed by marking, personalisation, territorial defence, social support, place restoration and stewardship (Lewicka, 2011b; Scannell & Gifford, 2010, 2014).

<u>Affect component: Key component of the person-place relationship</u>

Throughout the literature, affect and emotion are identified as the key components of place attachment (Giuliani, 2003; Gustafson, 2001a; Hidalgo & Hernandez, 2001; Lewicka, 2011b; Low & Altman, 1992; Manzo, 2005; Manzo & Devine-Wright, 2014; Relph, 1976; Scannell & Gifford, 2017, 2010, 2014; Shumaker & Taylor, 1983; Tuan, 1974, 1977). Tuan (1974, 1977) called this "topophilia" which means "love of place" and Relph (1976) defined place attachment as an authentic and emotional bond with an environment that satisfies a fundamental human need. Further evidence of the fact that emotion plays a key role in people's personal relationship with a place comes from studies of disruption and displacement (Devine-Wright & Howes, 2010; Fried, 1963; Manzo, 2014). Fried (1963) conducted a study on displacement of people in Boston who were forced to move from their neighbourhood by urban planners who wanted to redesign and improve the neighbourhood. This caused residents to lose familiar structures and social settings. They mourned the loss of their personally significant places and even showed symptoms of grief similar to the death of a loved one (Fried, 1963). Traditionally, place attachment is defined in terms of positive emotions, namely in the desire to maintain close to a place in an attempt to experience the positive emotions that a place may evoke (Giuliani, 2003). This is why Gustafson (2001a) prefers to use the broader term of ***place meaning***, to acknowledge the fact that relationships with personally significant places do not necessarily need to be positive but can also be negative (Gustafson, 2001a). This is supported by Manzo (2003, 2005, 2014), who showed that personal, emotional relationships with a place can develop from a whole range of emotions and experiences, which can be positive, ambivalent, or negative. This has provided further evidence that the affective component of a person's relationship with a personally meaningful place does not necessarily need to be positive. This will be discussed in more detail in Section 2.6.4.

Now that all the dimensions of the PPP-framework have been discussed, this thesis can be positioned in the existing literature on place attachment. This review identified a gap in the literature in academic studies as well as commercial applications which address and leverage a person's individual, emotional relationship with their personally meaningful places. Most of the work in Urban Interaction Design to date

has focused on the social and physical dimensions of place, and the emotions those dimensions evoke in groups of people.  An individual person's affective relationship with their own personally significant places has been researched less, even though those are the places that a person has the strongest emotional relationships with (Gustafson, 2001a; Manzo, 2005; Scannell & Gifford, 2010). Thus, this thesis will focus on the individual person dimension, the full dimension of place (i.e., the social and the physical dimension), with a particular focus on the affective component of the psychological process dimension (Figure 2-15).
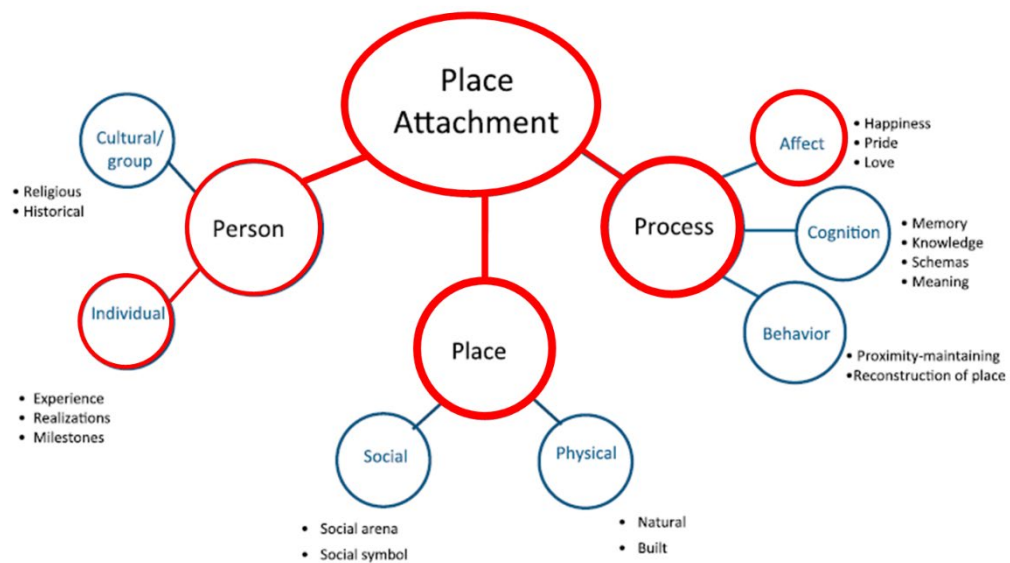


***Figure 2-15 - Positioning of this PhD thesis in the theoretical PPP-framework of place attachment (Scannell & Gifford, 2010).***

These personally meaningful places form a web of emotional person-place relationships over the city, describing the nature of one's relationship with places in the urban environment, and shaping a person's individual experience of the city. This tapestry is unique for each individual, and will be discussed in more detail in the upcoming sections (Manzo, 2005, 2014; Scannell & Gifford, 2010, 2014).

### 2.6.3   An Analytical Framework of Place Attachment: The Self-Others-Environment Framework

Gustafson (2001a) has suggested an analytical framework of place attachment, to create an understanding of what makes personally significant places meaningful, looking at places at various scales of spatiality. That is, what the different positive and

negative meanings are related to places that people are attached to on an individual level. It also identified a number of underlying dimensions of place meaning which emerged from this analysis, describing how the attribution of meaning occurred. What makes this framework particularly relevant, is that it, unlike earlier research, it does not focus on a specific type of place such as the home, neighbourhood, or the workplace, but advocates a more holistic approach towards meanings of place. It investigates all places that participants considered meaningful on a personal, individual level throughout their entire lifetime, and provides a systematic framework for the analysis of place attachment to a whole range of places.

This exploratory, semi-structured interview study was conducted with 14 participants living in Sweden, with ages ranging from 18 to 71 years. They were asked questions about places that had been important throughout their lifetime, and to indicate their level of attachment to places on five different spatial levels (i.e., their community/village, their city, their county, their country Sweden, and their continent Europe). Based on the three-part division by Sixsmith (1986) of Personal, Social, and Physical experiential modes of the home, the analysis of the interviews resulted in a three-polar triangular model consisting of the Self, Others and Environment for understanding place. The subjective meanings that participants' attributed to personally significant places can be mapped onto this (Gustafson, 2001a). An important difference between the two models though, is that Gustafson acknowledges that meanings of personally significant places do not unambiguously belong to one of these categories, but can be mapped in between those three poles, as can be seen in Figure 2-16 below.
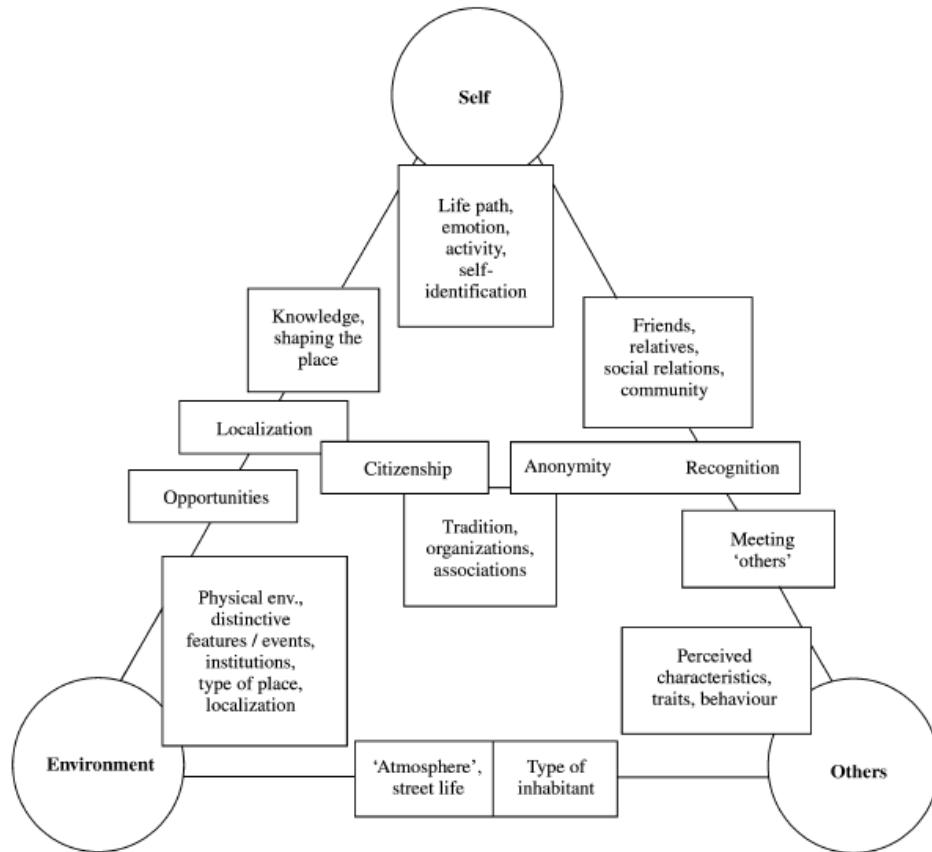
*Figure 2-16 - Gustafson's analytical framework of place attachment, showing the personal meanings of place spontaneously attributed by participants (Gustafson, 2001a).*

The Self pole reflects places that often have highly personal meanings, which are typically expressed in terms of personal experiences and memories. Often these are related to the life path of the individual, such as places where they have lived which are associated with their roots (i.e., self-identification), and places that played an important role during certain stages of a person's life such as childhood, adolescence and parenthood. This is similar to the individual person dimension in the PPP-framework. Similar to Sixsmith (1986), Gustafson (2001a) identifies and classifies emotion as a theme of meaning around the Self-pole, further indicating it is a key component in the relationship with places that are meaningful on a personal level. According to the PPP-framework, emotion is indeed a process through which a place can acquire personal meaning to form an emotional bond with a place, but like Sixsmith, Gustafson appears to limit this to the home or place of residence, which participants associated with feelings of security and a sense of home.

At the Others-pole characterizes the characteristics of other people in the place. A distinction is made between strangers that a person has no social relationships with (i.e., others), and people that a person has social relationships with. The Self-Others dimension describes a category of place meanings that stem from the social relationship between a person and other people living in a place. These places become personally meaningful because friends or relatives are living there, or the sense of community between people living in close proximity of each other such as neighbours.

The Environment pole describes a large number of place meanings that meanings stem from characteristics of the physical environment itself, including different types of built environments and natural environments. This is similar to the physical place dimension in the PPP-framework. Distinctive features or events in this category are not limited to characteristics of the physical environment itself such as architecture and weather conditions and seasons. It may also be associated with a place through the historical or symbolic significance of a place, especially in relation to entire countries being mentioned as personally meaningful places. On a city level however, places in cities or entire cities are identified as being a certain type of place, such as industrial.

This three-pole model provides a useful initial analytical model for mapping and understanding the different meanings that participants spontaneously attributed to all kinds of personally significant places, and indicating how the attachment is related to the self, the (physical) environment, or to other people in the in the place. However, Gustafson does identify some other limitations of his study. Not all the places mean the same to everybody, meaning that not all participants attribute the same meanings to the same places. Neither does the model imply that all places or types of places have the same meanings. What this model tries to do, is capture this variation in people and places in the attributed meanings of place. Given the limited number of interviews conducted (i.e., the paper mentions 17 interviewees, but not the number of places or person-place relationships mentioned by those interviewees), the range of meanings in the model is not exhaustive. Furthermore, the position of the categories of meanings in the three-pole model are not exact or fixed. Their position reflects their analytic relationship to each other, and no other type of scale or quantitative measure (Gustafson, 2001a).

A strong aspect of the model is that it takes into account all the places that participants subjectively consider meaningful to them personally or have considered meaningful at some point during their life, including in their past, current situation and potentially their future. Gustafson also specifically looked at the scale of meaningful places that people identified, and found that self-related meanings (i.e., associated with the Self pole or the Self-Others relationship or the Self-Environment relationship) are typically attributed to places that are at the scale of the residence, neighbourhood, village, town or city. On the other hand, places of a larger scale such as regions, nations and continents typically have meanings attributed which are more associated with the Environment pole, Others pole, or the Environment-Others relationship. That is, places of different spatial scales may be attributed with different meanings, and places within a city up to the scale of city level are typically considered more personally significant (Gustafson, 2001a). This suggests that looking at personally significant places at a city level would be suitable lens for further investigation.

During the second step of Gustafson's two-step analysis, several underlying dimensions of place meaning were identified that indicate how and why those meanings are attributed to places, namely distinction, valuation, continuity and change. These underlying dimensions cannot easily be mapped in the triangular Self-Others-Environment model as they organise the attribution of meaning in more basic way and are often not explicitly, consciously, or reflectively mentioned by participants, but rather implicitly emerged during the interviews. Distinction means that a personally meaningful place is an identifiable, distinguishable, unit which is defined in terms of similarities and differences in comparison to other places, and its unique qualities. Valuation is the personal, subjective value that a person puts on the underlying distinction of the place. This valuation can be positive or negative, strong or weak, and may influence the level of personal involvement a person has in a place. Continuity is an important aspect of the personal meanings of place on all three poles. It involves a temporal dimension which is often connected to and explicitly present in the life path of a person (i.e., the Self-pole), continuity of history and cultural traditions (i.e., Environment pole) and the continuity of place-bound social relationships (i.e., Others pole). Strongly related to the theme of continuity, is the theme of change, which also has a temporal dimension. Places can get new meanings because of

external events or developments or through conscious and deliberate effort of people themselves. Giving places meaning does not happen just once, and once a place has been given meaning, the place meaning is not set in stone. It is an ongoing process and people can play an active role in this process of meaning making, for example by emotionally investing in a place  (Hummon, 1992; Scannell & Gifford, 2010). This could be done by creating and maintaining social relationships their neighbourhood by visiting neighbours, which can result in a feeling of bondedness with the community (i.e., affective process related to the social dimension of place in the PPP-framework), by acquiring knowledge about a place (i.e., cognitive processes in the PPP-framework), or by physically (re)shaping the place through personal, collective, or community projects (a behavioural processes in the PPP-framework). These personal meanings can impose restrictions, conflict with other people's personal meanings or with collective meanings, or with long-held cultural, symbolic, or historical meanings. But each meaning of place can have the power to alter, modify or change the existing place meanings over time on all of these levels (Gustafson, 2001a; Scannell & Gifford, 2010). All these underlying dimensions are encompassed in the processes of place attachment-dimension as identified in the PPP-framework by Scannell and Gifford (2010), and focus on place experiences. This offers a more nuanced and detailed approach to understanding emotional person-place relationships to a range of different places, and developing from a host of different experiences and emotions (Manzo, 2005, 2014), which will be discussed in more detail in the next section.

### 2.6.4  Experience-In-Place

In the previous section, emotional person-place relationships between an individual person and all their personally meaningful places throughout their lifetime has been discussed. But as both Gustafson (2001a) and Manzo (2005, 2014) point out, more research is needed to better understand the full range of places with which people develop emotional person-place relationships and how those relationships are formed. Where Gustafson (2001a) focuses on the range and different types of place meanings attributed to personally significant places (i.e., positive and negative emotional person-place relationships), there is a need to understand the full spectrum of experiences and emotions people have in personally meaningful places from which those place attachment develops, if we are to reach a better understanding of emotional person-

place relationship to places in the urban environment (Manzo, 2003, 2005, 2014; Manzo & Devine-Wright, 2014; Moulay et al., 2018; Scannell & Gifford, 2014, 2017). In this section, the array of positive and negative experiences and emotions from which these emotional person-place relationships can develop, will be discussed.

Manzo (2005) interviewed 40 participants living in the New York metropolitan area on personally significant places in general (i.e., experiences of personally significant places), places of residence that they liked or disliked (i.e., experience of residence), and personally significant places which that evoke strong memories (i.e., past experiences). Findings demonstrated a richness and complexity of people's personal relationships to a variety of places, as participants were allowed to pick their own places that they considered to be personally meaningful.

In line with findings by Gustafson (2001a), Manzo (2005) found that on the physical dimension of place, this led to a wide variety of different types of places that are considered to be personally meaningful. These personally meaningful places differ in spatial level, environmental conditions, and can be in the private, semi-public, or public realm. In particular, Manzo (2005) found that personally meaningful places are not organised around their house or neighbourhood, which account for only 29% of all personally meaningful places. This indicates that the focus on the home or the neighbourhood commonly found in research on emotional people-place relationships might be too narrow. In fact, people can have a multitude of geographically scattered places across the city, that form a web of meaning in people's lives (Manzo, 2003, 2005, 2014). In general, these places are not extraordinary in the sense that they are famous or of an award-winning design. They are ordinary, mundane (semi-)public places that are routinely experienced and encountered in everyday life (Gustafson, 2001b; Lewicka, 2011b; Manzo, 2005; Scannell & Gifford, 2010).

Participants also described a broad range of emotions related to places, which are strongly related to the experiences that participants had of these places. This included extreme positive emotions reported by 55% of the participants, like deep love for a place (so much that participants wanted their ashes scattered their after they died). However, 33% of the participants reported strong negative emotions reported related to a personally meaningful place, such as feelings of fear or hatred to the point that

the place could make the participant feel physically ill, for example in a place where they had been abused (Manzo, 2005, 2014). Not all places were described in such strong emotional terms though. Places that did not evoke personal memories or did not have a strong connection to the self, were described in less empathic ways such as "a nice place to be" or "I like it", which Chawla (1992) calls "affectionate identification". This appears to occur if the place attachment stems more from the social or physical dimensions of place (Gustafson, 2001a). This is in line with what Relph (1976) had already argued, namely that the relationship to places does not have to be strong nor positive. In fact, most participants (72%) also talked about negative emotions and experiences related to their own personally significant place. Negative experiences-in-place that created meaning to a place typically had to do with negative interpersonal conflicts, like for example breaking up with your partner in the park, leading to that park being personally significant to a person, based on a negative experience (Manzo, 2005).

What emerges from these personal stories of personally meaningful experiences and the variety of places and emotions related to those experiences, is that emotions about places cannot be disconnected from a person's experiences in them. It can be concluded that in particular when it comes to place attachment on the individual, personal level, it are not so much the places (i.e., physical locations) that are important, but what Manzo (2005) calls ***experience-in-place***. That is, it is the combination of personally meaningful experience and emotions that a person has in a place, that create place meaning. It is from the experience-in-place and emotions that the emotional relationship between a person and a personally meaningful place develops (i.e., place attachment) (Manzo, 2005, 2014; Scannell & Gifford, 2010, 2014). So rather than attempting to develop a classification of different types of physical places or physical settings, the focus of the analysis should be on these personally significant experiences and emotions in places that can make a place personally meaningful (Manzo, 2005, 2014). This line with the overall human-centred focus of Urban Interaction Design on importance of people's experiences in the urban environment, and in particular with Dourish and Bell's (2007) and McCullough's focus on situated interactions (McCullough, 2001, 2004, 2013). It attempts to shift the focus

away from place and technology, and towards the experiences and interactions that a person has in these places through which meaning and context develop.

Taking emotional experience-in-place as the unit of analysis, an initial categorisation of different types of experience-in-place is identified. It consists of the experience-in-place of evolving identity and personal growth, the experience-in-place of memories, and the experience-in-place of safety, threat, exclusion and belonging. The experience-in-place of evolving identity and personal growth, are experiences that places offer for reflection, introspection, self-understanding, and personal growth, or because significant life events occurred in these places (e.g. the beginning or ending of a romantic relationship). Like Gustafson (2001a), Manzo (2003, 2005, 2014) found that the places selected as personally meaningful are linked to important life issues such as love, loss, identity, different types of abuse, death, sexuality and other issues related to interpersonal relationships. Although these experiences were not always dramatic or unusual or uncommon, they did have a big impact on the individual participant. This type of experience-in-place is mainly experienced at the individual level, and would typically be grouped around the individual person dimension of place in the PPP-framework (Scannell & Gifford, 2010), or the Self-pole of Gustafson's framework (Gustafson, 2001a). If a place becomes significant because important life events occurred there, the place itself becomes a marker of that milestone in a person's life journey (Gustafson, 2001a; Manzo, 2005, 2014).

In the experience-in-place of memories, places act as memory cues that trigger memories of people, places, events, emotions and experiences which are the building blocks of participants' lives. In fact, as study on spontaneous reminiscing found that after physical mementos, places provide the strongest memory cues for personal memories, even before activities and other people (van Gennip, van den Hoven, & Markopoulos, 2015). Through places, people can make connections and comparisons between a whole collection of emotions and experiences in the present and in the past. Certain experiences that make places memorable, act as psychological or emotional bridges to the past. In this case, the experience of new places can be linked to the experience of past places, events and people, which helps to create and maintain a sense of continuity and wholeness in people's lives (i.e., a stable sense of

the self or (self-)identity) by knowing that past, present and future are linked and related (Gustafson, 2001a; Manzo, 2005; Scannell & Gifford, 2010; Twigger-Ross & Uzzell, 1996; van Gennip et al., 2015).

The experience-in-place of safety, threat, exclusion and belonging is found to be important as all participants described at least one place that was important to them because it provided them with sense of belonging. However, this is particularly important for socially marginalised or potentially vulnerable groups (i.e., ethnic minorities, women, and the LGBTQ+ community) (Manzo, 2005). In the study, which was conducted in the United States, it was concluded that the feelings of belonging are not based on a person's individual identity, but their social-political identity. Places were people feel excluded are usually typically public places where social boundaries have been created (e.g., women or gay people who do not feeling comfortable in particular clubs or neighbourhoods), leading to a place experience of "outsideness". These aspects are also strongly related to the social dimension of place, that is the people around you in that place and one's social connections in that place. (Manzo, 2005; Hidalgo & Hernandez, 2001; Scannell & Gifford, 2010; Relph, 1976). This is also highlighted by many studies in Urban Interaction Design which focus on technological interventions aimed at creating increased feelings of personal safety mediated by technology in these places in the urban environment (see section 2.5.3) (e.g. Blom et al., 2010; Satchell & Foth, 2010, 2011b).

In line with findings by Gustafson (2001a), Manzo (2005, 2014) concludes that negative experiences-in-place and emotions can also lead to the development of emotional person-place relationship with a personally significant place, in particular with respect to the home. For some participants (25%) negative experiences in their current or previous homes (e.g., divorce of parents, moving house often, house in a bad neighbourhood) has resulted in a negative emotional person-place relationship, and a conscious decision to disconnect from that place. Where proximity-maintaining behaviour is typically observed in people's positive relationship with places (Scannell & Gifford, 2010), Manzo (2005, 2014) found that negative experiences of places can result in place avoidance behaviour. It shows that places can become personally

meaningful through positive and negative experience-in-place and emotions (Gustafson, 2001a; Manzo, 2005, 2014; Manzo & Devine-Wright, 2014).

Where Scannell and Gifford (2010) focussed on psychological processes through which place attachment can be expressed and experienced (i.e., affect, cognition, behaviour), Manzo identifies two ways through which places can develop meanings through emotional experience-in-place. A place can develop meaning to a person because of one significant experience or event that took place in that place, which could be called a pivotal moments or flashpoint moment. In this case, the individual experience in a place is so personally significant that the place in which the experience takes place gains its own meaning (Lewicka, 2011; Manzo, 2005).  Alternatively, many places develop meaning over time through the accumulation of everyday experiences in them (Tuan, 1977). Repeated use of places that are a part of a person's everyday life, enable people to have a variety of experiences in those places. This adds many layers of meaning to those places as people collect experiences in them over a period of time (Lewicka, 2011b; Manzo, 2005; Scannell & Gifford, 2010; Tuan, 1977).  Gustafson (2001a) noted that these emotional person-place relationships are not constant, but can develop and transform over time due to past, present, and future experiences-in-place and emotions (Gustafson, 2001a; Lewicka, 2011b; Manzo, 2005). It are the places that a person has a personal, emotional relationship with (i.e., individual place attachment), that evoke the strongest emotions and the emotional bond is the strongest, due to the personally meaningful experiences-in-place, personal memories associated with a place, and the connection to one's the self (identity). Since these individual emotional relationships with places are not limited to the house, neighbourhood or workplace, but have been shown to occur among a whole range of everyday places in the urban environment, they form a web of personally significant emotional person-place relationships across the city, shaping a person's individual emotional experience of the city. This tapestry that describes the nature of one's relationships to urban places is unique for each individual (Gustafson, 2001a; Lewicka, 2011b; Manzo, 2005, 2014; Scannell & Gifford, 2010).

A better understanding of these emotional person-place relationships can be of interest to designers. It can inform the design of physical- and social features of a place

to promote affective bonding with the place. Several studies illustrate how insights into Person, Place, and Psychological Processes dimensions of place attachment can inform the design of a coffee shop, park, and retirement home (Moulay et al., 2018; Scannell & Gifford, 2014; Tumanan & Lansangan, 2012). Five physical characteristics of coffee shops that promote place attachment are cleanness through regular maintenance, regulate smells of coffee and baked goods to evoke affective memories, lighting to support activities such as reading, socializing, and relaxing, provide comfortable seating, and incorporate large windows to provide views of the outside world. Social characteristics that promote place attachment in a coffee shop are opportunities to linger to increase time spent in the coffee shop, providing some control over the environment (e.g. movable furniture and having a "usual" chair), providing trust and belonging (e.g. policies against discrimination), support desired activities of customers (e.g. studying), support social presence (e.g. regulars and round tables), and provide social support (e.g. quiet corner for privacy to confide in others) (Scannell & Gifford, 2014; Tumanan & Lansangan, 2012).

Lentini and Decortis (2010) argue that emotional person-place relationships can also inform the design of technological devices and services for personal, ubiquitous computing in a similar way. Based on the literature in environmental psychology and ubiquitous computing research, they theorise that there is a typology of five interrelated dimensions of human experience of place. The first three are inspired by computing research on place discussed in section 2.5.1 (Brewer & Dourish, 2008; Dourish & Bell, 2007; Harrison & Dourish, 1996). Firstly, geometrical and geographical experience is the perceiving and comprehending of spatial qualities of the environment (see also section 2.3). Secondly, sensorial experience refers to the perceiving and comprehending of the sensorial qualities of the environment (see also section 2.3). Thirdly, cultural experience represents the apprehension of behavioural and cultural understanding and appropriateness of activities in a place. The last two dimensions are informed by Manzo's (2005) place attachment study of experience-in-place. Personal experience refers to the personally meaningful experiences-in-place that are mainly experienced at the individual level. Relational experience refers to the opportunities for interpersonal relationships and interactions that happen in places. These five dimensions can serve as the basis of understanding the human experience

of place, and of the development for technology for supporting the interactions and rich experiences-in-place that take into account the complex relationship between person and place (Decortis & Lentini, 2008a, 2008b; Lentini & Decortis, 2010).

However, more work is needed to refine the interrelationship between these five dimensions. Lentini and Decortis (2010) focus their research on relational experiences of children and the socio-cultural understanding of outdoor places in their current neighbourhood, using shared visual representations only. In their typology, they only distinguish between individual and shared emotional experiences-in-place and do not take into account the emotional component of experience-in-place. There is still little known about the actual emotional, cognitive, and behavioural processes through which attachment to a place develops (Moulay et al., 2018). In particular, there is a gap in our understanding of the different types of positive and negative meaningful experience-in-place and emotions from which emotional person-place relationships with personally meaningful places in the urban environment can develop (Manzo & Devine-Wright, 2014; Moulay et al., 2018; Scannell & Gifford, 2014).

## 2.7 Towards a Holistic Approach: Combining Experience-in-Place and Emotions in Urban Interaction Design

Following from the social studies on place attachment, it can be concluded that when it comes to people's individual, emotional relationship with personally significant places, it are not so much the places that are important, but the personally meaningful experiences-in-place and emotions that people have in these places that create meaning and form the affective bond between the person and the place. However, in the field of Urban Interaction Design, a gap has been identified in academic studies and commercial applications which address and leverage the connection between personal experiences and memories, and the urban environment (Matassa, 2013).

Early work in the field of Human-Computer Interaction (HCI) on the lifelogging movement, Quantified-Self technology and Personal Informatics, has focused on designing for the capturing and recollecting the entirety of personal experiences in a person's life (Caprani, O'Connor, & Gurrin, 2013; Li et al., 2013; Mann, 2004; Matassa, 2013; Matassa & Rapp, 2015; Mavoa et al., 2013; Zhou & Gurrin, 2013). More recent HCI studies focus on designing for significant personal memories rather than the

entirety of a person's life, exploring the practices connected to the preservation of memories using physical and digital mementos (Bowen & Petrelli, 2011; Petrelli & Whittaker, 2010; van den Hoven, Sas, & Whittaker, 2012; van Gennip et al., 2015). They aim is to develop novel devices for remembering in specific contexts like over sharing a meal (O'Hara et al., 2012) or tools that support recollection with technological memory aids in personally meaningful places (Matassa, 2013).

The Quantified-Self movement and Personal Informatics focus on tracking and monitoring a person's behaviours, thoughts, emotions and moods in order to enable processes of change in a person's behaviour and attitude and improve wellbeing. Studies in this field have shown that in order to achieve this, combining behavioural or emotional data with contextual place-related data in which they occurred, are more effective (Li et al., 2013; Matassa & Rapp, 2015).

### 2.7.1   Personal memories and the urban environment

Several studies have focused on crowdsourcing metadata about a place by enabling people to mark-up and annotate digital maps with notes, images and media objects geocoded to specific locations (Shepard, 2011). A study that does link people's memories to the places in the urban environment in which they occurred, is the Urban Tapestries study (Angus et al., 2008; Lane, Thelwall, Angus, Peckett, & West, 2005). This study explores the potential costs and benefits of ***public authoring*** (i.e., the mapping and publicly sharing of local knowledge, memories, stories, information, and experiences, using maps). The project enabled participants to annotate a digital map of the city on a website to share the personal, cultural, social and historical meanings of places in their city. Places on the map could be tagged with text, sound clips, images and video clips. It opposed the prevailing view in the early 2000's that saw tourists as the main users of mobile and location-sensing technologies. Instead, it focused on the potential use of such technologies and services for locals in their own neighbourhoods and communities, to explore what was it about local places that mattered on an everyday basis to people as they went about the mundane routines of daily life. Results showed that people mostly mark places in their neighbourhood that are important to them on a personal level or are important to the neighbourhood community.  At the core of this practice lies what is called ***social knowledge***, the

everyday essential sharing of information, stories, knowledge, memories, and stories with family, friends, neighbours and strangers through storytelling. It is a social and cultural practice that is not just for informational or practical purposes, but is enjoyable and strengthens social ties (Angus et al., 2008; Lane et al., 2005).

Other research inspired by this study focused on the collective community memories or stories related to shared use of places, which aims to create a sense of community, or neighbourhood or city identity, among people in a certain geographical location, or aims to preserve cultural heritage (Christopoulou & Ringas, 2011; City of Edinburgh Council; Edinburgh Libraries, 2020; Decortis & Lentini, 2008a, 2008b; Lentini & Decortis, 2010; Dimitrios Ringas & Christopoulou, 2013a; Dimitrios Ringas, Christopoulou, & Stefanidakis, 2011). For example, the CLIO project uses people's personal stories related to places to create a sense of community among people using those places, in order to create a neighbourhood or city identity. A digital online map was tagged with stories in mostly visual form (i.e., text, pictures and videos) and a few audio recordings, but no content analysis of the actual experiences or emotions recorded by people living in the city was conducted.  Researchers did notice though that using CLIO on shared urban screens led to social interactions and discussing and commenting on place experiences in a group, while individuals using the mobile app led to longer interactions with a higher number of memories. Accessing these collective memories through a browser in a remote location led to random selection of memories, while people walking through the city with the mobile app tend to select memories close by. The project highlights potential for sharing emotional experience-in-place with a group of friends or with people in the local community. Researchers observed that participants experience strong emotions (e.g. laughing, arguing) while interacting with the memories as they often feel connected to the memories that they view (e.g. a person commenting on using the same square where his grandfather used to play) and start talking and commenting on the memories within their group of friends or people in the local community (Christopoulou & Ringas, 2011; Dimitrios Ringas & Christopoulou, 2013a; Dimitrios Ringas et al., 2011).

Rather than annotating digital maps, the Yellow Arrow project (Allen, Michael, House, & Shapins, 2004, 2008) enabled people to leave a physical mark at places and on

objects in the urban environment, using a sticker in the form of a yellow arrow (Figure 2-17). Via SMS and a unique code on the yellow arrow sticker, a personal message could be linked to the place. It began in 2004 as a street art project in New York but soon became a hype and spread over the world as a global public art project attempting to capture local experiences.



**Figure 2-17 - Yellow Arrow sticker: 7535 arrows, placed in 467 cities in 35 countries (Allen et al., 2004).**

It was built around the idea that every place is distinct and interesting if seen from a unique, personal perspective. It enabled people to, on an individual level, capture and share their own view of that place. The yellow arrows were intended to draw the attention of people passing by, who could then unlock the messages linked to it by texting the unique code found on the yellow arrow sticker (Figure 2-18). The content of the personal messages, which due to the nature of SMS was limited to text, ranged from poems to personal stories, to game-like instructions of what people should do now or go next. The website YellowArrow.net allowed users to annotate the location of yellow arrows on digital maps and provided an online photo gallery of the yellow arrows collection across the world, in a similar fashion to geo-tagging and place-based sharing of annotated pictures nowadays offered by websites such as Flickr. The Yellow Arrow project created a bridge between the physical and digital world by hyperlinking the physical world. Although not particularly focused on personal memories, the project provided an online cartography of the local, the intimate and the everyday as viewed and experienced by individuals (Allen et al., 2004, 2008; Shepard, 2009, 2010, 2011).

***Figure 2-18 - Yellow Arrows marking places and objects in the urban environment, offering unique, individual perspectives (Allen et al., 2008)***

The projects and research discussed here shows how technological devices and services can utilize the personal memories and past experiences that make places personally meaningful, but do not address the emotional component of these person-place relationships.

As discussed in Section 2.5, other technological devices and services focus on the emotional experiences of urban places evoked by the social and physical dimensions of urban places across multiple (groups of) people, but do not take into account the personal memories, stories and experiences that evoke emotions in urban places on an individual level. Studies use emotion maps to visualize stress hotspots in supermarkets (El Mawass & Kanjo, 2013), investigating how people's feelings in places are affected by environmental factors like air pollution, noise, greenery, aesthetic beauty, and traffic (Guerrache et al., 2016; MacKerron & Mourato, 2012; Quercia, O'Hare, et al., 2014; Quercia, Schifanella, et al., 2014; Resch et al., 2016), map people's emotional feelings of different typologies of a places such as restaurants, museums and stores (Mody et al., 2009; Vogels, 2008), or cafés, gardens, and supermarkets (Al-barrak et al.,

2017; Al-Husain et al., 2013; El Mawass & Kanjo, 2013; Kanjo et al., 2015). These digital emotion maps could then potentially be used to recommend places or walking routes that evoke a specific emotional experiences across multiple people based on physical and social characteristics of that urban place (Al-Barrak & Kanjo, 2013; Al-barrak et al., 2017; Candeia et al., 2017; Quercia, O'Hare, et al., 2014; Quercia, Schifanella, et al., 2014), or inform urban planning and urban (re)design (Resch et al., 2015, 2016; Ujang & Zakariya, 2015; Zeile et al., 2016).

### 2.7.2 Combining personal memories, experiences, and emotions in urban places.

However, social science studies have shown that emotions are the strongest for places that a person has a personally meaningful relationship with, and that place attachment to these personally meaningful places develops from the combination of personally significant experiences and emotions in these places. Therefore, it is argued that in order to create a better understanding of the relationship between person, place and technology in the urban environment, a holistic approach should be taken in which both personal experiences and emotions related to these personally meaningful urban places are taken into account. A better understanding of this emotional person-place relationship could then provide insight in how new technological devices and services could be used to augment this urban lived experience.

However, there is a gap in the literature when it comes to research which takes into account both personal experiences (e.g., personal memories and stories) and personal emotions, connected to urban places. In his Emotional Cartography and Biomapping studies, Nold (2004, 2009) let participants interpret their own emotion data at places in the city collected using wearable technology which measures physiological data, resulting in emotions maps of the city annotated with reflective comments of the participants as to why and emotion had occurred at specific locations. However, since Nold was primarily interested in the construction and visualisation of these physical emotion maps themselves, no further analysis or categorization was done on the personal experiences and emotions related to those urban places that were visualised in the emotion maps (Nold, 2004, 2009, 2018).

Other studies also attempt to capture both the personal experiences and emotions related to urban places using digital emotion maps. Matassa, Rapp & Simeoni (2013) explore how a wearable interactive system could be used by cyclists to capture and communicate personal memories related to places in the urban environment in-situ. The aim is to use notifications to trigger personal memories to get cyclists to reflect on their personal, emotional relationship with places in the urban environment to strengthen this affective bond. This is anticipated to stimulate a behaviour change towards stewardship and environmental sustainability. (Matassa, Rapp & Simeoni, 2013; Matassa & Simeoni, 2014; Matassa & Vernero, 2014; Matassa & Rapp, 2015). The emotions related to those places are used in the interface design as a potential way to visualize the location of memories on a digital emotion map. Furthermore, work provides no insight on which kind of emotions and experiences are actually related to people's personally significant places in the urban environment, but instead focus on the design of a mobile phone app which aims to enable situated remembering using a combination of environmental cues, GPS, and digital mementos of those personal experiences-in-place, in the form of social media content. In addition, Matassa and Vernero (2014) aim to use a critical design approach to engage cyclists by prompting fake personal experiences and emotions which are ambiguous or conflicting with a cyclist's own personal relationship with their personally meaningful urban place. Matassa and Vernero (2014) anticipate that this will prompt cyclists to provide their one "true" or "correct" place meaning, leading to a better understanding of people's personal, emotional relationship with urban places (Chapin & Knapp, 2015; Matassa, 2013, 2015b; Matassa & Rapp, 2015; Matassa et al., 2013; Matassa & Simeoni, 2014; Matassa & Vernero, 2014).

### 2.7.3   Representations of emotional person-place relationships

From the analysis of the literature, it follows that there are different forms that the data on emotional person-place relationships can take, and that this data typically gets consumed at the location or remotely. Either the user needs to be at a specific location where the memory or emotion occurred (i.e., locative media), or it can be accessed remotely via a website or by using personal mobile or wearable devices. For applications which use personal memories and stories such as Yellow Arrow (Allen et al., 2008), Rider Spoke (BlastTheory, 2009) or Dead Drops (Bartholl, 2010) the user

needs to be at the specific location, indicated by markers in the physical environment or via GPS. The same holds for some technological applications and services that focus on (group or aggregated) emotions, which are only accessible at a particular location, for example through urban screens (Foth et al., 2014; Dimitrios Ringas & Christopoulou, 2013a) or media architectural interfaces such as projections on buildings (Behrens et al., 2014) or art work installations (Bullivant, 2005). For example, the D-Tower tower in the city of Doetinchem in The Netherlands, is an interactive digital sculpture that changes colour depending on the prevalent mood of the inhabitants of the city (Figure 2-19). (Behrens et al., 2014; Bullivant, 2005).



*Figure 2-19 - D-Tower, a building that shares an communicates the aggregated emotions of residents of the city (Behrens et al., 2014).*

A well-known form of remotely consuming or interacting with this type of emotional person-place data, would be through physical or digital mementos, which are typically interacted with at a different location (e.g. the home or workplace) then the place they originated from (e.g. a holiday destination) (van Gennip et al., 2015). In fact many Human-Computer Interaction research has focused on using physical or digital mementos such as pictures (Hodges, Berry & Wood, 2011), clothes (Berzowska & Coelho, 2006) as autobiographical memory cues to help people with remembering, meditating and reflecting on personal memories and personal experiences, often to improve physical and mental wellbeing (Bowen & Petrelli, 2011; Matassa & Vernero, 2014; van Gennip et al., 2015).

However, for most applications and services in Urban Interaction Design, the data is typically aggregated in the form of an emotion map, which sometimes can be tagged

with digital media which relates to an aspect of people's emotional experience of their personal meaningful place. This digital media is typically used to capture the personally significant emotional experience of the place in the form of a story, or used to display and attach related digital mementos to the location on the map. A visualisation of the emotion is used to indicate the location of the personally meaningful place on the map, which is subsequently annotated with or linked to visual media in the form of pictures, videos, text, or social media updates, while it sometimes takes the form of audio (Angus et al., 2008; City of Edinburgh Council; Edinburgh Libraries, 2020; Grandison, 2018; Lane et al., 2005; Matassa & Rapp, 2015; Nold, 2004, 2009; Quercia, Aiello, Schifanella, et al., 2015; Quercia, Schifanella, et al., 2014; D Ringas, Christopoulou, & Stefanidakis, 2011; Dimitrios Ringas & Christopoulou, 2013a; Stals et al., 2018; Thudt, Baur, Huron, & Carpendale, 2016).

Some studies focus particularly on a specific sensory experience of urban places, such as urban soundscapes investigating the effect of sounds on the experience of urban places (Aiello, Schifanella, Quercia, & Aletta, 2016; Christidis & Quinton, 2016; Hazzard, Spence, Greenhalgh, & McGrath, 2017; Rizopoulos, Gazi, & Christidis, 2014) or smell maps of the urban environment exploring the effect of smells on the people's experience of urban places (Lauriault & Lindgaard, 2006; McLean, 2012, 2014, 2019; Quercia, Aiello, Mclean, & College, 2015). However, even these urban sounds and urban smells are subsequently aggregated and visually represented on a map of the city (Figure 2-20) rather than through using the corresponding sound or smell as a representation (McLean, 2020).
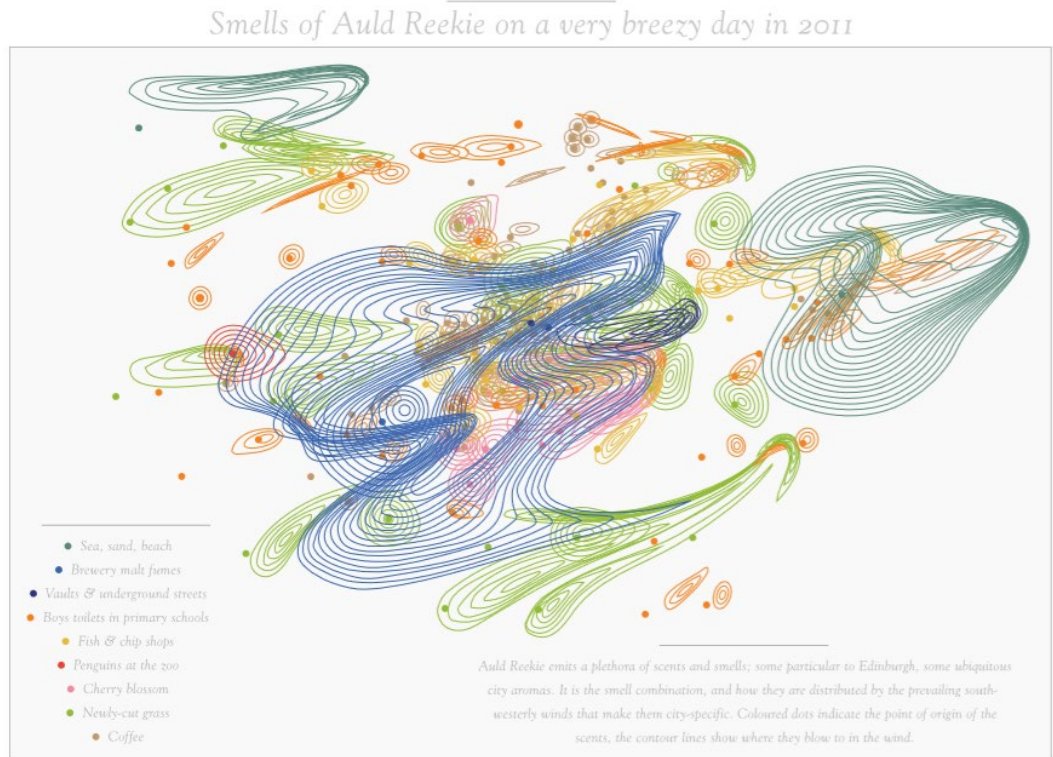
*Figure 2-20 - Smell Map of Edinburgh (McLean, 2012).*

But those smells and sounds are interpreted in terms of emotional experience of place. For example, Aiello et al. (2016) investigated the relationship between different categories of urban sounds (i.e., human sounds, music, nature sounds, indoor sounds, transport sounds, and mechanical sounds) and how those affect the emotional experience of urban places. They found that music in the urban environment is associated with strong emotions of joy and sadness, while human sounds (e.g., sounds of children playing or footsteps of other people) in the urban environment are related to joy and surprise. However this sound data is subsequently aggregated and the soundscape is communicated using a map of the city in which the sound categories of each street are only visually represented rather than using the actual sounds (Aiello et al., 2016; Quercia, 2015; Stals et al., 2018). A holistic approach with a focus on people's individual emotional experience-in-place of personally meaningful places could thus provide context, interpretation, and meaning to those sounds and smells in the urban environment, bringing together research which focuses on individual sensory experiences of urban places (Lentini & Decortis, 2010; McLean, 2014).

### 2.7.4  Potential for personal use and sharing emotional person-place relationship data with others.

In previous sections it has been discussed how most studies in the field of Urban Interaction Design focus on either the personal experiences related to urban places in the form of stories and memories, or focus on the emotional experience of urban places, but not the combination of the two from which place attachment to personally significant urban places develops on an individual level. For the few studies that do, this personal data of emotional person-place relationships typically takes the form of (annotated) emotion maps. This section will discuss how this personal emotional person-place relationship data could potentially be explored and used by smart citizens in a hybrid city, and in particular how this personal data could potentially be of value or relevant to others.

Similarly to personal Quantified-Self data of physical activity (e.g. running apps like Nike+) diet (e.g. MyFitnessPal), moods and emotions (e.g. MoodPanda, ComfortZones) and memories (e.g. UMap) (Elsden & Kirk, 2014; Elsden, O'Kane, et al., 2017; J., M., A., M., & 32nd Annual ACM Conference on Human Factors in Computing Systems, 2014; Li et al., 2013; Matassa, 2013; Matassa & Rapp, 2015; Stals et al., 2017b) , emotional person-place relationship data could also be used for personal use to benefit physical and psychological wellbeing. A study on everyday involuntary memory cues as opportunities for interaction design to support a process of personal attachment with items invoking personal memories, found that after mementos, places provide the most cues for everyday reminiscing (van Gennip et al., 2015). In Scotland for example, the NHS project Football Memories organizes events where people who suffer from dementia and Alzheimer come together in the local football stadium to stimulate their personal memories by reliving and sharing their own match day experiences in the football stadium where they occurred (Figure 2-21).

*Figure 2-21 - Elderly people suffering from dementia and alzheimers come together to relive and discuss their personal football memories at the football stadium of professional football club Hibernian in Edinburgh (NHS Lothian).*

Reminiscing and reflecting on autobiographical memories has clear mental benefits as it is vital to our self-image, personal identity, how we express ourselves and relate to others. It helps us feel well and balance our emotional needs (Knez, 2006, 2014; Lewicka, 2011b; Norman, 2014; Ratcliffe & Korpela, 2016; Scannell & Gifford, 2010; van Gennip et al., 2015). Quantified-Self technology could be used to enable situated remembering, and has been shown to be more effective by combining data of a person's personal memories and experiences and strong related emotions evoked by personally meaningful places, with cues in the environment at the location where these personally significant experiences had occurred (Li et al., 2013; Matassa & Rapp, 2015).

However, as Schnädelbach et al. (2017) have since also pointed out, the relationship between personal data, people, and the urban environment remains poorly understood despite being a growing aspect of our everyday lives, as sensors, mobile technologies, and wearable Quantified-Self technologies spread through the urban environment. There is a growing strand of research in the Quantified-Self technology which seeks to go beyond the typical present-focused and individual focused use of this technology and personal data (Elsden, O'Kane, et al., 2017; Rooksby et al., 2014). It

seeks to understand how the meaning of this present- and individual focused personal data might evolve over time (Elsden & Kirk, 2014) and how this personally data which typically is used to assist the process of remembering, or promote positive thoughts and feelings for the specific individual being monitored, when shared might be relevant or valuable to other people that the individual has social relationships with (Elsden & Kirk, 2015; Elsden, O'Kane, et al., 2017; Stals et al., 2017b).

Sharing emotional experiences of places is a powerful social practice, which can enable the reliving of an experience and improve social ties (Angus et al., 2008; Blom et al., 2010; Lane et al., 2005; Mody et al., 2009; Nold, 2009; Dimitrios Ringas & Christopoulou, 2013a). Nold (2009) noticed that when participants were presented the aggregated and annotated emotion map of their city as a group, this prompted participants to start sharing their personal relationship with a place with other participants. This enabled them to relive the experience-in-place and connect with other participants, in particular when multiple participants had emotions and personal stories related to the same location. This has been shown to be beneficial for improving social inclusion in the local community (Decortis & Lentini, 2008b; Lentini & Decortis, 2010) and addressing local issues of concern (Nold, 2009).

The main motivation for backpackers and travellers to use social media applications and share visual mementos is that they enjoy joint reminiscing and reliving mutual past travel experiences related to places that they had visited together (Axup, MacColl, & Cooper, 2006; Mody et al., 2009; Thudt et al., 2016). In the Urban Tapestries project, researchers found that different age groups showed different motivations for sharing personal memories and stories related to places in the neighbourhood with other members of the local community. Younger people found it more important to be able to digitally share their memories with their friends, while seniors actively came together to share stories and memories in person. This provided them with a sense of community and enabled them to leave traces of their presence in the city (Lane et al., 2005).

Also, in the study by Blom et al. (2010) participants who were asked to use a smartphone application to increase feelings of safety by tagging unsafe places and contact nearby people only in case of an emergency, spontaneously started using the

mobile safety application to tag places they liked and to connect with friends nearby to arrange meet-ups. This unexpected use of the app reveals that there might be an underlying need for social connectedness and a desire to highlight and reinforce personal relationships with places that have positive emotions and experiences related to them (Blom et al., 2010). These studies all seem to suggest that there is potential for sharing people' personal relationship with personally significant places with other people, as it could enable the reliving of a past experience and improve social ties (Stals et al., 2017b).

However, how an individual person's emotional person-place data could be communicated or shared with others using this new technological layer that is being added to the urban environment, requires more investigation. As also concluded by Resch et al. (2016), the focus appears to be on how different technological devices and services can be used to create and visualize an emotion map of the city (Resch et al., 2016). For example, for Nold's Biomapping project (Nold, 2004) and Emotional Cartography project (Nold, 2009) and the Mappiness project (MacKerron & Mourato, 2012), the creation of an arousal or emotion map using different types of wearable and mobile technologies appears to be a goal in itself. Some projects such as the Urban Emotions project (Resch et al., 2015), the Emocycling project (Zeile et al., 2016), Quercia et al.'s work (Quercia, O'Hare, et al., 2014; Quercia, Schifanella, et al., 2014) and the NeuroPlace project (Al-Barrak & Kanjo, 2013; Al-barrak et al., 2017) use aggregated emotion maps to improve or augment people's emotional experience of the urban environment. The maps inform urban (re)design and traffic safety or recommend places and walking routes that evoke similar emotions in a large group of people based on the social and physical dimensions of place. But these projects do so in mostly a technology-driven, top-down fashion by crowdsourcing data. What is lacking, is an understanding of how smart citizens living in the city might actually use this emotion data layer of the hybrid city, potentially in the form of an individual or aggregated emotion maps, in expected or unexpected ways (Stals et al., 2018).

Leahu et al. (2008) explored how arousal maps of the city (i.e., maps that visualised different arousal levels at different urban places, without identifying the specific emotions related to those arousal levels or places) might be interpreted and could

potentially be used by people living in the city. During a walk in the city, participants were provided with a mock-up arousal map of the city to enable people to negotiate potentially conflicting personal emotional meanings of places in the urban environment. Although the study does not explore real relationships between people and places, it does provide some insight on the meaning of the physical arousal maps themselves. Interestingly, participants did not consider privacy to be an issue, as participants interpreted these arousal maps to be anonymous (i.e., it could not be identified whose arousal map it was), only containing bodily signals, which were also considered too personal to be relevant to someone else. However, participants saw their own individual arousal map as a potential interface with a romantic partner, which they could share to improve intimacy in their relationship by sharing something very personal. The researchers subsequently envisioned several applications of arousal maps. An individual's arousal map of the city could for example be framed as a memento similar to a framed picture or painting, or it could be given to or shared with a loved one as a present. Arousal maps generated from the aggregated data of multiple inhabitants of a city were envisioned to be used as public maps for tourists to navigate a city in an alternative way (e.g., help adrenaline junkies identify locations for extreme sports, or help mothers with children identify safe walking routes). Aggregated arousal maps could also be used as public advertisement to attract tourists to explore a certain area which had high (or low) arousal levels related to it (Figure 2-22) (Leahu et al., 2008).

The study however provides no further insight in emotional relationship between places and people on a personal level. It also focuses only on the individual's emotional experience of the urban environment as indicated by arousal levels, without taking into account the personal stories and experiences related to those places. The sharing of an individual's arousal map with other people than the partner or spouse or for different motivations than improving intimacy is not investigated further. Furthermore, only the potential use of arousal maps is investigated, but not the potential use of emotion maps.

*Figure 2-22 – Top and bottom-left: Aggregated arousal maps envisioned to be used as public maps for advertisement and tourism. Bottom-right: Envisioning the use of a person's framed individual arousal map as a personal memento or gift for a romantic partner (Leahu et al., 2008).*

However, rather than sharing the emotion maps themselves, the new technological layer in the urban environment could also be used to share personal stories of experiences and memories that make a place personally meaningful. This could potentially also improve social connectedness between different types of people, and has the potential to add personal value to an otherwise mundane, everyday place by

allowing a person to experience a place through another person's eyes. Barthel et al. (2013) for example investigated the use of IoT technology in the form of RFID tags and QR codes to augment second-hand objects by providing a link to the personal stories related to those objects (Barthel et al., 2013; Burke, Quigley, & Speed, 2013; De Jode et al., 2012; Speed & Manohar, 2010). These personal stories added interest and value for both the customers as well as the store owners to those second-hand objects. Sharing personal experiences-in-place in places using new technologies such IoT technologies could add value to places for people in a similar way. As Gustafson (2014) points out, in a time of globalization in which people are increasingly mobile, these new IoT-, mobile-, and wearable technologies enable people to create and maintain relationships to important people in their lives as well as multiple personally significant physical and virtual places around the world (Gustafson, 2014). More research is needed though to understand what the value and relevance of emotional person-places relationships might for other people, where people's interest and curiosity would lie in sharing, exploring, and interacting with data related to emotional person-place relationships in a hybrid city, and what the different forms are this data could take. Not only for exploring new and unknown physical and virtual places in the context of tourism, which has often been the focus of research in the field (Benyon, Quigley, O'Keefe, & Riva, 2014; Han, Kim, Lee, & Kim, 2019; Lane et al., 2005; Tlili & Amara, 2016; Tucker & Shelton, 2018; Urry, 2000; Urry & Larsen, 2011), but in particular for local places and local people, in their city of residence.

## 2.8 Conclusion: Knowledge Gaps & Research Questions

In this section, an overview of the critical analysis of the literature and the identified gaps in knowledge will be provided, and the research questions will be formulated.

### 2.8.1 Knowledge gaps

City populations are currently in a state of rapid flux. In the urban studies, there has been a trend towards incorporating a grassroots, bottom-up approach to inform urban design. The focus is on people's sensory experience of urban places and the emotions evoked by urban places, and empowering citizens to play an active role in city- and place making in the urban design process (see section 2.1 and 2.2).

At the same time, Weiser's vision of ubiquitous computing is being increasingly realised through IoT technologies and mobile and wearable technologies, and Quantified-Self technologies spreading through the urban environment, adding a new technological layer to the already existing infrastructure of the city. This is creating a hybrid city in which the physical world of the urban environment and the digital world in the form of increasing layers of different digital data come together. This new technological layer provides new opportunities for people at an individual level to investigate, view, shape, interact with, and augment their experience of the urban environment, which is constantly being created and re-created at the intersection of person, place and technology (Bailey, Devine-Wright, & Batel, 2016; Gustafson, 2001a, 2014; Lewicka, 2011b; Manzo, 2005, 2014; Manzo & Devine-Wright, 2014; Manzo, Kleit, & Couch, 2008; Masso et al., 2019; Raymond, Kyttä, & Stedman, 2017; Scannell & Gifford, 2010).

For the design of technological devices and services for this new technological layer in the urban environment, the traditional smart city vision, operates at the urban scale and takes a top-down, technology-driven design approach in which the technology is in command, and the focus is on managing the efficiency of various urban infrastructures. Complementary to this approach, this thesis in the field of Urban Interaction Design operates at the human scale, and takes a human-centred, bottom-up design approach. The focus is on the needs, desires, rituals, human activities and interactions, experiences and behaviours of people in the urban environment and how those could inform the design of new technological devices and services for smart cities of the (near) future. The focus is on city making, that is, smart citizens as active, engaged citizens in the urban environment using new technological devices and services to create wealth, culture and more people, and pleasant cities to work, live, and play in.

To that end, there is a growing need to create a better understanding of the relationship between person, place, and technology in the urban environment. In the field of Urban Interaction Design, there has been an increased focus on emotion to investigate and create a better understanding of the person-place relationships in the

urban environment, and how technology could play a role in augmenting this urban lived experience (Figure 2-23).
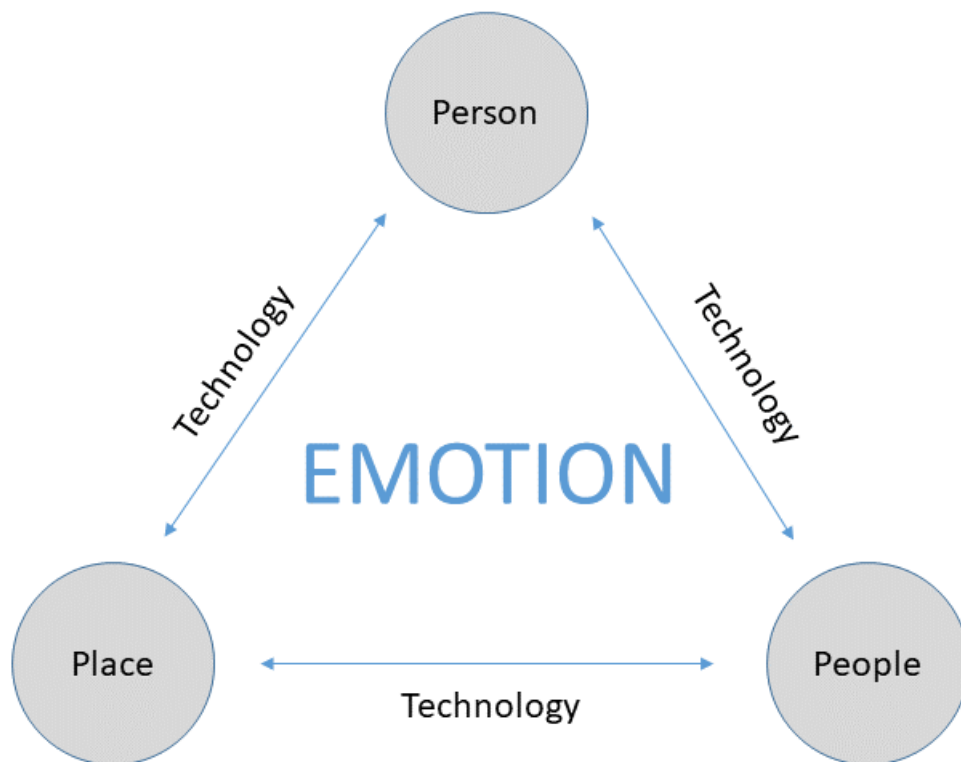


*Figure 2-23 - Focus on emotion to create a better understanding of the relationship between person, place, and technology in the urban environment.*

Most research in Urban Interaction Design on people's emotional experiences of urban places has focused on emotions evoked by the physical and social dimensions of place across multiple people, and using technology to mediate these emotions, in particular feelings of safety. However, there is a knowledge gap when it comes to understanding and utilizing people's personal emotional person-place relationships in the urban environment, where emotions are evoked by an individual's personally meaningful experiences related to those places. There are not many academic studies and commercial applications which address and leverage the connection between personal memories and experiences, and the urban environment (Matassa, 2013). From the critical analysis of the social science literature on place-related concepts and frameworks of place attachment, it emerges that it are not so much the places themselves that are important, but the ***experience-in-place*** and emotions that a

person has in a place (Manzo, 2005, 2014). That is, it are the personally meaningful experience and emotions a person has in a place, from which an emotional person-place relationship in the urban environment develops (Figure 2-24) (Manzo, 2005, 2014).
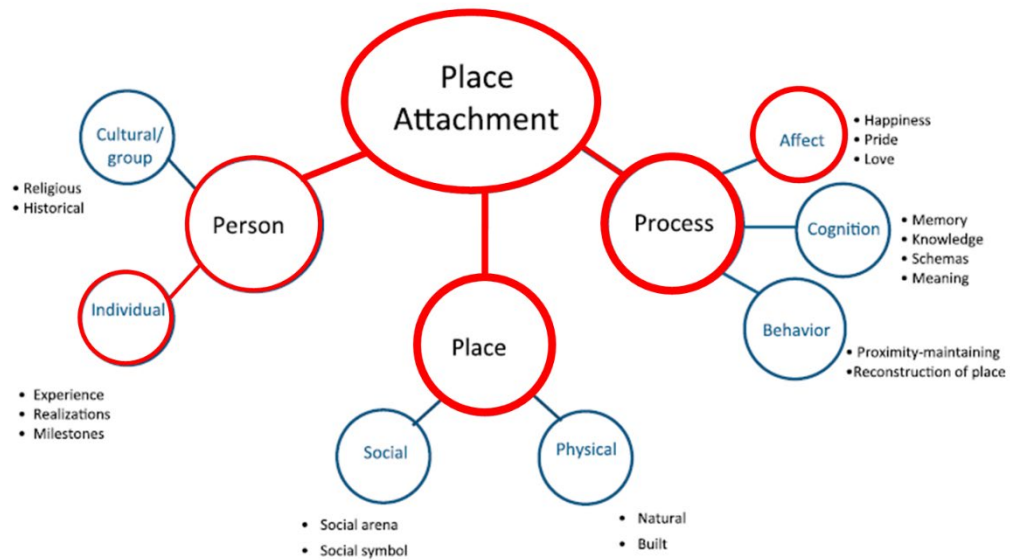


*Figure 2-24- Positioning of this PhD thesis, focusing on the individual, emotional person-place relationships in the urban environment, in the theoretical PPP-framework of place attachment (Scannell & Gifford, 2010).*

Qualitative research into place attachment typically centres on specific places such as the home, neighbourhood or the workplace, or a specific type of, often positive, emotion. However, the personally meaningful experiences and emotions from which emotional person-place relationships develop, can be positive or negative and can develop towards a whole range of (semi)public everyday places in the urban environment. In addition, most social science studies into personal, subjective place meanings, have focused on personally meaningful places throughout a person's lifetime, rather than on personally meaningful places in their current city of residence.

In the field of Urban Interaction Design, research has focused on investigating people's personal experiences in the form of personal stories and memories connected to urban places, or on the emotions evoked by urban places across different groups of people, and leveraging those relationships with technological devices and services. Place attachment studies however have shown that place attachment and emotions

are the strongest for places that a person has a personally meaningful relationship with. They form a web of personally significant emotional person-place relationships over the city, shaping a person's individual experience of the city. It is therefore argued that places that are meaningful to people on a personal level, provide a suitable lens for further investigation.

Currently, there is a knowledge gap in the literature when it comes to research which takes into account both personally meaningful experiences-in-place (e.g., in the form of personal memories and stories) and personal emotions a person has in personally meaningful places in the urban environment, and how those could inform the design of new technological devices and services for the hybrid city of the (near) future. In order to create a better understanding of the relationship between person, place and technology in the urban environment, a holistic approach should be taken in which the full range of personally meaningful experiences and emotions that a person has across different types of personally meaningful places in the urban environment, is taken into account. Such a holistic approach is expected to contribute to a better understanding of emotional person-place relationships in the urban environment, and can inform the design of new technological devices and services to augment this urban lived experience for the hybrid city of the (near) future.

In the few studies identified in the Urban Interaction Design literature that do take into account personally meaningful experiences and emotions related to personally significant places, this data typically takes the form of emotion maps, which are sometimes annotated with visual or audio representations. However, emotion maps are of limited efficacy in representing, communicating, and sharing the complex emotional person-place relationships in the urban environment.

In addition, despite being a growing aspect of everyday life, the relationship between this personal data, people, and the urban environment remains poorly understood (Schnädelbach et al., 2017; Stals et al., 2017b).  There is a growing strand of research which seeks to understand how this personal data, if shared, might be relevant or of interest to other people (Elsden & Kirk, 2015; Elsden, O'Kane, et al., 2017; Leahu et al., 2008; Rooksby et al., 2014; Stals et al., 2017b). However,, there is a lack of understanding which emotional person-place relationship data might be of interest,

the different forms this data could take, and how smart citizens in the city of residents might actually use this emotional person-place relationship data layer in their hybrid city of residence in novel, innovative ways.

### 2.8.2 Research questions

The overall aim of this thesis in the field of Urban Interaction Design, is to create a better understanding of the relationship between person, place, and technology in the urban environment. This thesis is expected to make a contribution to knowledge in the field of Urban Interaction Design, by creating a better understanding of people's emotional person-place relationships with personally meaningful places in their city of residence, and how those emotional person-place relationships can inform the design of technological devices and services for the hybrid city of the near future.

The critical analysis of the relevant literature, and identification of knowledge gaps in the field of Urban Interaction Design, has resulted in the formulation of the following research questions which this thesis will aim to answer to provide an original contribution to knowledge:

> *"How can people's personal, emotional relationships with their own personally meaningful places in the urban environment, and in particular their personally meaningful experiences-in-place and emotions connected to the personally significant places in their city of residence, inform the design of technological devices and services for the hybrid city of the near future?"*

1. **How are people's personal emotional place meanings (i.e., their personally meaningful experiences-in-place and emotions) connected to their own personally significant places in the urban environment?**

   a) What are the personally meaningful experiences (i.e., experiences-in-place) connected to a person's personally meaningful places in the urban environment?

   b) What are the emotions connected to these experiences-in-place?

2. **How can these personal emotional meanings of place be represented and communicated?**

a) How can these personal, emotional relationships with places be represented? (i.e., what are the different forms this data can take?)

b) How can these emotional person-place relationships be communicated to other people?

3. **What is the relevance of these emotional person-place relationships to other people?**

a) Where does people's interest lie in exploring this personal emotional person-place relationship data?

b) Where does people's interest lie using this personal, emotional person-place relationship data?

c) What is the relevance of social relationships in exploring and using this personal data?

d) What is the relevance of the different types of emotions in exploring and using this personal data?

4. **How can people's personal, emotional relationships with personally meaningful places in the urban environment potentially inform the design of future technological devices & services for the hybrid city of the near future?**

In this chapter, a critical analysis of the literature on state-of-the-art research in the field of Urban Interaction Design, urban studies, and social science studies on place attachment has been conducted. Gaps in existing knowledge regarding the relationship between person, place and technology in the urban environment have been identified. In particular in the understanding of emotional person-place relationships in the urban environment, and how the personally meaningful experiences-in-place and emotions connected to a person's meaningful places in the urban environment, could potentially inform the design of future technological devices and services for the hybrid city of the near future. Research questions have been formulated, and opportunities for contributions to knowledge have been identified.

In the next chapter, current methods to investigate emotional person-place relationships in the urban environment identified in the literature will be reviewed and evaluated. Both qualitative and quantitative methods will be discussed, informing the research design and methodology in order to be able to answer the research questions.

# Chapter 3: Methodology

## 3.1 Introduction

In this chapter, the overall research design and approach taken to answer the research questions will be modelled using the Double Diamond Model. Existing methods to investigate emotional person-place relationships in the urban environment identified in the literature will be reviewed and evaluated. Both qualitative and quantitative methods will be discussed, informing the research design, methodology and approach taken in this thesis in order to address the research questions outlined in the previous section. The focus will be on how to investigate the emotional person-place relationships that currently exist between people and their personally significant places in the urban environment, and in particular how to elicit the personally meaningful experiences (i.e., in the form of personal stories and memories) and emotions connected to these personally meaningful places in the urban environment. This chapter will conclude by outlining the three-staged, multi methods approach, consisting of an evaluative map technique in the first stage, a walking interview in the second stage, and another evaluative map technique using speculative maps in the third stage.

Double Diamond Model

The overall research design for this thesis can be modelled using the Double Diamond Model (Norman, 2013). The model describes the two phases of the human-centred design process; finding the right problem, and finding the right solution to fulfil human needs (Figure 3-1). This design process consists of four stages, a divergent discover stage and convergent define stage in the problem space in first diamond, and a divergent develop stage and a convergent deliver stage in the solution space in the second diamond. This double diverge-converge process is effective and frees researchers and designers from unnecessary restrictions to the problem and solution space (Norman, 2013).

FINDING THE RIGHT
**PROBLEM**

FINDING THE RIGHT
**SOLUTION**

ALTERNATIVES

Divergence | Convergence | Divergence | Convergence

TIME
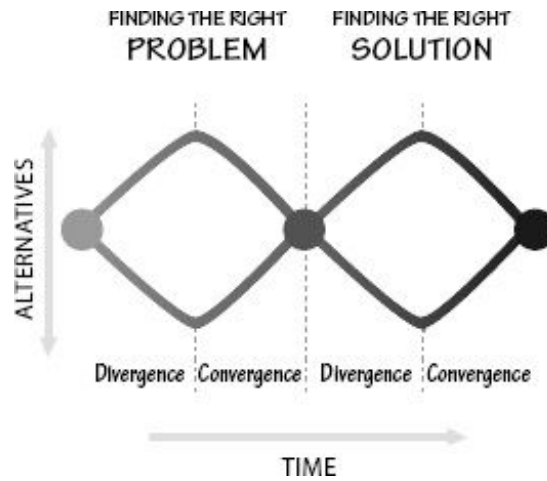
*Figure 3-1 - Double Diamond Model (Norman, 2013, p220)*

This Double Diamond design process model is used to model the approach and process taken in this thesis in order to answer the research questions (Figure 3-2).

Walking & Talking sessions

Define Themes

Speculative Design Fictions

Focus Groups

**Research Questions**

**Taxonomy of Emotional Experiences -in-Place**

**Design Guidelines**

Discover | Define | Develop | Deliver

Time
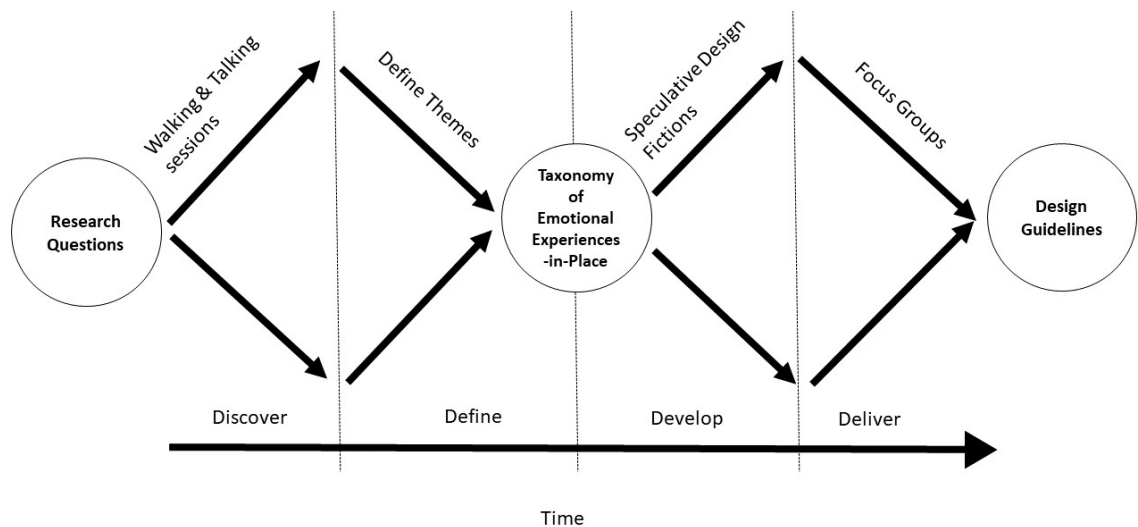
*Figure 3-2 - Research design of this thesis presented as a Double Diamond Model.*

Informed by the literature review, the focus in the first diamond is on exploring and creating a better understanding of the problem and the problem space. A Walking & Talking sessions consisting of (speculative) evaluative map techniques and a walking interview, are used to discover, investigate and understand the emotional person-place relationships residents of Edinburgh currently have with personally meaningful places in the urban environment (Research question 1). It also investigates how people

represent and communicate or would like to represent and communicate representations of their emotional person-place relationships in the urban environment using technology, and the different forms this data can take (Research Question 2). Furthermore, it investigates what the potential, value or relevance might be for sharing this personal data with others (Research questions 3). Following this initial stage of discovery and exploration, following a grounded theory approach, themes that emerged from the analyses of the gathered data corpus will be defined, leading to convergence in the define phase. This will result in a taxonomy of emotional experience-in-place. In the second diamond, the design space will be explored by taking a Speculative Design approach in order to investigate how the data corpus gathered in first diamond, could potentially inform the design of future technological devices and services for the urban environment of the (near) future (Research question 4). In the design phase, a suite of Speculative Design Fictions will be created to this end. In the subsequent deliver stage, this suite of speculative design fictions will be presented to- and discussed with residents of Edinburgh. Their responses will be analysed using a thematic analysis to inform a set of design guidelines for urban interaction designers.

In this chapter, the focus will be on the research design and methodology for the discovery stage. That is, the divergence process in the first diamond in the double Diamond Model, investigating and exploring the problem space. The analysis of the resulting data corpus and the defining of the themes that emerged in the define-phase will be discussed in more detail in Chapter 4. The research design, methodology, and methods utilised in the second diamond of the Double Diamond model will be discussed in more detail in Chapters 5 and 6.

## 3.2 Evaluation of methods to investigate emotional person-place relationships

This section examines the methods, research designs and criteria used in research studies investigating emotional person-place relationships in the urban environment. Both quantitative and qualitative approaches will be discussed from social science studies into place attachment as well as research methods employed in Urban Interaction Design using technological devices and services to elicit personally meaningful experiences and emotions related to personally meaningful places in the

urban environment. This will inform which methods to employ in order to address the research questions outlined in Section 2.8.2.

In order to determine what would be the best approach to investigate people's personal, emotional relationships with urban places and how technology could play a role in people's individual experience of the city, research methods used in related research will be reviewed in this section. These methods can roughly be categorised in three sections: quantitative and qualitative methods in social sciences studies of emotional person-place relationships, and methods used in Urban Interaction Design using technology to investigate emotional person-place relationships in the urban environment. The methods used in related research include qualitative in-depth interviews, (explorative) ethnography, participatory mapping workshops (i.e., bodystorming), walking tours, walking interviews, site- and participant observation, evaluative map techniques, apps, wearable psychophysiological sensory devices, and crowdsourcing data. In addition, also other research methods that could be used to investigate emotional person-place relationships will be discussed, such as contextual inquiries, focus groups, and cultural probes.

### 3.2.1 Quantitative methods for investigating place attachment in social science studies

Quantitative research focuses on measuring objective numerical data regarding the strength and type of attachment, and using statistical analysis for generalising it across groups of people, or using it to identify or predict a particular phenomenon (Goodman, Kuniavsky, & Moed, 2012; Manzo, 2019; Scannell & Gifford, 2014). In the social sciences, more effort has been invested in the development of quantitative than qualitative measures of place attachment, as is evidenced by the development of a variety of questionnaires, surveys and self-report scales to measure place attachment (Giuliani, 2003; Lewicka, 2011b). Early studies focused on proxy measures such as length of residence, number of neighbourhood ties, and house ownership, which are often used as predictors for place attachment. These measures are used as substitutes to measure place attachment but offer little insight into the emotional component of person-place relationships. They are based on the assumption that a positive emotional relationship with place leads to certain behaviours such as being willing to stay in a neighbourhood or investing to buy a house. For more recent questionnaires

and surveys, many different self-report scales have been developed, with the number of dimensions (e.g. general attachment, continuity, familiarity, commitment) depending on the specific place-related concepts under investigation and the specific place under investigation (Giuliani, 2003; Lewicka, 2011b; Scannell & Gifford, 2010, 2014).

However, quantitative research methods into place attachment typically focus on the significance of places to specific groups of people. The focus is on the subjective importance or strength of the emotional attachment to certain places, and then differentiating between people based on certain characteristics. Quantitative methods are less suitable for eliciting what places mean, as in the literature there is no adequate, agreed upon definition of place attachment or how it can best be measured (Lewicka, 2011b; Scannell & Gifford, 2010). Differences in findings using quantitative methods to investigate place attachment often depend on slightly different, ill-defined and not agreed upon notions of the various place-related concepts and how they relate to one another, such as place identity, place dependence, and place attachment (Lewicka, 2011b). In addition, the findings resulting from the use of quantitative methods such as surveys using different scales (e.g. self-reports) cannot go beyond broad and simple distinctions between places such as social or physical place attachment, which does not reflect the richness and complexity of people's emotional relationships with places (Lewicka, 2011b; Patterson & Williams, 2005; Scannell & Gifford, 2014).

### 3.2.2   Qualitative methods for investigating place attachment in social science studies

Qualitative approaches, mostly represented by the phenomenological approaches taken by human geographers, attempt to embrace the richness and complexity of people's emotional experience of and relationship with place. They seek to understand the nature, events, and experiential qualities of place as they are subjectively experienced in their contexts and through the lens of the research participants (Lewicka, 2011b; Manzo, 2019). In a qualitative approach, varied place meanings, personal experiences of attachment, and perceptions of places are articulated by individuals, and then summarized into themes by the researcher (Scannell & Gifford, 2014). Instead of generalizability to a larger population, qualitative methods have

transferability, meaning that the themes and concepts that emerge from the data through qualitative analysis can be thought of as abstract concepts with potential relevance to other cases (Scannell & Gifford, 2014). Places acquire meaning through personal and group experiences and memories, and through the multi-sensory feelings experienced when being-in-the-place (Lewicka, 2011b). Place attachment to personally significant places develops from experience-in-place and emotions, which can be positive or negative (see section 2.6.4) (Manzo, 2005, 2014). This means that a holistic approach should be taken to investigate place attachment, focusing on experience-in-place and emotions that people have place as a whole from which place meaning develops (see section 2.6.5). In order to understand place attachment to a specific place, one must first understand its meaning (Stedman, 2003). Qualitative measures aim to offer insight into place meanings and can be divided into two types, verbal measures and pictorial measures (Lewicka, 2011b).

Pictorial measures

Pictorial measures can include photographs, drawings, and maps. This can be photographs of places provided by the researchers (Paulos & Goodman, 2004; Quercia, O'Hare, et al., 2014) or be made by participants of their own personally significant places (e.g. Beckley et al., 2007). Also, drawings of places or (mental) maps of areas generated by participants have been used as measures of attachment to houses, neighbourhoods and cities. The places being drawn by participants on a map are indicative of the importance of a place to a person, neighbourhood or community, especially if a place is drawn my multiple participants belonging to particular group (Lynch, 1960). Examples of methods using participant-generated maps as pictorial measures include participatory mapping (Fang et al., 2016; Offenhuber & Lee, 2012), community mapping (Angus et al., 2008; Crivellaro et al., 2016; Fox & Le Dantec, 2014; Nold, 2004), and psychogeographies (Andreani & Sayegh, 2017; Flint, Grandison, & Barrett-Duncan, 2018; Leahu et al., 2008; Pinder, 1996) . Often these individual maps are based on multisensory experiences, and are either a map of an individual's experience, or the individual psychogeographies are combined into one aggregated map.

Also, evaluative map techniques are commonly used qualitative measures, providing insight into meanings of specific places located on maps. Evaluative map techniques allow people to, at a high level, indicate which places in the city are important to them. Evaluative map techniques can be used both to measure emotional attachment to places as well as eliciting place meanings (e.g., by using tokens as an indication of the strength of the attachment or predefined types of place meaning). Another example of evaluative map techniques are specially prepared maps which are then given to participants so that they can mark places on the map which match certain criteria, such as like/dislike, boring/exciting, safe/unsafe, or places to show a visitor or tourist. These maps are then digitized and combined into one aggregated map, in which different colours or colour intensities (e.g., heat map) indicate the differences in levels of marking. An advantage of such evaluative map techniques is that (differences in) markings can easily be calculated and visualised, and that the maps can be applied to various scales of spatiality (e.g. from rooms within buildings to city scale) (Lewicka, 2011b; Stals et al., 2014). These methods do give some insight into place meaning and the strength of the emotional relationships with places. But participants are often only able to assign a predefined emotions and meanings to places based on the limited set of meanings and emotions provided by the researchers, and are unable to freely assign their own meanings to places.

 Verbal measures

Verbal measures in place attachment studies typically take the form of qualitative in-depth interviews of which the content is analysed at a later point in time. Most qualitative place attachment studies in the social sciences use sedentary in-depth (semi)structured interviews (Lewicka, 2011b; Stals et al., 2014). In-depth semi-structured interviews are shown to be particularly useful when taking a explorative approach into investigating what various places may mean to people, and how people relate to those places (Bailey et al., 2016; Gustafson, 2001b; Manzo, 2005, 2014; Manzo et al., 2008; Manzo & Perkins, 2006). Gustafson (2001a) Manzo (2005) stress the importance of allowing participants to freely and spontaneously ascribe subjective meanings, experiences, and emotions to personally significant places. Letting

participants choose themselves which places have been personally meaningful does not limit it to a predefined type of specific places such as the home, workplace or neighbourhood, or to predefined experiences-in-place and emotions. Limitations of qualitative interviews are that they are limited in their generalizability to the broader population, and in their ability to analyse causal aspects of the place attachment process (Scannell & Gifford, 2014).

Often, verbal and pictorial methods are combined into a two-stage method to balance some of their strengths and weaknesses (Manzo, 2019; Scannell & Gifford, 2014). Pictorial methods are first used to identify meaningful places in the city, or to give some indication of the emotional attachment to meaningful places. These then provide discussion points for further investigation during in an in-depth interview. This allows people to elaborate further on their emotional relationship with places (Kanstrup, Bertelsen, & Madsen, 2014; Lewicka, 2011b; Manzo, 2019; Stals et al., 2014). However, limitations of these sedentary quantitative and qualitative approaches discussed so far, are that they are not designed to be fun or engaging for participants to participate in (e.g. surveys and questionnaires), participants are asked to recollect or imagine how places make them feel (e.g. using pictures of meaningful places), and they provide a high-level experience of the city (e.g. using maps) (Stals et al., 2014).

<u>Walking Interviews</u>

Other qualitative research methods offer a more fine-grained experience of the city and highlight the importance of being in-situ. Ethnographic observations and contextual inquiries (Flick, 2014; Goodman et al., 2012; Sobolewska, Smith, & Turner, 2009), as well as cultural probes and diary studies (Gaver et al., 1999; Luusua et al., 2015) are more contextually sensitive as they make use of contextual cues. Walking interviews (sometimes referred to as "walking probes") also offer a hybrid of in-depth qualitative interviews, participant observation, and being in-situ (Kanstrup et al., 2014; Kusenbach, 2003; Ratzenböck, 2016; Stals et al., 2014). Evans and Jones (2011) reviewed a variety of walking interviews and sedentary interviews used in the field of human geography and found that walking interviews produce richer data because participants are prompted by environmental cues, meanings, and connections to the

surrounding environment. They are also less likely to try and give the 'right' answer, and find it easier to verbalise attitudes and feelings when living the experience in place (Evans & Jones, 2011; Hein, Evans, & Jones, 2008). Evans and Jones (2011) compared the quantitative and qualitative data generated by the walking interviews and sedentary interviews employed in a pilot study and found that a major advantage of using walking interviews over sedentary interviews is their capacity to access people's attitudes, feelings and knowledge about the environment in situ, and generate richer and more place-specific data. Walking is considered to be a more intimate way to engage with the landscape and offers insights into both the place as well as the self. Although walking interviews take more time than sedentary interviews, the natural flow of walking and the breaks in the conversation make it easier for the researcher to keep the conversation going. Due to environmental memory cues, participants need less prompts, produce more spontaneous data and almost double the number of stories related to places than sedentary interviews. Walking interviews produce more data about the way people relate specifically to places and produces narratives that unfold through place. In walking interviews, participants organise experiences spatially making it suitable approach for eliciting personal stories, memories, experiences and emotions related to personally meaningful places, while participants in sedentary interviews organise experiences through time (i.e., temporally) (Evans & Jones, 2011; Hein et al., 2008; Stals et al., 2014).

A spectrum of approaches exists in walking interviews, with route determination, place selection, and emotion measurement or elicitation being the central, important factors of variation. This ranges from the participant being the one familiar with the area and determining the walking route, to there being no determined route and only aimless wandering, to the researcher being the person familiar with the area and determining the route (see Figure 3-3 below) (Evans & Jones, 2011; Hein et al., 2008; Kanstrup et al., 2014; Ratzenböck, 2016; Stals et al., 2014).
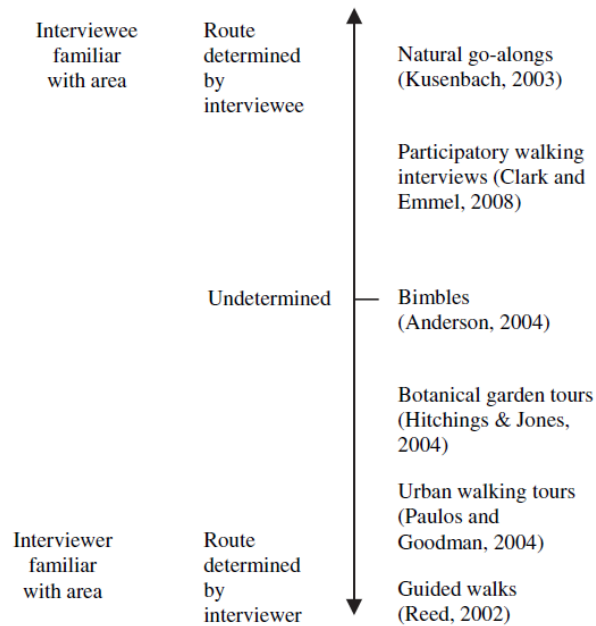
*Figure 3-3 - Typology of Walking Interviews by Evans & Jones (2011).*

The relevance of route determination, place selection, and emotion measurement or elicitation will be discussed in more detail in the next section, when methods used in Urban Interaction Design to elicit personal experiences and emotions related to the places in the urban environment will be discussed.

## 3.3 Walking Methods in Urban Interaction Design to investigate emotional person-place relationships.

As discussed in the previous section, walking methods have been shown in the social sciences to be a suitable method for investigating large-scale public settings such as urban environments, and are an effective method for in-situ eliciting place-related personal stories and emotions to uncover the personally meaningful experiences and emotions from which a person-place relationships develop. A variety of walking methods exist, with route determination, place selection, and emotion measurement or elicitation being the central in variation.  Also in the field of Urban Interaction Design, walking methods are becoming more common due to the importance of being in-situ, but there is still a lack of understanding how walking methods can be applied in a design context (Kanstrup et al., 2014; Stals et al., 2014). In this section, the methods used in the key studies in Urban Interaction Design that focus on emotion and affect to create a better understanding of the urban environment and inform the design of

technological devices and services for the urban environment discussed section 2.5, will be reviewed.

### 3.3.1   Walking method with questionnaires

The familiar stranger study by Paulos & Goodman (2004) was one of the first studies in the field of Urban Interaction Design to investigate people emotional relationships with urban places. Nine participants were taken on a 45-minute, one-on-one walking tour with a researcher. The participant was taken on a walking tour to four functionally distinct, semi-public urban places (i.e., a square, a post office, a restaurant and a park). Both the route as well as the selection of the places was predetermined by the researcher and the same for all participants. At each location, the participant was asked to identify familiar people and fill out a questionnaire to measure levels of discomfort currently experienced based on the social and physical dimensions of place. The aim was to investigate the influence of familiarity of places and strangers on people's feelings of anxiety and comfort in their everyday public places.

In this study, the researchers were familiar with the urban places being studied, determined the route, places being visited, and the sequence in which the place were being visited. When studying people's personally significant places in a city however, the participant's familiarity and personal connection with the place is more important. Therefore, the (types of) places should not be determined by the researcher. The participants should be allowed to pick their own personally significant places they would want to visit and discuss, and pick their own place order and walking routes.

For measuring the emotions connected to urban places, the questionnaires in the familiar strangers study (Paulos & Goodman, 2004) only measured levels of discomfort related to the social and physical dimensions of each public place. But since Manzo (2005) showed that emotions connected to personally significant places can be positive or negative, questionnaires which take into account the full range of emotions should be used when investigation emotional person-place relationships in the urban environment, such as PANAS-X questionnaire (Watson, Clark, & Tellegen, 1988),  and the Russel's Affect Grid (Russell, 2003; Russell & Pratt, 1980; Russell, Weiss, & Mendelsohn, 1989). This would allow emotions to be elicited in-situ, but participants would have to give a score from one to five on between thirty to sixty emotions

depending on the specific questionnaire being used. Since participants are expected to have more than one meaningful place in the city they live in, multiple locations will need to be visited, which would involve repeatedly filling out the same questionnaire for each location. This is expected to take several minutes each time. Furthermore, it is a dull task for the participants, especially if it needs to be done repeatedly, which might influence the quality of the given responses. In addition, filling out the questionnaire interrupts the participant's actual emotional experience of being in the place (Gartner, 2010, 2012; Healey, 2008; Stals et al., 2014; Westerink et al., 2011, 2008).

### 3.3.2  Walking method with GSR

Biometric galvanic Skin Response (GSR) sensors or mobile EEG headsets linked up to a GPS device and data logger have also been used to objectively measure emotional responses to the urban environment. The Biomapping-project (Nold, 2004) and Emotional Cartography-project (Nold, 2009) emerged as a critical reaction to pervasive smart city technology and quantified-self technology. The aim was to investigate the implications of technology that can record and visualise people's emotional experience of urban places, and how those different layers of data in the urban environment can best be visualised and shared using emotion maps. Nold (2004, 2009) also acknowledges the importance of letting participants walk freely around the urban environment. This enables them to visit their own personally most significant areas and places in the city with which they have a strong emotional relationship, and it makes the walking tour a more engaging experience. He carried out multiple emotion mapping workshops with communities around the world, with the number of participants varying between 3 and 14 participants. The resulting emotion maps as discussed in more detail in section 2.6, enabled the sharing of this data with others, and addressing and gaining new insights about community issues in the mapped area.

A limitation of this participatory mapping technique is that the arousal levels are not actual emotions (e.g., they are not indicative of valence), but in retrospect are being interpreted or transformed into emotions by the participant in discussion with the researcher. This meant that multiple sessions with the same participant at different points in time are necessary. Like the sedentary interviews and walking interviews, the

method does highlight the importance of being able to share, discuss, and elaborate on the personally meaningful experiences and emotions related to places face-to-face with the researcher (Nold, 2009). This increases participant engagement and allows the contextualisation and ground-truthing of the data, which is typical a problem when measuring and annotating (psycho)physiological signals (Leahu et al., 2008; Leahu & Sengers, 2015; Nold, 2009; Resch et al., 2015; Stals et al., 2014; Westerink et al., 2011, 2008). The physical activity of walking and the movement effects of daily activities in general overwhelm and disrupt overall physiological responses (e.g. when walking uphill) (Gartner, 2012; Westerink et al., 2011, 2008).

### 3.3.3   Walking method with EEG headsets

Earlier Urban Interaction Design studies typically used GSR to measure arousal levels (El Mawass & Kanjo, 2013; Kikhia & Hallberg, 2013; Nold, 2004, 2009). But due to the limitations outlined above and increased affordability of wireless wearable EEG headsets, more recent studies use EEG headsets to investigate the emotional experience of different types of urban places such as urban streets, supermarkets, cafes, and green spaces (Al-Barrak & Kanjo, 2013; Al-barrak et al., 2017; Andreani & Sayegh, 2017; Aspinall et al., 2015; Barahona Rios, Estevez Fernandez, Cui, & Huang, 2018). These walks with a wearable EEG headset (Figure 3-4), sometimes referred to as "brainwalks" (Coyne, 2017; Karandinou, 2017), measure electrical activity in the brain (Electro Encephalogram, EEG) (Westerink et al., 2011, 2008).



*Figure 3-4- Epoc Emotic wireless, wearable EEG headset (Aspinall et al., 2015).*

The algorithm in the accompanying Affectiv software suite translates these brainwaves into six mental emotional states, but a limitation is that this algorithm is a black box due to intellectual property rights (Aspinall et al., 2015; Barahona Rios et al., 2018). In addition, like the GSR measuring devices (Leahu et al., 2008), EEG headsets have been reported by participants as being obtrusive and highly uncomfortable to wear over a longer period of time (Al-barrak et al., 2017), and there is a need to carry additional equipment to operate headset and log the data, which needs to be carried by the participant in a backpack (Figure 3-5) (Aspinall et al., 2015).
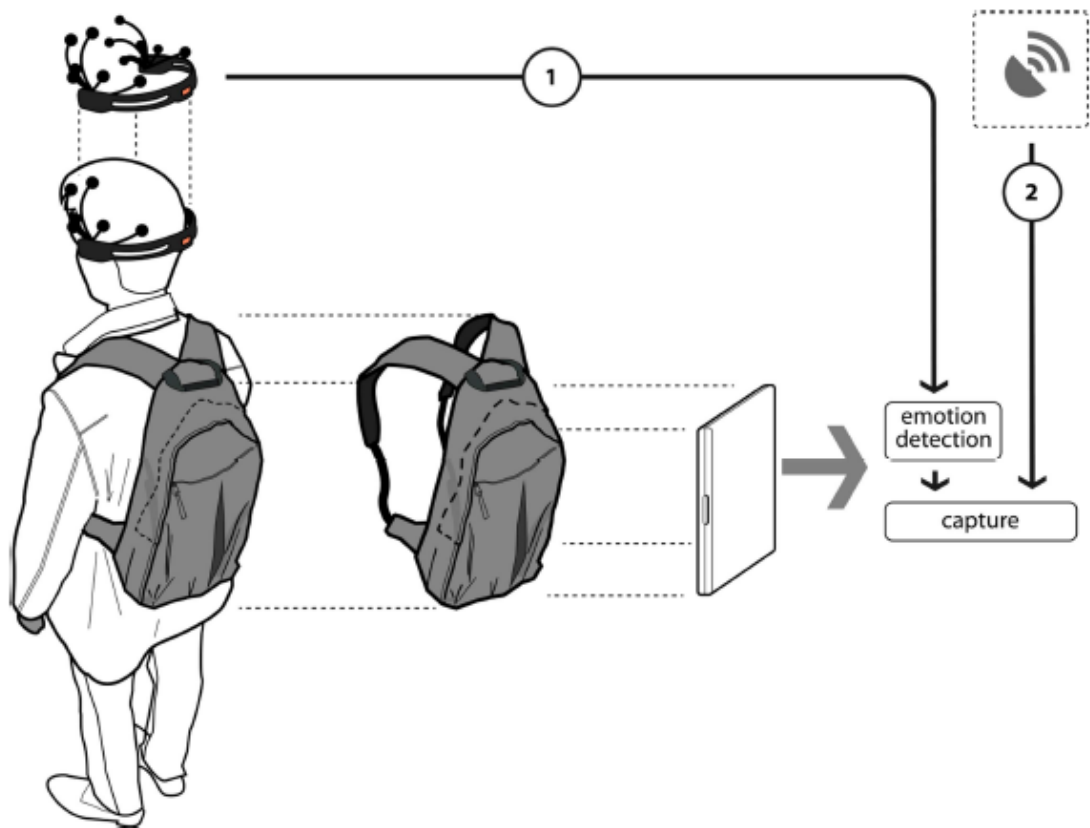


*Figure 3-5 - Participants wearing the EPOC Emotiv EEG headset which is (1) geoannotated by a GPS unit and (2) the data is stored on a laptop that the participant is carrying in a backpack (Aspinall et al., 2015).*

The wearable EEG headset is also quite visible and noticeable, which has made participants become self-conscious and which might influence the data, in particular when worn in a public space (Aspinall et al., 2015; Tilley et al., 2017).

Similar to the wearable GSR measuring devices, participants expressed concerns about the device's (perceived) ability to read their emotional state, raising privacy concerns

and the feeling of being hooked up to a lie detector. This would be detrimental to the discussion of the personally meaningful experiences and emotions related to personally significant urban places in-situ (Al-barrak et al., 2017; Nold, 2009). It should not lead to the participant feeling forced to share personal or emotional experiences related to places when confronted with the data. Furthermore, eliciting a person's personally meaningful experiences in the form of personal memories and stories cannot occur in-situ while wearing the EEG headset, as talking during the walking tour influences the EEG readings (Coyne, 2017).

The grounding and contextualisation of the emotion data gathered thus remains challenging. A group of observers sometimes need to follow the participant to document the walk using notes and pictures to this end (Coyne, 2016b, 2017), potentially increasing the feelings of self-consciousness (Figure 3-6).



*Figure 3-6 – A group of observers closely following a participant wearing a EEG headset during the Urban Brainwear Workshop, to take notes and pictures of the walk through the urban environment to be able to ground and contextualise the collected EEG data afterwards (Coyne, 2017).*

A separate interview session would still be needed to not overburden the participant and to interpret and contextualize the gathered data. Although the combination of objective quantitative and subjective qualitative interview data can result in a more complete picture and a better understanding of the emotional experience of the urban environment (Tilley et al., 2017; Wang, 2016), the inability to elicit both the emotions and personally meaningful experiences related to urban places in-situ in the same

session remains is a limitation for walking methods using GRS or EEG for emotion measurement.

### 3.3.4 Walking method with dedicated mobile application

An alternative way to elicit emotional person-place relationship data and investigate how participants would like to represent, capture, and share it with others, is by using a dedicated mobile phone application. Several studies have used or anticipate the use of a dedicated smartphone application. This would allow participants to walk or cycle freely through the urban environment at their own convenience without the researcher being present. Since no such smartphone app was available at the time, this would mean that such an app would need to be developed by the researcher (Andreani & Sayegh, 2017; Avram, 2014; Lane et al., 2005; Matassa & Rapp, 2015; Mody et al., 2009; Resch et al., 2015; Dimitrios Ringas & Christopoulou, 2013b; Dimitrios Ringas, Christopoulou, & Stefanidakis, 2015). For most of these studies, the focus subsequently shifts to the design, development, and testing of the app itself, rather the insights that can be gained from the data collected with it, or the development of the app is never even completed (Matassa & Rapp, 2015; Mody et al., 2009).

However, an app that has been used in an ethnographic research context by MIT and has since become available for free on iOS and Android, is EthnoAlly (Bahillo & Favero, 2017; Smaniotto Costa et al., 2019; Uricchio, McMillion, Sinclair, & Lab, 2015). EthnoAlly is a mobile application that enables researchers to create and organize multimodal field notes for ethnographic studies (Figure 3-7). It allows participants to in-situ produce qualitative, location-tagged multimedia materials (e.g., written notes, audio notes, pictures videos, photos) and automatically collects quantitative contextual data (i.e., location data, speed data, time data, and weather data). This can then be archived, visualised, organised, and analysed on a cloud application server. It can be used as a participatory tool that researchers can use with their participants, both in person and remotely, to create multimedia diaries. (Bahillo & Favero, 2017; Osaba, Pierdicca, Duarte, Bahillo, & Mateus, 2019; Smaniotto Costa et al., 2019; Uricchio et al., 2015).
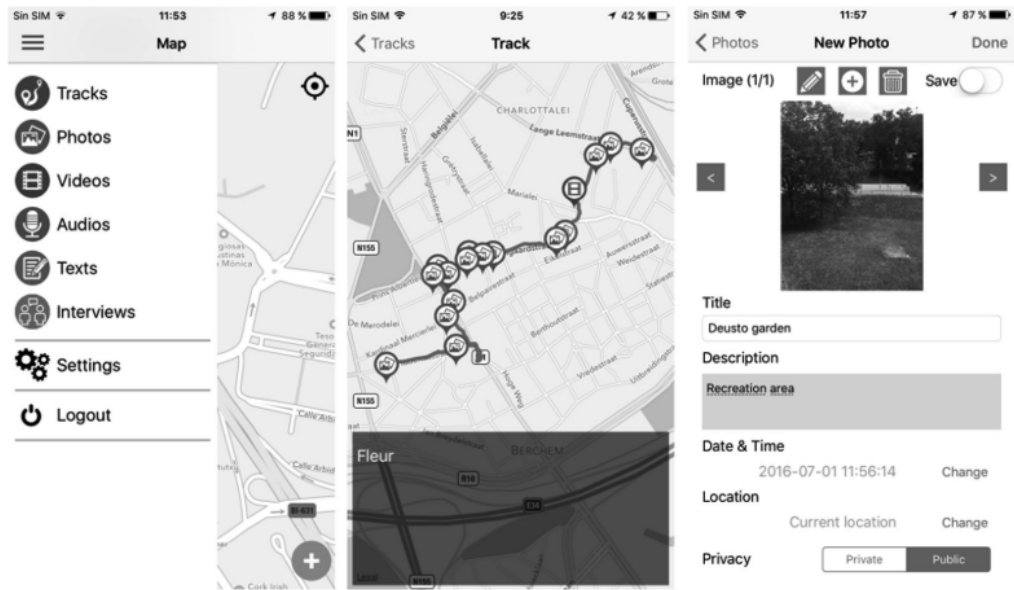
*Figure 3-7 - Interface of the EthnoAlly app that enables the collection of quantitative and qualitative data from participants in-situ (Osaba et al., 2019).*

An advantage of using such an app would be that it can be used in-situ, especially if the participants are willing to walk to personally significant places. It is less suitable though for other modes of transportation such as cycling or driving. Like diary studies and cultural probes, it requires a longer investment of time for the participants compared to a walking interview, which could negatively influence response and completion rates and would require participants to be prompted to continue to use the app. An additional problem would be that the participant needs to record the story related to a place (potentially in-situ) which would require a lot of typing if the input is text-based, or would require the participant to engage in an unnatural activity such as making a video or audio recording in-situ rather than telling the story to another person (e.g. the researcher) face-to-face (Avram, 2014; Gaver et al., 1999). However, an advantage of using a dedicated app would be that participants can easily upload and share already existing mementos or representations of emotional person-place relationships in the urban environment with the researcher or social contacts, or easily create and share new digital media while at the location. This would make data gathering and content analysis easier for the researcher, but the different forms this data can take would be limited by what can be recorded by using the smartphone and the app (e.g., smartphones can easily record videos, pictures, and audio clips, but not smells or

taste). In addition, similar to diary studies and cultural probes, follow-up interviews are likely to be needed to allow participants to elaborate on the content shared or for the researcher to seek clarification (Flick, 2014; Goodman et al., 2012).

### 3.3.5  Walking & Talking method

The Walking & Talking method (Stals et al., 2014) is a walking tour through the urban environment with a participant and an observer. This method is designed to help participants to be more relaxed when reporting personal experiences and emotions related to a place, has a low threshold for participating, builds up rapport quickly and easily, and treats the participant as an equal conversation partner to the researcher. Furthermore, as an in-situ method, exposure to the actual personally meaningful places allows participants to relive emotions and experiences, triggering memory processes that lead to richer and potentially more valid descriptions of place. This method allows participants to be self-directed in place and route selection and does not require retrospective (re)construction of experience. No additional session is required to contextualise or to ground truth the elicited emotion data. Both emotions and experiences related to personally meaningful places are elicited and shared face-to-face with the researcher during the walking tour, meaning that less time investment is need from both the participant and the researcher (Stals et al., 2014).

Being in-situ also allows the actual act of approaching, being in and leaving one's personally significant places, thus encompassing the full extent of the experience of that place, similar to Benford's concept of trajectories (Benford, Giannachi, Koleva, & Rodden, 2009). It includes a warm-up phase, in-situ experience of and in a place, and a cooling down phase. This allows participants the opportunity during the walking interview to anticipate or look forward to reaching their personally significant place, and reflect on their experience-in-place after physically leaving the place. This full extent of the in-situ experience of a place is designed to work as a catalyst, providing participants with cues from the environment which can prompt memories, stories related to the place, emotions and specific details (e.g., the smell of a specific flower, weather conditions, a local soundscape) that would be difficult to recall and communicate by just imagining.

Walking to one's personally significant places in the city is designed to also act as an external stimulus in triangulation (Whyte, 1980). Whyte's concept of **triangulation** is defined as the process by which some external stimulus provides a linkage between people and prompts strangers to talk (Whyte, 1980). The city itself can act as a conversation starter, allowing a more natural flow of conversation between the participant and the researcher, leading away from the idea that the participant is being "interrogated" by the researcher, towards a distribution of roles in which the participant and researcher are equal conversation partners (Stals et al., 2014).

Finally, the physical act of walking itself is conducive to discussing personal, emotional experiences or stories related to a place. When discussing which places people found meaningful in their life, Manzo (2005) found that participants mentioned the importance of movement as a way of thinking and reflecting. Watching the scenery pass by while walking through the city allows a person to get lost in their thoughts and to have a moment of privacy to think and reflect. Where periods of silence naturally occur during a walk, while they quickly start to feel awkward during sedentary interviews. In addition, participants report that the physical act of walking itself makes the "mental wheels" of the brain turn and provides them with a relaxing experience. The physical act of walking thus helps participants relax, think and reflect (Evans & Jones, 2011; Hein et al., 2008; Kanstrup et al., 2014; Manzo, 2005; Stals et al., 2014).

Plutchik Emotion Wheel for subjective, qualitative emotion measurement

There are two main types of qualitative approaches to identifying subjective emotions, namely categorical and dimensional (Rizopoulos et al., 2014). The categorical approach uses a set of basic emotions which are thought to be expressed similarly across various different cultures (Plutchik, 2005; Rizopoulos et al., 2014), while a dimensional approach seeks to break down emotions into easily identifiable and quantifiable components or underlying dimensions, such as arousal (e.g. activation level or intensity) and valence (e.g. positive-negative, or pleasure-displeasure) (Russell, 2003; Russell & Pratt, 1980; Russell et al., 1989).

An advantage of the categorical approach is that it makes it easy and quick for the participant to identify the basic emotions related to a place, but makes it difficult to make a distinction between an emotion at different intensity levels. The dimensional

approach on the other hand makes subsequent analysis more manageable by making it possible to rate or qualify each emotion on underlying dimensions, resulting in a more manageable set of quantities to be measured and identified (Rizopoulos et al., 2014). It also makes it easier to allow and add descriptive terms for emotions that participants might use which are not part of the basic set of emotions.

The qualitative, in-situ identification of subjective emotions is integrated in the Walking  & Talking method through the use of the Plutchik Emotion Wheel (Plutchik, 2005), which combines the advantages of the categorical and dimensional approach. The Plutchik Emotion Wheel (Figure 3-8) is divided into eight zones of basic human emotions, namely joy, trust, fear, surprise, sadness, disgust, anger, and anticipation, indicated by eight different colours.  In addition, each basic emotion is divided into three different intensity levels. For example, for the basic emotion "anger" indicated by the colour red, anger at a lower intensity level is also included in the form of "annoyance", and anger at a higher intensity level is also included in the form of "rage". The Plutchik Emotion Wheel is also easy to navigate for participants, as opposite emotions are positioned on opposite ends of the emotion wheel. For example, joy and sadness are located at opposite ends of the emotion wheel (Plutchik, 2005). Furthermore, it also allows the identification of more complex emotions that are combinations of basic emotions. For example, "love" is also on the emotion wheel as a combination of the two basic human emotions "joy" and "trust". And finally, the Plutchik Emotion Wheel offers an analytical framework for the researcher for categorizing and analysing the emotions mentioned by the participant as being related to the experience of the participant's personally meaningful place (Stals et al., 2014).
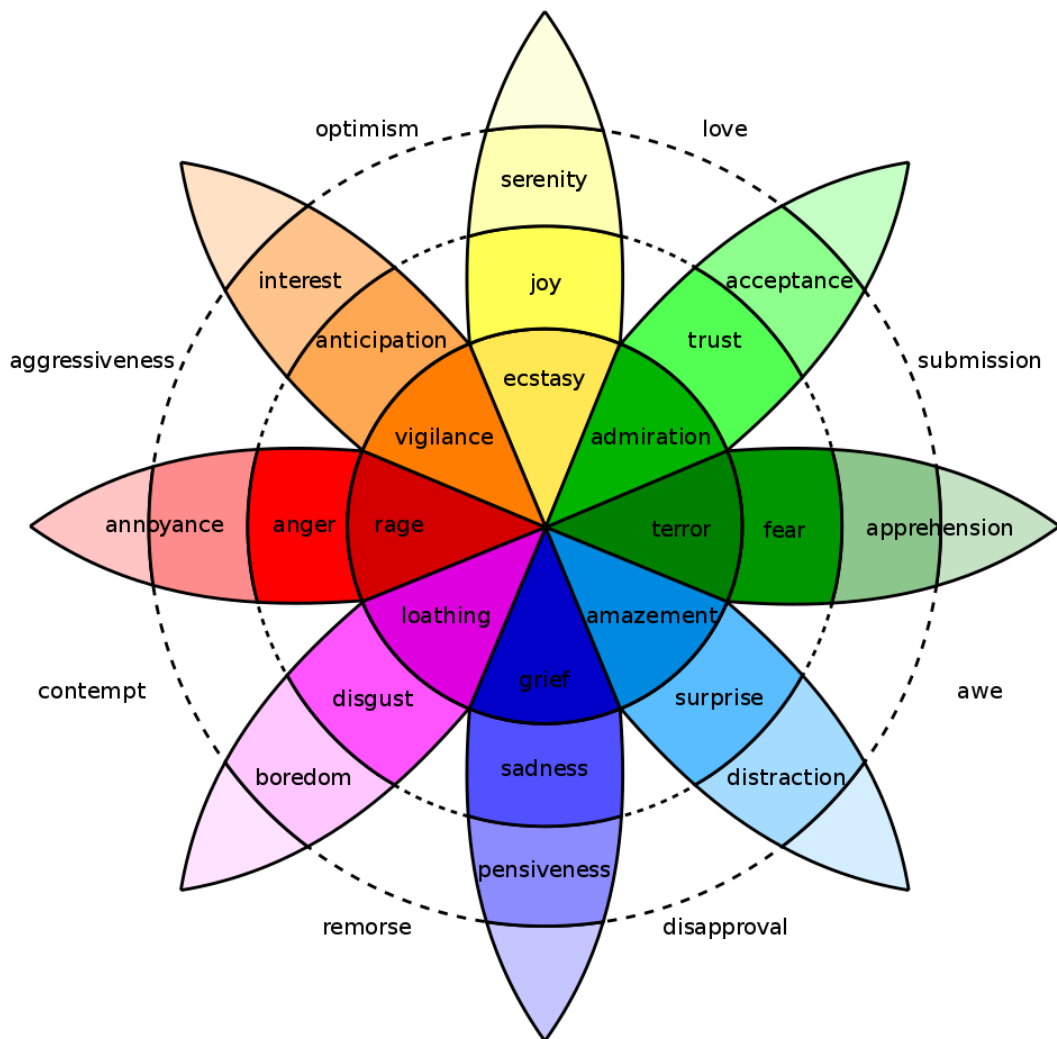
*Figure 3-8 - Plutchik's Emotion Wheel, showing the eight basic human emotions at three different intensity levels (Plutchik, 2011).*

The Plutchik Emotion Wheel is selected to elicit subjective emotions related to personally meaningful places, because it offers participants a lightweight means of explicitly expressing and verbalizing their different emotions and emotion intensities, associated with different places as the walk unfolds. These are directly shared and discussed with the researcher, meaning that no additional session for contextualising or for providing ground truth is required. Furthermore it has been used to this end in previous research in an HCI design context (Nielek, Ciastek, & Kopeć, 2017; Stals et al., 2014; Warpechowski, Orzeszek, & Nielek, 2019).

## 3.4 Three-staged Multimethod Approach

From the analysis of the methods used in the social sciences to investigate place attachment (section 3.2), it becomes clear that walking interviews would be more suitable than sedentary interviews for investigating people's emotional, personal relationships with places in the urban environment. Verbal and pictorial measures are often combined in a two-stage multi-method research approach order to measure place attachment and elicit the personally meaningful experiences in the form of personal memories and stories, or to locate personally meaningful places on a map in order to plan a walking route for a walking interview for further discussion. In Urban Interaction Design, technological developments have made it possible to use wearable, mobile technology to elicit people's objective emotional experiences of place in the urban environment, using GSR sensors, wireless wearable EEG headsets, or dedicated mobile apps. However, it is difficult to contextualize and provide a ground truth for this quantitative data, and is likely to require multiple sessions with participants to do so. A walking interview using the Walking & Talking method is preferred, as it enables the elicitation and discussion of emotions and experience-in-place in the urban environment in-situ in the same session.

Walking interviews appear to be most suitable for addressing research question 1 and 2, in particular due to the use of environmental memory cues, which will enable the in-situ elicitation of the personally meaningful experiences and emotions from which people's personal, emotional relationships with personally significant places in the urban environment develop (Evans & Jones, 2011; Hein et al., 2008; Stals et al., 2014). Since people can get attached to a whole range of different places, it is important that participants can freely and spontaneously select their own personally significant places (Gustafson, 2001a; Manzo, 2005) as well as the walking route and the sequence in which the places are visited (Evans & Jones, 2011; Hein et al., 2008; Nold, 2004, 2009). Furthermore, it needs to be made as easy, fun and engaging for participants to share their emotional relationships with personally significant places in the urban environment (Gaver et al., 1999) face-to-face with the researcher (Nold, 2004, 2009), where the distribution of roles between the researcher and participant is that of equal conversation partners (Stals et al., 2014). A multimethod approach gathering qualitative data using multiple different methods in the same study can provide a

more complete picture of the context, leading to a deeper understanding of people's emotional relationships with personally meaningful places in the urban environment, and can provide inspiration for the design of future technological devices and services for the hybrid city (i.e., Research Question 4) (Creswell & Poth, 2018; T. Wang, 2016). Being able to elicit the emotions and ground and contextualize them during the walking interview, would also requires less time investment for both the participant and the researcher compared to other in-situ methods (Evans & Jones, 2011; Stals et al., 2014).

The resulting method consisted of a three-stage multimethod approach (Figure 3-9).
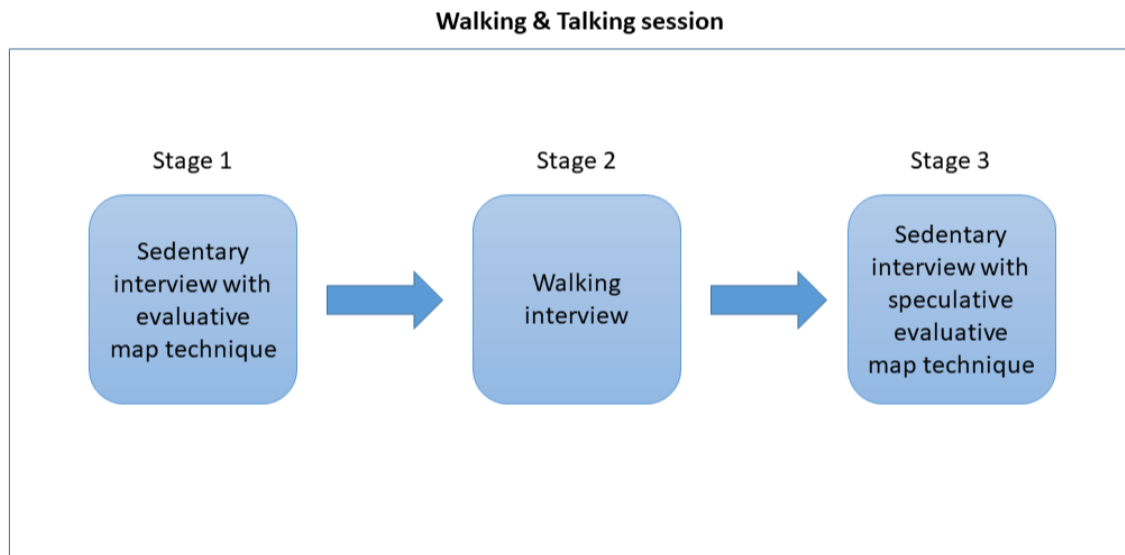


*Figure 3-9 - 3-Stage Multimethod Approach*

In the first stage of the Walking & Talking session, a pictorial method in the form of an evaluative map technique will be used in combination with a sedentary semi-structured interview. This is the traditional approach in social science studies of place attachment (Lewicka, 2011b; Manzo, 2019), and the combination of pictorial and verbal measures has been shown to offer more insight into people's emotional relationships with meaningful places (Hernández et al., 2014; Lewicka, 2011b; Manzo, 2019). It offers a high-level view and experience of the city which enables the participant to select and locate their own personally meaningful places in the urban environment, plan the walking route for the walking interview along these places, and allow to obtain general information from the participants. In the second stage, this will

be followed by a walking interview using the Walking & Talking-method (Kanstrup et al., 2014; Kusenbach, 2003; Stals et al., 2014), to investigate how people's personal emotional place meanings (i.e., experience-in-place and emotions) are connected to their own personally significant places in the urban environment (i.e., Research Question 1), how these emotional personal meanings of places can be represented and communicated using technology, and the different forms this data can take (i.e., Research Question 2). During this walking interview, the Plutchik Emotion Wheel will be used to elicit the personally meaningful experiences and emotions related to people's personally meaningful places in the urban environment. Finally, in the third stage after the walking interview, a sedentary interview with evaluative map technique using specially prepared pictorial measures in the form of speculative social and emotion maps will be used to investigate the relevance of personal, emotional person-place relationship data to other people. (i.e., Research Question 3). The rationale for this is that emotional person-place relationships are currently typically represented and communicated in the form of arousal maps or emotion maps, and have been used in similar studies as conversation pieces to reflect on current practices and explore future possibilities regarding the use of emotional person-place relationship data (Leahu et al., 2008; Matassa & Vernero, 2014; Nold, 2009). This will be discussed in more detail in section 4.1.2.

# Chapter 4:  Walking & Talking in the Urban Environment

In the previous chapter, a general two-phased approach to the primary research has been outlined using the Double Diamond Model.
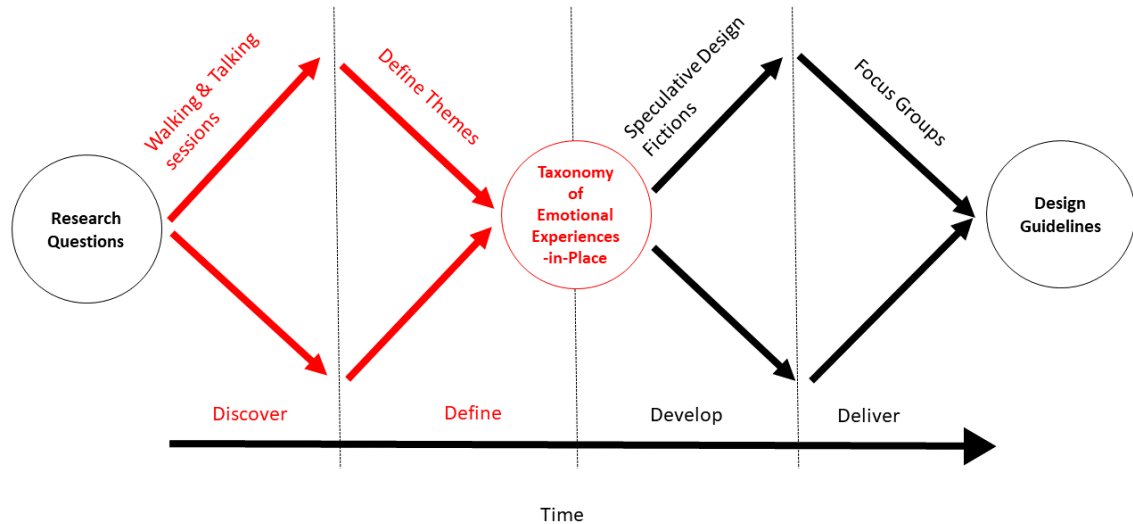


*Figure 4-1- Double Diamond Model - First Diamond*

In this chapter the focus will be on the first diamond in the model (Figure 4-1). This is aimed at creating a better understanding of the problem and the problem space, by investigating and understanding the emotional person-place relationships people currently have with personally meaningful places in the urban environment, the different forms this data can take, and the potential for consuming and sharing emotional person-place relationship data.

The operationalization of the selected methods will be discussed in Section 4.1. This includes participant recruitment, the research toolkit and equipment used, the design of the methods and procedures, the pilot study, and the rationale and procedures for a grounded theory approach to data analysis. The Walking & Talking sessions were conducted over a nine-month period from November 2016 to July 2017, investigating 45 personally meaningful places and the emotional person-place relationships of eight participants with those personally meaningful places in their current city of residence, Edinburgh in the United Kingdom. The themes that emerged from the analysis of this data corpus, are a taxonomy of emotional experiences-in-place, and opportunities for

technology to capture, represent, consume and share emotional person-place relationships, are discussed in Sections 4.2 and 4.3.

## 4.1 Operationalization of Methods

Edinburgh is a suitable city for investigation, because of its multicultural population and size, and compact, walkable city centre consisting of a variety of different types of urban areas. It is the capital of Scotland (United Kingdom) with a population estimate of 518,500 inhabitants for the City of Edinburgh. This makes it the second largest city in Scotland and ninth largest city in the United Kingdom by population (Office for National Records of Scotland, 2018). It is an international, multicultural city with the highest percentage in the United Kingdom (48%) of a non-UK born population (Office for National Records of Scotland, 2017).

The street layout is typical of the old quarters of many northern European cities and the city centre is compact and easy to traverse on foot within half an hour. It contains many different types of urban areas, namely a commercial area, different types of high-end, deprived, and gentrified residential areas, urban green spaces, and a historic city centre. The historic city centre is listed as an UNESCO World Heritage site, making Edinburgh a popular tourist destination. It is also considered to be a city with a lot of greenery, as it has more trees per head of populace than any other city in the United Kingdom (Darot & The City of Edinburgh Council, 2019; Office for National Records of Scotland, 2017, 2018). The combination of these factors make Edinburgh is a suitable city to investigate using a walking method (Kanstrup et al., 2014; Stals et al., 2014).

### 4.1.1 Participant recruitment, eligibility criteria and sample selection rationale

For most studies in both the social science studies into place attachment as well as studies in the field of Urban Interaction Design employing a walking method to investigate emotional experiences of places in the urban environment, the number of participants typically ranges from 3-15 (see Appendix K for a more detailed table overview of the different studies that have been evaluated to this end) (Al-Barrak & Kanjo, 2013; Aspinall et al., 2015; Bailey et al., 2016; Gustafson, 2001a; Lane et al., 2005; Leahu et al., 2008; Manzo, 2005; Mody et al., 2009; Nold, 2004, 2009; Paulos &

Goodman, 2004; Sixsmith, 1986; Tilley et al., 2017). The aim will therefore be to recruit 10-15 participants.

However, most social studies on place attachment which allowed participants to spontaneously and subjectively select their own personally meaningful places, do not specify how many places have been selected by or reported on by participants, neither in total nor per participant (Gustafson, 2001a; Manzo, 2005). Also review papers of walking methods, walking interview and mobile methodologies did not provide guidelines or recommendations in this respect (Evans & Jones, 2011; Hein et al., 2008; Kanstrup et al., 2014). However, similar studies in the field of Urban Interaction Design which aim to measure participants' emotional responses to different types of places in the urban environment, typically have each participant visit between 3 and 5 different (types of) places as part of the walking method employed (Al-Barrak & Kanjo, 2013; Al-barrak et al., 2017; Aspinall et al., 2015; Paulos & Goodman, 2004; Stals et al., 2014). In order to balance the number of participants and the number of personally meaningful places, each participant was initially asked to select five personally significant places. This allowed some leeway in case a participant would select a place that would not be possible to visit during the walking tour, for example because the place is too far away or because the place might be closed (Stals et al., 2014). In the context of this thesis, this would then result in a study of approximately 50 personally meaningful places (and emotional person-place relationships with these places) in the urban environment.

Participant recruitment procedure & Eligibility criteria

The participant recruitment procedure, eligibility criteria and sampling strategy were based on the procedure and eligibility criteria employed in Manzo's study (2005) and Gustafson's study (2001) of people's personally significant places throughout their lifetime (Gustafson, 2001a; Manzo, 2005). Participants were recruited through a networking procedure, beginning with referrals of potential participants from personal contacts (Gustafson, 2001a; Leahu et al., 2008; Manzo, 2005). Potential participants were initially contacted by phone or email, depending on the contact information provided, to request participation and to screen them for eligibility. Based on the recommendations and eligibility criteria provided by Manzo (2005) who as part of her

study investigated place attachment to places in the city that the participants are currently living in, the following eligibility criteria were formulated: Firstly, participants were considered eligible if they were current residents of Edinburgh, that is, living in the same city that was being investigated. This was done because of accessibility and to make it possible to examine the kind of places that are important to people living in the same city. Secondly, participants were eligible if they had been residents of this city for at least two years, to ensure that there was a base of personally meaningful experiences-in-place in the city under investigation. Thirdly, participants needed to be able to traverse the urban environment on foot at their own pace, as one of the methods employed was a walking interview. And finally, participants could not be friends or family of the researcher, but acquaintances were allowed. People too close to the researcher were not considered suitable, because this could potentially influence the responses of the participants, lead to hierarchy – or power dynamic issues, or compromise the researcher's objectivity (Chand, 2016; Scottish Oral History Centre, 2016; Wong, 2013).

Sampling procedure

The sampling procedure was based on Gustafson's (2001a) and Manzo's (2005) recommendations for strategic non-representative sampling (Trost, 1986) used in similar studies of place attachment and subjective place meanings throughout people's lives (Gustafson, 2001a; Manzo, 2005; Scannell & Gifford, 2017). The objective of this approach was not to draw a statistically representative sample of participants, but to obtain a wide range of variation in the responses through the strategic consideration of socio-demographic variables or factors expected to produce variation in place attachment to places in the urban environment. Gender, age, nationality/race, occupation, level of education, place of residence (within the city), length of residence in the city, and life path were considered in this sampling process, as these factors have been shown to be associated with variations in meaning and experience of place and place attachment (Giuliani, 2003; Gustafson, 2001a; Hernández et al., 2007; Hidalgo & Hernandez, 2001; Lewicka, 2011b; Manzo, 2005; Manzo & Devine-Wright, 2014; Scannell & Gifford, 2017; Trost, 1986)

An additional recruitment aim was to recruit participants that have at least one social connection with one of the other participants taking part in the study to investigate the potential relevance of a person's emotional person-place relationship data to people that the participant has different types of social relationships with. Therefore, each recruited participant was asked if they knew someone else within their social circle who would be willing to participate in the study. Similar procedures to participant recruitment have previously been employed in urban HCI studies involving emotion and affect, to provide a natural, social context for elicitation, expression, and sharing of personal emotions and stories using technology (Chand, 2016; Isomursu, Tähti, Väinämö, & Kuutti, 2007; Leahu et al., 2008; Sundström & Ståhl, 2007; Wong, 2013).

### 4.1.2 Design

In this section, the design of the methods for the 3-stage multimethod approach for the Walking & Talking sessions will be discussed. Each Walking & Talking session consisted of a sedentary interview with an evaluative map technique in the first stage, a walking interview in the second stage, and a sedentary interview using a speculative evaluative map technique in the thirds stage.

Stage 1: Sedentary semi-structured interview with evaluative map technique

A semi-structured, face-to-face, interview with and evaluative map technique was chosen for the first stage. The rationale for this has been discussed in Chapter 3. The first set of open-ended semi-structured interview questions for this sedentary interview consisted of 15 questions. These were designed as a warmup exercise as they should be easy to answer for participants (see Appendix C, section A). These questions also allowed the researcher to obtain relevant socio-demographic information and background information from the participants derived from the variables and factors that have been shown in the literature to produce variations in the meaning and experience of place and place attachment (Giuliani, 2003; Gustafson, 2001a; Hernández et al., 2007; Hidalgo & Hernandez, 2001; Lewicka, 2011b; Manzo, 2005; Manzo & Devine-Wright, 2014; Scannell & Gifford, 2017). They also addressed their general perception and experience of and relationship with Edinburgh as a city (Bernardo & Palma-Oliveira, 2013; Gustafson, 2001a; Lewicka, 2011b; Lynch, 1960;

Scannell & Gifford, 2010), as well as their current use of technological devices and services in the urban environment to capture, augment and share experience-in-place (Haimson & Tang, 2017; Harper, Hara, & Goncalves, 2015; Li et al., 2013; Quercia, Aiello, Schifanella, et al., 2015; Quercia, Schifanella, et al., 2014; Resch et al., 2016; Steiger, Resch, & Zipf, 2016; van Gennip et al., 2015). Finally, it addressed the way they move through the city using different modes of transportation (Bassoli et al., 2007; Brewer & Dourish, 2008; Dourish & Bell, 2007; Lynch, 1960; Matassa, 2013).

 For the design of the evaluative map technique in the first stage, the main aim was to enable the participant to identify the location of meaningful places and routes on a map of the city. These are places that people are typically personally attached to according to the literature, namely  their current and previous homes, as well as the workplace, and the typical routes participants take when moving through the city (Lewicka, 2011b; Manzo, 2019; Scannell & Gifford, 2010). In addition, participants were asked to indicate the location on the map of each of the personally meaningful places in the city that they had selected themselves. The design of the map and in particular the area of the city the map covered, was based on all the locations selected in a previous case study of personally meaningful places conducted in Edinburgh (Stals et al., 2014). The printed paper map of Edinburgh that was used to this end was a printout from Google Maps, as participants were likely to be familiar with this type and style of the map. It was divided over 10 A4-sized pieces to make the map easier to handle for the participant and focus on a specific area of the city (Figure 4-2).

*Figure 4-2 - Printed paper map of Edinburgh, used for the sedentary interview with the evaluative map technique in the first stage.*

For each of the personally meaningful places indicated on the map by the participant, questions were asked regarding the personal meaning of the place, the experience-in-place and emotions that made this place personally meaningful to the participant, and the role other people played in this particular experience (see Appendix C, section B). These questions were derived from Manzo's (2005) list of semi-structured interview questions to explore the nature of participants' experiences in each personally meaningful place mentioned, the qualities of those places, and the process of meaning making.

Stage 2: Walking & Talking interview including emotion elicitation in the urban environment

Based on the analysis of important aspects of the various walking methods identified and outlined in the Chapter 3, the Walking & Talking method was selected for the

walking interview (Stals et al., 2014). This method was selected because it is designed to probe the emotional relationship between a person and their significant places in the urban environment. The semi-structured walking interview was designed as hybrid of in-situ observations and 11 semi-structured in-depth interview questions (see Appendix C, section C). This method offered a more fine-grained experience of the city than the sedentary interview with the evaluative map technique in the first stage. It used the Plutchik Emotion Wheel to in-situ elicit the emotions connected to each personally significant place and the personally meaningful experiences that the participant had in each of these places in the form of stories (6 questions). The potentially evolving meaning of each place for the participant was discussed (1 question), and the behaviours that occurs in relationship to each personally significant place observed (1 question). Other people connected to the personally meaningful experiences of place were identified (1 question), and how participants have used technology in the past and would like to use technology in the future to capture and share their experiences-in-place with others (2 questions). These questions were derived from the open-ended, in-depth interview questions used by Manzo (2005) and Gustafson (2001a), as well as the dimensions of the models of place attachment developed by Gustafson (2001) (i.e., self, others, environment) and Scannell & Gifford (2010) (i.e., person, place, and psychological processes).

Stage 3: Sedentary interview with speculative evaluative map technique

The main aim of the third stage of the Walking & Talking sessions was to gain insight into where people's interest might lie in exploring and using this personal, emotive person-place relationship data, and the potential relevance of social relationships and type of emotion in exploring and using this personal data (i.e., Research Question 3). It was designed to identify potential for informing the design of innovative technological devices and services that use this type of data to augment the urban lived experience.

Following similar research which used specially designed arousal maps of the city as a research tool and conversation piece to generate discussion (Leahu et al., 2008; Matassa & Vernero, 2014; Nold, 2009), this third stage took a speculative design approach using an evaluative map technique. Auger (2013) argues that in general,

speculative design serves two distinct purposes: it critiques current practice and it enables thinking about potential futures (Auger, 2013). To this end, each participant was presented with two specially designed speculative maps of their city of residence. Each map was intended to stimulate reflection and critical attention within participants on their current personal, emotional relationship with places in the urban environment, and how such personal geo-located social data and emotion data regarding person-place relationships might be used, explored and shared using maps in the near future. The social map and emotion map of Edinburgh were intended to act as a catalyst and conversation piece to help participants imagine and reflect on a future scenario in which personal data regarding other people's emotional bonds with places in the city would be available to them in the form of a map, and how they would potentially use this data (i.e., Research Question 3) (Stals et al., 2018). The first map, which will be referred to as the "Social map of Edinburgh", contained person-place relationship data from multiple people that the participant has different types of social relationships with. The other map referred to as the "Emotion map of Edinburgh", depicted different types of emotions connected to places in the city.

Rather than creating mock up maps with fake person-place relationship data (Leahu et al., 2008; Matassa & Vernero, 2014),  the aim was to make the possible future scenario in which this type of data would be captured and shared using maps as realistic as possible. This was done to create a more realistic and engaging interaction with the data on the map (Angus et al., 2008; Lane et al., 2005; Dimitrios Ringas & Christopoulou, 2013a) which would improve the quality of the responses of the participants (Goodman et al., 2012). To that end, emotional person-place relationship data used to design both maps was based on real data from a previous case study of people's personal relationships with places in Edinburgh (Stals et al., 2014).

The Social Map of Edinburgh aimed to investigate the relevance of social relationships on exploring other people's personal person-place relationship data regarding their personally meaningful places (Figure 4-3 - Social Map of EdinburghFigure 4-3). The design of the social map was based on a printed version of Google Maps to remain consistent across all three stages of the Walking & Talking sessions. It depicted the city centre of Edinburgh, as a previous case study of people's personal relationships with

places in Edinburgh indicated that most personally meaningful places are located in the city centre (Stals et al., 2014). A drawing of a castle was positioned at the location of Edinburgh castle on the map, as it is a well-known and highly visible historic landmark on the top of a hill in the city centre of Edinburgh. This would allow participants to quickly orient themselves and find their own location on the map (Lynch, 1960).
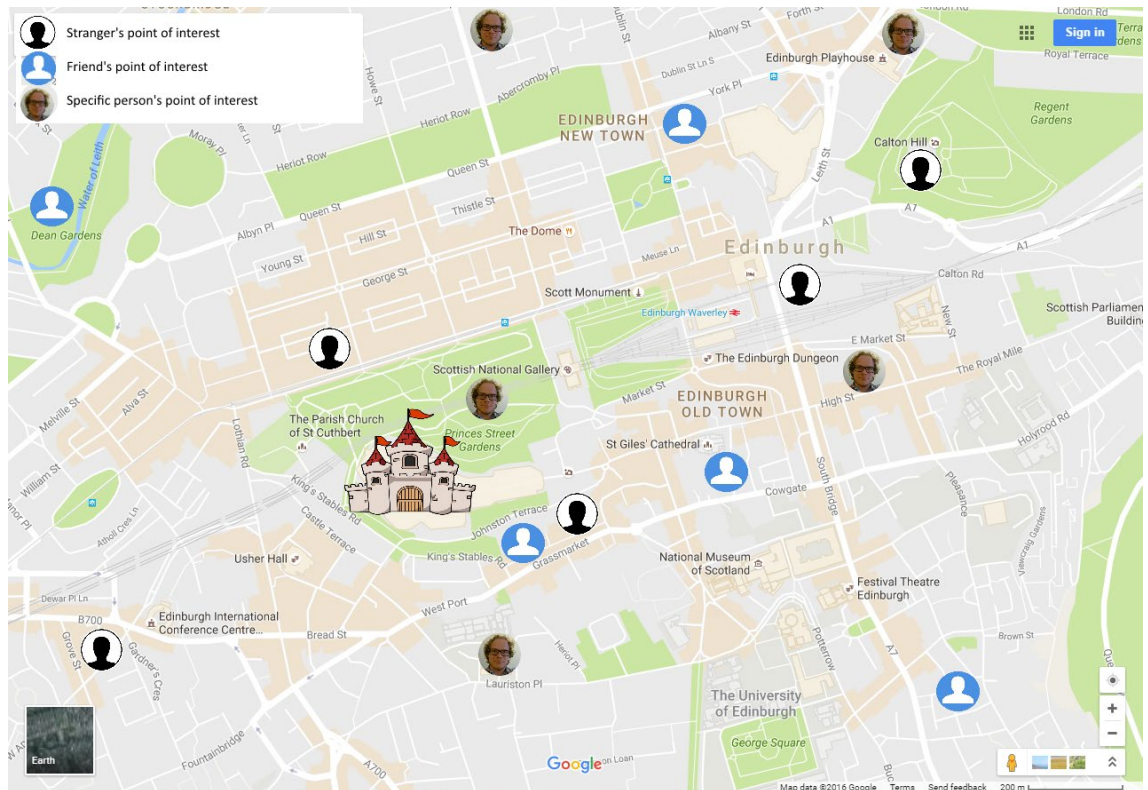


*Figure 4-3 - Social Map of Edinburgh*

The social map depicted the location of personally meaningful places of three types of people that the participant has different social relationships with. It is informed by already existing popular location-based place sharing applications such as Foursquare, Facebook Places, and TripAdvisor (Angus et al., 2008; Avram, 2014; Lindqvist et al., 2011), and popular social media used to capture and share personally meaningful experiences-in-place such as Facebook, Periscope and Snapchat (Birnholtz et al., 2015; Haimson & Tang, 2017; McRoberts, Ma, Hall, & Yarosh, 2017; Xu, Chang, Welker, Bazarova, & Cosley, 2016). Personally meaningful places of strangers, that is, people that the participant has no social relationship with, were depicted by the white icons on the map. A friend's personally meaningful places were depicted by the blue icons

on the map, mimicking the colour scheme of Facebook.  And finally, personally meaningful places of a specific person in this PhD study that the participant knows in real life and has a social relationship with, were depicted by a profile picture of that specific person on the map. This implies that this icon as well as the type of social relationship with this specific person could be different for each participant. In case there had not been a participant recruited or interviewed yet that the current participant has a social relationship with, a picture of the researcher was used. An index is provided in the top left corner of the map to indicate the meaning of each of the icons for the participants.

For each of these three types of social relationships, the social map contained an equal number of personally meaningful places. These places were picked from a set of personally meaningful places from previous case study conducted in Edinburgh (Stals et al., 2014) based on a several criteria. Firstly to provide an even spread of places across the map so that it would be likely that a selected place was in close proximity to the participant's current location or their own personally meaningful places, to provoke discussion (Avram, 2014; Matassa & Vernero, 2014; Dimitrios Ringas & Christopoulou, 2013a). And secondly, to contain a variety of different types of places in different public realms (i.e., private, semi-public, and public places) that have different functions and are likely to evoke different emotional experiences (Al-barrak et al., 2017; Mody et al., 2009; Paulos & Goodman, 2004). Therefore, the map contained one private place (home), five semi-public places (a pub, restaurant, casino, university campus, student hall), and five public places (park, historic tourist location, bus stop, street, and a bridge). However the exact locations were not specified and were left to be interpreted, negotiated and inferred by the participant in order to investigate where their curiosity and interest lie in exploring this type of data (Boehner et al., 2007; Leahu et al., 2008; Leahu & Sengers, 2015; Stals et al., 2017a, 2018).

The Emotion Map of Edinburgh was designed to be a provocation intended to stimulate reflection and critical attention within participants on their current personal, emotional relationship with places in the urban environment, and speculate how such personal geo-located emotion data might be used, explored and shared using emotion maps in the near future. The emotion map contained different types of positive and

negative emotions connected to specific locations and areas in the city, with each emotion indicated by a different colour and a textbox indicating the corresponding emotion (Figure 4-4). The colour and words used to indicate the emotions on the map correspond with the colours and words of the emotions on the Plutchik Emotion Wheel. The selected places correspond with the personally meaningful places used in the design of the Social Map of Edinburgh for strangers and friends. The emotions related to each place were based on the real data from a previous case study of people's personal relationships with personally meaningful places in Edinburgh (Stals et al., 2014). Using an authentic emotion map of Edinburgh was expected to increase participant engagement and improve the quality of the responses (Goodman et al., 2012).
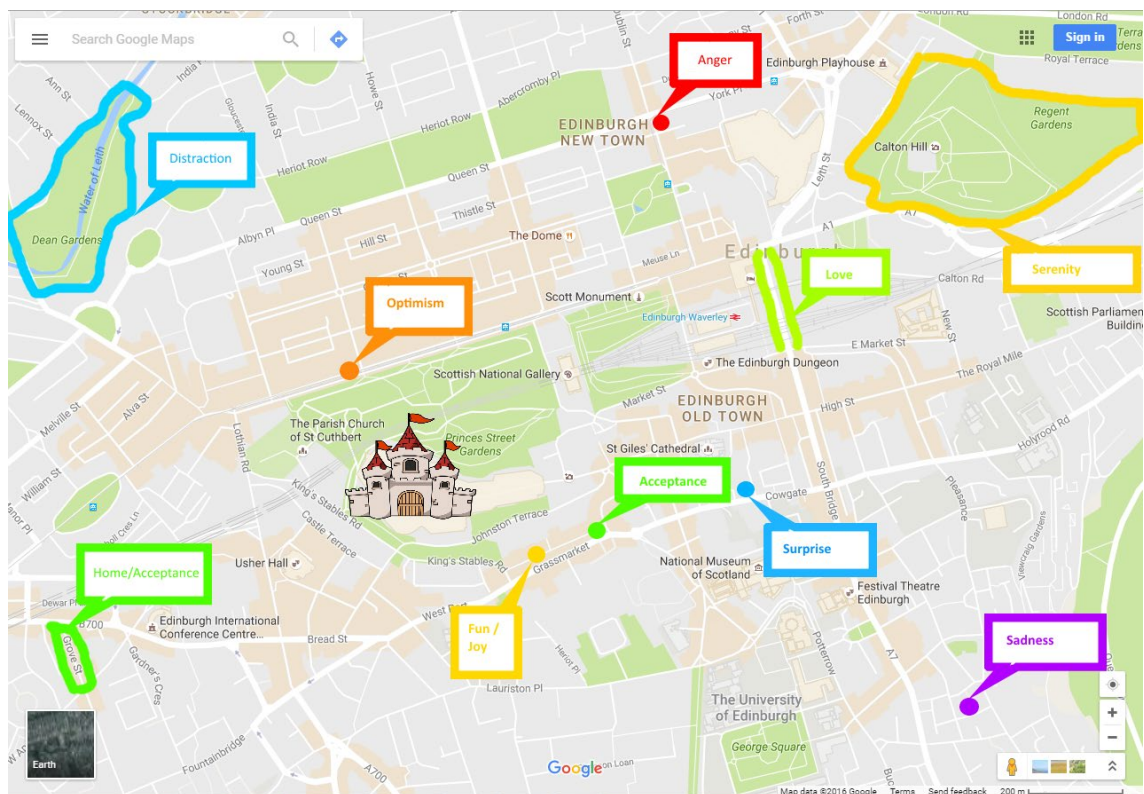


*Figure 4-4 - Emotion map of Edinburgh, used as a speculative evaluative map technique*

A specific aim of the emotion map was to investigate the potential influence of the different types of emotions connected to personally meaningful places in the city of residence, on the relevance and interest of this type of personal data to other people (Stals et al., 2017a, 2018). The fact that the maps are open-ended and are not interpreted for the participant was a conscious design decision. It follows the approach

by Leahu et al. (2008), who used arousal maps as an approach of interpreting place-based physiological signals and for envisioning how those could be shared and used. It puts the participant in control of interpreting place meaning of places in their own city, allowing different meanings to emerge, and enables the participant to reflect on, analyse and envision potential use and sharing of this personal, emotive person-place relationship data (Boehner et al., 2007; Leahu et al., 2008; Leahu & Sengers, 2015).

The list of open-ended questions used in the third stage during the sedentary (semi-)structured interview with the speculative evaluative map technique, were based on the questions used by Leahu et al. (2008) as part of a discussion on the potential use and interpretation of arousal maps within a group of friends. Similar to their approach, the open-endedness of the questions as well as the maps themselves, invited participants to tell stories and talk about the social motivations and personal values and experiences of places that make sharing and exploring this type of data appealing, to inform further design (Leahu et al., 2008). Questions revolve around the different types of social relationships and emotions related to other people's personally meaningful places in the urban environment that might be of interest to the participant, the participant's interaction with- and interpretation of the two speculative maps, and the potential applications of this data (see Appendix C, section D for the full list of questions).

### 4.1.3 Procedures

In this section, the procedures for Walking & Talking sessions are outlined. Before recruitment of participants started, ethical approval for the study was obtained. Appropriate ethical approval forms, participant information sheets and consent forms were developed in keeping with Edinburgh Napier University guidelines (see Appendix B: Application for Ethical Approval).

Following the networking procedure for participant recruitment outlined in section 4.1.1, friends, acquaintances, colleagues and personal contacts were contacted to ask if they have any contacts within their own social circle which might be interested in participating in the study. Potential participants were then be contacted by the researcher and screened according to eligibility criteria outlined in section 4.1.1. If they match the eligibility criteria, a formal invitation was sent by email, including the

Participant Information Sheet (see Appendix D), providing a brief description of the study and what taking part in the study will involve.

In preparation for participating in the study, the participant was asked to think about approximately five places in Edinburgh that are meaningful to the participant on a personal level and/or that the participant has an emotional connection with. This is done because it can be difficult for participants to come up with these places on the spot (Manzo, 2005; Manzo & Devine-Wright, 2014; Stals et al., 2014).  It was made clear that the reason why the participant picks those places was entirely up to them and can be positive or negative (Manzo, 2005). Three examples of potentially meaningful places were provided, namely "the place where you have met your partner, your favourite pub, or the close where you got mugged".  The participant was informed that the total interview was expected to take approximately two hours, and was asked to choose a quiet indoor place close to one of their selected personally meaningful places for the first part of the interview, such as a bar or a coffee shop. Participants were offered two beverages throughout the Walking & Talking sessions, but no payment or reward for participation was provided.

On the day, prior to starting the first stage of the Walking & Talking session, the researcher walked the participant through the information on the Participant Information Sheet (see Appendix D) and the Informed Consent Form (see Appendix E). Written informed consent was requested and obtained from all participants in keeping with Edinburgh Napier University's research ethics guidelines. Participants were informed that the entire interview would be recorded on video and audio using a GoPro Hero 4 Session camera mounted on a handler (Figure 4-5), and that pictures would be taken during the interview, but that their responses would remain anonymous. However, explicit written consent was obtained to allow anonymised clips of the recordings, stills of the video and the pictures to be included in any associated publications, and to allow the sharing of identifiable participant responses with other participants in this study.

***Figure 4-5 - GoPro Hero 4 Session camera mounted on a handler so it can be positioned upright on the table or held like a microphone during the walking interview.***

In the first stage, after the open-ended interview questions outlined in Appendix C section A (Personal Information) have been answered, the participant was presented with the paper map of Edinburgh for the evaluative map technique. The map was laid out in on the table in front of the participants. Following the list of interview questions outlined in Appendix C section B (Evaluative Map Technique), the participants was given a pen and asked to indicate on the map where their (current and previous) home, workplace, and typical routes they take using various modes of transportation, were. Subsequently, the participant was asked to indicate the location of the four personally meaningful places they had selected on the map (in no particular order). For each selected place, the participant was asked to verbally answer a fixed set of open-ended questions regarding the participant's personal relationship with the place (see Appendix C, section B: Evaluative Map Technique, Question 4).  In order to help the participant verbalize their emotions related to personally meaningful places (Question 4c), the Plutchik Emotion Wheel (Plutchik, 2005) was introduced at this point and briefly explained to the participant. Participants were allowed to use the emotion wheel as well as their own words to describe their feelings or emotions.

Once all the personally meaningful places that the participant had selected had been discussed, the walking route for the walking interview in the second stage two of the Walking & Talking session was determined. The GPS and GeoTracker app (Bogdanovic, 2013) on the researcher's smartphone were switched on in order to track and visualise the actual walking routes being taken as well as additional track statistics (Figure 4-6).
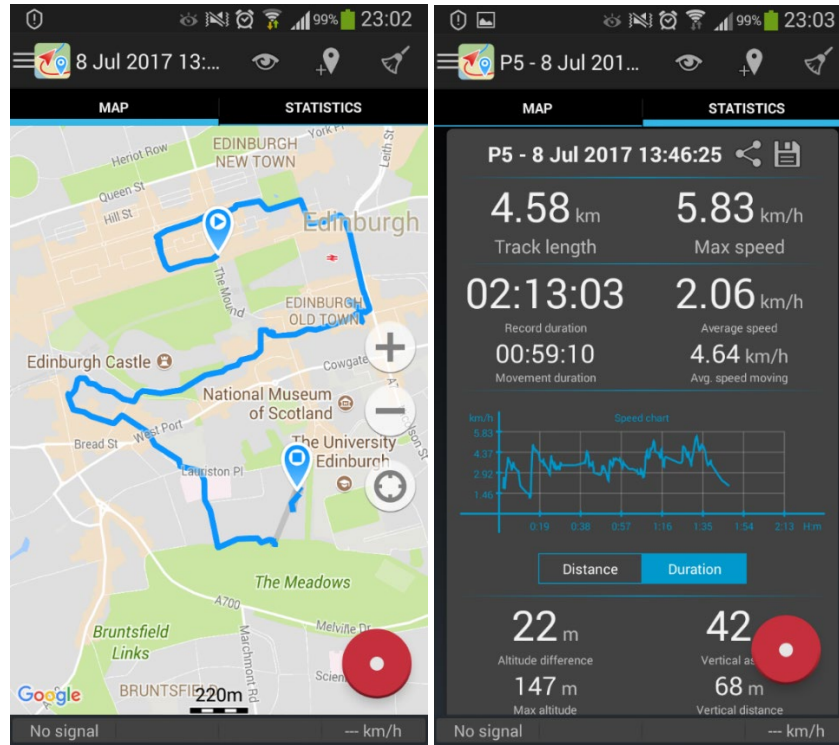


*Figure 4-6 – GeoTracker screenshots from recorded Walking & Talking session.*

The GoPro camera mounted on a handle was held in the hand by the researcher as if it was a microphone, with the camera facing the participant. The participant was handed a new paper print of the Plutchik Emotion Wheel on a clipboard, in a transparent plastic cover to protect it from any potential rain, and a waterproof marker to indicate any emotions and feelings that occurred during the walk on the emotion wheel (Figure 4-7).
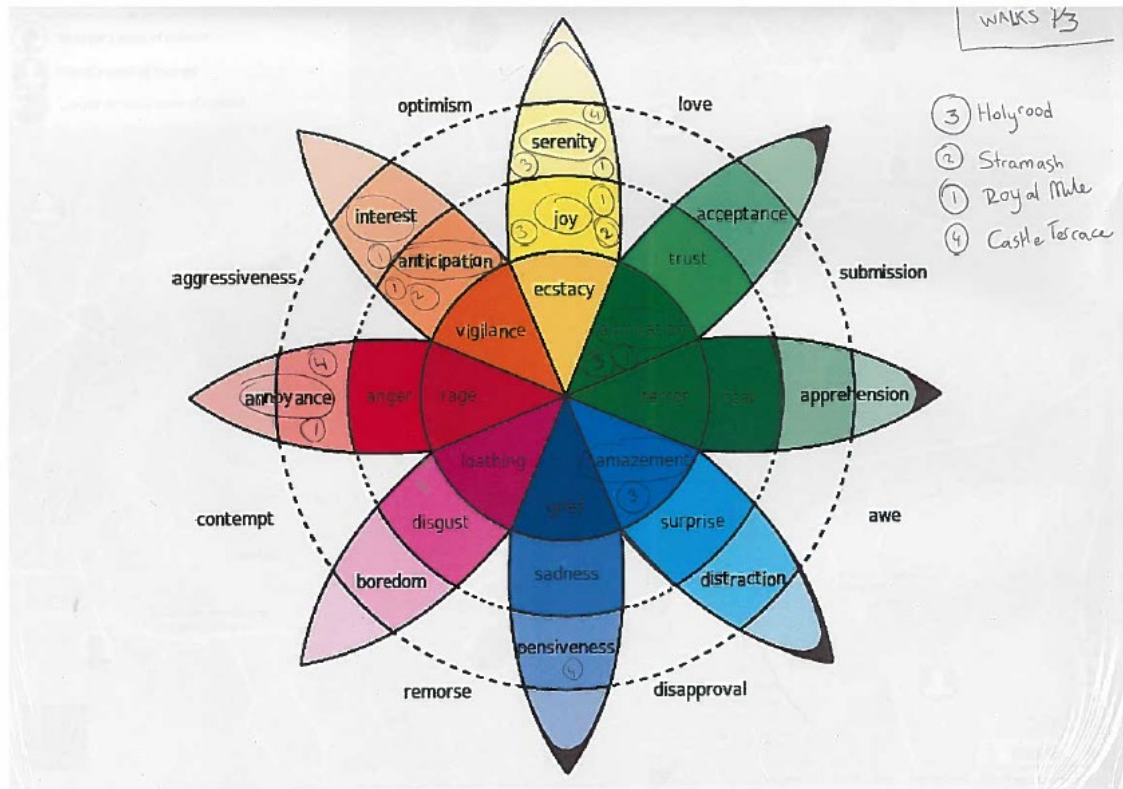
*Figure 4-7 - Example of the paper sheet with the Plutchik Emotion Wheel, filled out by a participant during the walking interview. The numbers on the emotion wheel indicate which emotions are related to each of the selected personally meaningful places listed.*

At the start of the walking interview, the researcher reminded the participant that the participant was in charge of the walking tour. The researcher regularly reminded or prompted the participant during the walk to indicate on the emotion wheel any emotions that occurred. For every place that the participant indicated as being personally meaningful during the walk (including places the participant had not selected in the first stage), the participant was asked to, for each place, verbally answer the semi-structured interview questions outlined in Appendix C (see section C: Walking & Talking).

After the walking interview in stage two had been completed, a quiet, indoor place such as a café, coffee shop or pub close to the last personally significant place visited was selected by the participant for the third and final stage of the Walking & Talking session. During this speculative evaluative map technique, the participant was first presented with the Social Map of Edinburgh. The researcher briefly explained the meaning of the icons on the map. The participant was then asked if they recognised

the icon with the picture of another participant in the study with whom they have a social relationship. They were asked to describe the nature of their relationship with this person in their own words. Then the researcher asked the participant to verbally answer the semi-structured questions outlined in Appendix C (see section D – Speculative Evaluative Map Technique – Social Map) to investigate the potential relevance of social relationships on the interest in and potential usage of other people's personal, emotive person place relationship data.

The Emotion map of Edinburgh was presented second. The researcher put the emotion map of Edinburgh in front of the participant on the table and verbally provided a brief explanation of the map. Then the researcher continued by verbally asking the semi-structured interview questions in Appendix C, section D2, D3, D4).

### 4.1.4   Pilot study

A pilot study consisting of two test runs with one participant each, was conducted in order to test and fine tune the methods, procedures and research kit. These two participants were recruited using the networking procedure as described in section 4.1.1.  The collected data was subsequently transcribed and analysed in order to assess if the data being collected would enable answering the research questions and to get an initial idea of how long it would take to conduct, transcribe, and analyse each Walking & Talking session.

Overall, the implementation of the methods allowed the elicitation of the data that was needed to be able to answer the research questions. However, some minor improvements to the wording of some of the interview questions were made, as well as to the procedures. Each Walking & Talking sessions in the pilot study took between 2,5-3 hours to complete, which was longer than the estimated two hours. In addition, it became apparent that it would be necessary to fully transcribe all three stages of the Walking & Talking sessions, meaning it would take about a month to conduct, transcribe and analyse each Walking & Talking session. In order to not overburden the participants and reduce the time needed to complete a Walking & Talking session, while also taking into account the additional time needed to fully process each session, it was decided to reduce the number of personally meaningful places per participant from five to four and recruit a maximum of ten participants. This would then result in a

study of approximately 40 personally meaningful places in total. This would still provide a reasonable balance between the total number of participants and total number of personally meaningful places investigated, without compromising the richness, diversity, and quality of the responses in the data corpus.

### 4.1.5  Analysis

Each of the video recordings of the complete Walking & Talking sessions was fully transcribed for analytical purposes using The FTW Transcriber software (Tyger Valley Systems, 2017) and a professional transcription service. The data analysis was conducted by coding these verbatim transcriptions based on a qualitative Grounded Theory approach (Charmaz, 2009, 2014; Corbin & Strauss, 1990, 2015; Creswell & Poth, 2018; Flick, 2014).

Rationale for a Grounded Theory Approach

The rationale for using a **grounded theory approach** is that it attempts to move beyond description to generate a general explanation or deeper understanding of a process, action, interaction, or phenomenon over time. This is done through interrelating categories of information based on data collected from individuals, and shaped by the views and experiences of the participants. The resulting theory or deeper understanding can be presented as a diagram or theoretical model, as propositions or hypotheses, or as a discussion containing a narrative that pulls together participants' experiences, shows the range of meanings, and compares these to existing theoretical frameworks in the literature (Charmaz, 2009, 2014; Creswell & Poth, 2018).

The grounded theory approach in this thesis followed the constructivist and interpretive perspective by Charmaz (2009, 2014. Like thematic analysis, it is less rigid than Strauss and Corbin's perspective in its prescribed and structured methods and procedures (Corbin & Strauss, 1990, 2015; Creswell & Poth, 2018). It is based on developing theory or a deeper understanding where the emphasis on the views, beliefs, feelings, assumptions, and ideologies of individuals rather than on the methods of research. However, gathering of rich data, coding of the data, memoing, and theoretical sampling are all used. It depends on the researcher's view and interpretation for combining categories or trends in the data corpus into themes, and

allows cartographic maps to be used for collecting and analysing data (Charmaz, 2009, 2014; Creswell & Poth, 2018).

<u>Procedures for Data Analysis</u>

Codes were allocated to participant quotations in the transcripts using an open coding approach where interpretation of quotations suggested appropriate codes to develop categories or trends of information emerging in the data corpus, as opposed to using pre-defined codes from the literature and assigning quotations to them.

The analysis began with reading the researcher's notes, watching the videos of the Walking & Talking sessions and reading through the transcripts to obtain an overall feeling for them. During this phase, a matrix was created in Microsoft Excel to organise and manage the data. The matrix provided an overview per participant, of each personally meaningful place, the type of place, and the experiences and the emotions connected to each personally meaningful place. In addition, for each participant's personally meaningful place, a journey map was created to visualise and understand how a person's emotional person-place relationship with that particular personally meaningful place had evolved over time. Journey mapping (also referred to in the literature as customer journey mapping) combines storytelling and visualisation to create a holistic view of an experience (Kaplan, 2016). It is a visualisation of the (emotional) experience based on the story provided by the participant. In place attachment studies and the context of this thesis, journey maps were used to organise and understand the order of a person's personally meaningful experiences-in-place and emotions in personally meaningful place over time, and the events and social connections related to it (Chow & Healey, 2008; Devine-Wright, 2014; Inalhan & Finch, 2004).
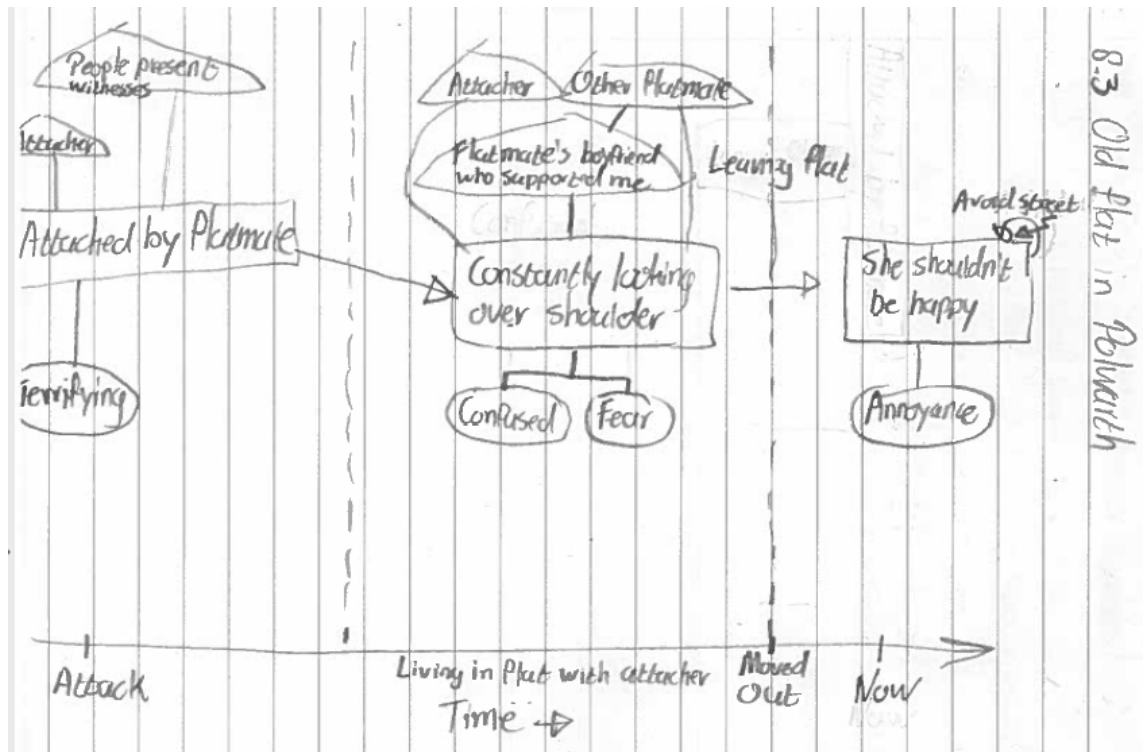
*Figure 4-8 - Sketch of the journey map of participant P8's emotional experience of her previous flat. It illustrates, in this case, the negative experiences-in-place and emotions from which her emotional person-place relationship with her previous flat developed over time.*

In the journey map above (Figure 4-8), the social connections are depicted by the triangles in the top row. The middle row shows the significant experiences that the participant had in the personally meaningful place depicted by the rectangles. The bottom row shows the related emotions depicted by the circles. The timeline at the bottom shows the different events as they occurred over time.

The verbatim transcript of each Walking & Talking session were coded by the researcher using qualitative data analysis software NVivo (versions 11 and 12) (QRInternational, 2017), and passes through three different phases. The first phase started with an initial open coding to develop initial categories of information. It occurred directly after each interview was completed, resulting in an initial, small, tentative set of codes. Data gathering and data analysis in a grounded theory approach is a zigzag process, which were undertaken simultaneously and iteratively. This **constant comparative process** consisted of going back and forth between the participants, conducting new Walking & Talking sessions to gather more data, and comparing it to new ideas or emerging categories in the memos written by the

researcher, as data are being collected and analysed. Memo writing lead directly to theoretical sampling, which aimed to further construct, analyse and develop tentative ideas about the data, properties of emerging categories and themes, clarify relationships between them, and learn how basic processes develop and change. It is emergent, strategic, specific, and systematic, and was done by seeking out new statements, events, cases, or participants (Charmaz, 2009).

Data gathering continued to the point at which **saturation** was reached. After having gathered data on 45 emotional person-place relationships with personally meaningful places in Edinburgh from eight different participants, this saturation point was reached, as gathering data from the seventh and eighth participant did not reveal any new categories, properties of categories, or other insights.

In the second phase of coding, significant phrases and sentences were coded, and meanings, interpretations, and ideas started to emerge. This resulted in a substantial set of codes. A further two passes of directed focused coding were used to explain and synthesise larger segments of the data corpus based on the frequency or significance of earlier codes. This refined the ideas, interpretations and meanings that emerged, and allowed merging and classifying the codes into categories or trends. In the third phase, these were clustered in a condensed set of seven themes that describe and interpret the data corpus. These themes were checked against the transcripts in the data corpus again for assuredness and consistency. An inter-coder reliability check was not necessary due to the small sample size of less than ten participants (Creswell & Poth, 2018; Armstrong et al., 1997).

Table 4-1 below provides an overview of the themes resulting from the analysis of the data corpus that contained interview transcripts, videos, pictures, field notes, emotion wheels, and maps. The number of instances of interpreted quotations of the transcriptions per theme are provided as an indicator of frequency of occurrence among participants.

| | Themes | #Participants | #Instances |
|---|---|---|---|
| Taxonomy of Emotional Experiences-in-Place | Place | 8 | 444 |
| | Emotions | 8 | 291 |
| | Experiences-in-place | 8 | 397 |
| Opportunities for Technology | Emotion Regulation | 8 | 122 |
| | Representations | 8 | 172 |
| | Sharing | 8 | 326 |
| | Consuming | 8 | 245 |
| **Total** | | **8** | **2074** |

*Table 4-1 - Number of instances as indicator of frequency of occurence per theme in the data corpus.*

Place consists of the different types of places that participants reported having an emotional person-place relationship with, as well as comments regarding their perceptions of, and personal relationship with, the city of Edinburgh as a whole.

Emotions consists of all affective states such as emotions, feelings, or moods that participants mentioned being related to their personally meaningful places in Edinburgh at any point in time.

Experiences-in-place provides a taxonomy of the different types of personally meaningful emotional experience-in-place that participants reported having in their personally meaningful places in Edinburgh, from which emotional person-place relationships develop.

The Emotion regulation-theme details the mainly individual use of personally meaningful places by residents to self-regulate their emotional state.

The Representations-theme details how participants prefer to represent their emotional person-place relationships with personally significant places in Edinburgh using different types of representations and sensory experiences.

The Sharing-theme details all people and interpersonal relationships that shape or are part of a person's emotional person-place relationship. It also includes participants' preferences and motivations for sharing emotional person-place relationships, or

aspects thereof, with other people. This includes willingness and unwillingness to share, both in person as well as mediated through technology.

The Consuming-theme refers to participants' interests, preferences, and motivations for exploring and consuming other people's emotional person-place relationship data, including envisionments regarding the potential usage of this data.

This set of seven themes can be split in two groups or overarching themes, namely a Taxonomy of Emotional Experiences-in-Place and Opportunities for Technology to capture, represent, consume, and share emotional person-place relationship data. These overarching themes will be discussed in more detail in section 4.2 and 4.3.

## 4.2   Taxonomy of Emotional Experiences-in-Place

In the first phase of the primary research, the focus is on creating a better understanding of the emotional person-place relationships people currently have with personally meaningful places in Edinburgh. The results of the analysis of the Walking & Talking sessions are split into two sections, one for each group of overarching themes. In this first results section, a taxonomy of the different types of experience-in-place and emotions people currently have in personally meaningful places in their city of residence is identified and discussed. This taxonomy is based on the Place-theme, Emotions-theme, and Experiences-In-Place theme in the data corpus. It is from these experiences-in-place and emotions that emotional person-place relationships with personally meaningful places in the urban environment develop (Research Questions 1). In the second results section 4.3, opportunities for technology are identified based on trends and themes in current technology use and interactions with personally meaningful places in the city of residence, and interactions with the speculative social map and emotion maps of Edinburgh. The focus is on how people (would like to) capture, represent, consume, and share (representations of) their emotional person-place relationships using technology and the different forms this data can take (Research Question 2), and what the potential value or relevance might be for sharing this personal emotional person-place relationship data with others (Research questions 3).

The Walking & Talking sessions were conducted over a nine-month period from November 2016 to July 2017 in Edinburgh (United Kingdom). It investigates 45

emotional person-place relationships of eight participants with their personally meaningful places in their current city of residence. Table 4-2 below provides an overview of the socio-demographic variables of the eight participants, which have been shown in the literature to produce variations in the meaning and experience of place and place attachment. These are gender, age, nationality, professional occupation, education level, place of residence, length of residence in the city, and life path (Giuliani, 2003; Gustafson, 2001a; Hernández et al., 2007; Hidalgo & Hernandez, 2001; Lewicka, 2011b; Manzo, 2005; Manzo & Devine-Wright, 2014; Scannell & Gifford, 2017).

| ID | Sex | Age | Relationship status | Area of residence | Length of residence in Edinburgh |
|----|-----|-----|---------------------|-------------------|----------------------------------|
| P1 | M | 28 | Dating | Leith | 4 years |
| P2 | M | 39 | Married with children | Marchmont | 22 years |
| P3 | F | 30 | Dating | Old Town | 6 years |
| P4 | M | 48 | Single | Leith | 48 years |
| P5 | F | 27 | Single | Merchiston | 5 years |
| P6 | F | 28 | Single | Newington | 4 years |
| P7 | F | 29 | Dating and living together | Gorgie | 7 years |
| P8 | F | 23 | Single | Merchiston | 7 years |

***Table 4-2 - Demographics of participants taking part in the Walking & Talking session***

From the eight participants, five are female and three are male. Regarding the age range of the participants, they are between 23 and 48 years old (average age 31.5 years), with five participants being in their twenties, two participants in their thirties, and one participant being in their forties. Four participants indicated being in a relationship at the time, while four participants indicated being single. Three of the participants are British and five of the participants are from other countries in Europe (i.e. Greece, Ireland, The Netherlands, and Portugal). All the participants are highly educated (i.e. bachelor's degree or higher), but are in various stages of their lives and careers. All participants live in various parts and neighbourhoods of Edinburgh. The

total length of residence in Edinburgh ranges from 4 years to 48 years (with an average length of residence of 12.9 years). Overall, the participant sample is younger, more socio-demographically diverse, has a more similar life path and is more highly educated than the general population.

In the next two sections, the Place-theme detailing the different types of places that these participants develop emotional person-place relationships with in the city of residence will be discussed, as well as the range and different types of emotions related to those personally meaningful places outlined in the Emotions-theme. This will inform the creation of a taxonomy of sixteen types of emotional experience-in-place, from which emotional person-place relationships with personally meaningful places in the urban environment develop.

### 4.2.1 Place

The Place-theme details participants' perceptions of and relationship with the city of Edinburgh as a whole, as well as the different types of places in Edinburgh that participants report having emotional person-place relationships with. In order to provide some context and create a better understanding of people's emotional person-place relationships with places in Edinburgh, it is useful to first gain some insight on how participants perceive and experience the city of Edinburgh as a whole, and what their current relationship with the city is (Bernardo & Palma-Oliveira, 2013; Gustafson, 2001a; Lewicka, 2011b; Lynch, 1960; Scannell & Gifford, 2010).

Perceptions of Edinburgh as a city

| Code | Number of participants |
|------|------------------------|
| Aesthetic: Beautiful and historic | 8 |
| Activities: Vibrant and cultural | 5 |
| Weather: Cold and rainy | 4 |
| Size: Small and walkable | 4 |
| No sense of community | 4 |

*Table 4-3 - Perceptions of Edinburgh as a city*

As can be seen in Table 4-3 above, participants' perception of Edinburgh is that of a beautiful, historic city. This aesthetic beauty is mostly attributed to the physical

environment or the physical dimension of place such as urban green spaces (P3, P5, P6), and old, historic buildings (P1, P2, P3, P4, P7, P8):

> *"The city itself is gorgeous as well. There is a lot of greenery in the city, which I enjoy. The old buildings are beautiful.""* - **P3**

Although the cold and rainy weather is overall considered to be a negative factor, temporal factors such as the seasons and weather can add to the atmosphere and beauty city. Edinburgh is considered to be a small city both in size and population, and a walkable one. This is considered an advantage as places and amenities are nearby and the city is easy to traverse and navigate on foot. All participants indicated they regularly walk as a mode of transportation within the city.

> *"It is kind of small. So you can basically go from place to place very easily. And more or less everything I look for, is here. Just about walking distance, I like that in a city. I don't like it to be too crowded or too big."* **– P1**

Participants express that they enjoy living in Edinburgh, especially because of the many cultural activities and events.

> *"It is a little bit traditional, used to be almost fuddy-duddy… It's a lot cooler city than it was when I first came here. I think that's changed and it's reflected in things like the bar scene, music scene, comedy scene, and of course the Fringe festival."* - **P2**

This also makes Edinburgh a popular tourist destination, which particularly appears to negatively impact participants' experience of the city during the Edinburgh Fringe Festival in August, when tourists overcrowd the city:

> *"I think the experience of summer in Edinburgh changes a lot because of the festival. It's kind of tiring. I actually chose not to be here the whole festival time this year. [..] It is too much. Too many things going on. Too many tourists. I get a bit overwhelmed with too much."* **– P6**

Participants also indicate having mixed feelings about their fellow citizens. Some like their laid-back nature, but an equal number of participants consider a lack of a sense of community to be a downside of living in Edinburgh:

> *"A place for me…the experience is based on the people in it. [..] I'm from a very small town, I wasn't used to that coming to a city where if you say hello to someone on the street, they don't say hello to you. City living was different for me, as well. [..] You're anonymous…I don't really feel like I belong to a community here. So sometimes I don't feel it's that friendly."* – **P5**

As people's individual experience of the city is shaped by their experience of their personally meaningful places in them, these positive and negative factors that shape participants' perception of Edinburgh are expected to also contribute to shaping a their individual emotional experience of the city (Gustafson, 2001a; Lewicka, 2011b; Manzo, 2005, 2014; Scannell & Gifford, 2010).

Types of Places

This section will take a closer look at place attachment within the city of Edinburgh, and the different types of places that the participants have selected as being personally meaningful. During the Walking & Talking sessions, the eight participants discussed their personal connection to 66 places in total throughout Edinburgh, of which 45 places were considered to be personally significant by the participants. The table below provides an overview of the different types of places that participants selected as being personally significant. Of those 45 places, 20 places are public places (44%) such as parks, streets, and neighbourhoods. 23 places are semi-public places (51%) such as bars, pubs, coffee shops, restaurants, museums, hotels, offices and university campuses and gyms. Only two places are classified as private places (5%), such as people's houses and flats. The places vary in geographical scale, with the smallest place being specific steps in a close (i.e., an entry from the street to a common stairway or to a court at the back of a building), to the scale of entire neighbourhoods and an airport.

The concept of place was intentionally not defined for participants to allow a broad selection of whatever type or size of place in Edinburgh they feel is important or meaningful to them, or that they feel they have an emotional connection with (Gustafson, 2001a; Manzo, 2005). This resulted in a variety of different types of

places being picked as being personally significant, as can be seen in the Table 4-4. In this table, the type of place is ranked by the percentage of the total number of personally significant places belonging to this type of place. If this percentage is equal for multiple different types of places, the spread among participants is considered.

| Rank | Type of place | Number of places | Selected by how many different participants | Percentage of personally significant places |
|---|---|---|---|---|
| 1 | Parks | 6 | 6 | 13% |
| 2 | Bars and pubs | 6 | 5 | 13% |
| 3 | Theatre, cinema, concert hall, museum, art venue | 5 | 4 | 11% |
| 4 | Street, square, esplanade with historic buildings | 5 | 4 | 11% |
| 5 | Neighbourhood | 5 | 3 | 11% |
| 6 | University campus | 4 | 3 | 9% |
| 7 | Transport infrastructures | 3 | 3 | 7% |
| 8 | Coffee shop, café or restaurant | 3 | 3 | 7% |
| 9 | House or flat | 2 | 2 | 5% |
| 10 | Hotel | 2 | 2 | 5% |
| 11 | Office | 1 | 1 | 2% |
| 12 | Rehearsal space | 1 | 1 | 2% |
| 13 | Gym | 1 | 1 | 2% |
| 14 | Steps | 1 | 1 | 2% |

*Table 4-4: Overview of the different types of places in Edinburgh selected by participants as being personally significant.*

The types of places in their city of residence, that were selected most often as being personally significant, are parks, and bars and pubs. These types of places each account for 13% of all personally meaningful places, closely followed by cultural venues such as theatres, concert halls, cinemas, museums and art venues, and sites with historic buildings such as particular streets, squares and esplanades located in the historic city centre of Edinburgh (11%).  This appears to indicate that the personal relationships that inhabitants have with their personally meaningful places in the city, indeed shape an important part of their experience of the city of Edinburgh as a whole.

The selection of these types of places is reflected in their overall perception of Edinburgh as an aesthetically beautiful, and vibrant cultural city.

What is noteworthy, is that the home, neighbourhood and workplace are not often selected as being a meaningful place in the city of residence. Current (7%) and previous (22%) homes, neighbourhoods and workplaces add up to at most 29% of all personally meaningful places. This means that 71% percent of all personally meaningful places are not organised around the (current) workplace or place of residence, which are traditionally the focus of place attachment studies. This is in line with findings by Manzo (2005) and Gustafson (2001a), that people create and maintain emotional person-place relationships with a whole range of different types of ordinary, mundane (semi-)public places spread across the city, which are routinely experienced and encountered in everyday life. It supports the holistic approach taken in this thesis, to take into account the full range of different types of personally meaningful places in the city of residence.

It becomes apparent from the table with the overview of different types of personally meaningful places, that these are mundane, everyday places (78%) like a park, a university building or a coffee shop. Personally meaningful places tend to do not stand out in the cityscape to the general passer-by, unlike for example Edinburgh Castle or the Eiffel Tower in Paris. However, they do stand out to the individuals due to their deeply personal meaning, like the hotel where a participant proposed to his partner:

> *"Very specifically: The Apex Hotel on the Grassmarket. It's a very specific memory. It's where I proposed to [P2's partner] at the stroke of midnight, well actually it was ten seconds before midnight, on New Year's Eve."* – **P2**

These personal stories and experiences provide further evidence in line with the literature (Gustafson, 2001a; Lentini & Decortis, 2010; Manzo, 2005, 2014) that it are not just the places or the type of place that are important, but the personally meaningful experiences-in-place and emotions that people have in these places that create place meaning. It justifies the holistic approach proposed by Manzo (2005, 2014) and taken in this thesis to focus the analysis on the different personally significant experiences-in-place and emotions people have in their personally

meaningful place in the urban environment from which emotional person-place relationships with places in their city of residence develop.

### 4.2.2 Emotions

In this section the different emotions related to personally meaningful places will be discussed. Figure 4-9 provides an overview of the different types of emotions and indicates in percentages to how many personally significant places each emotion is related.
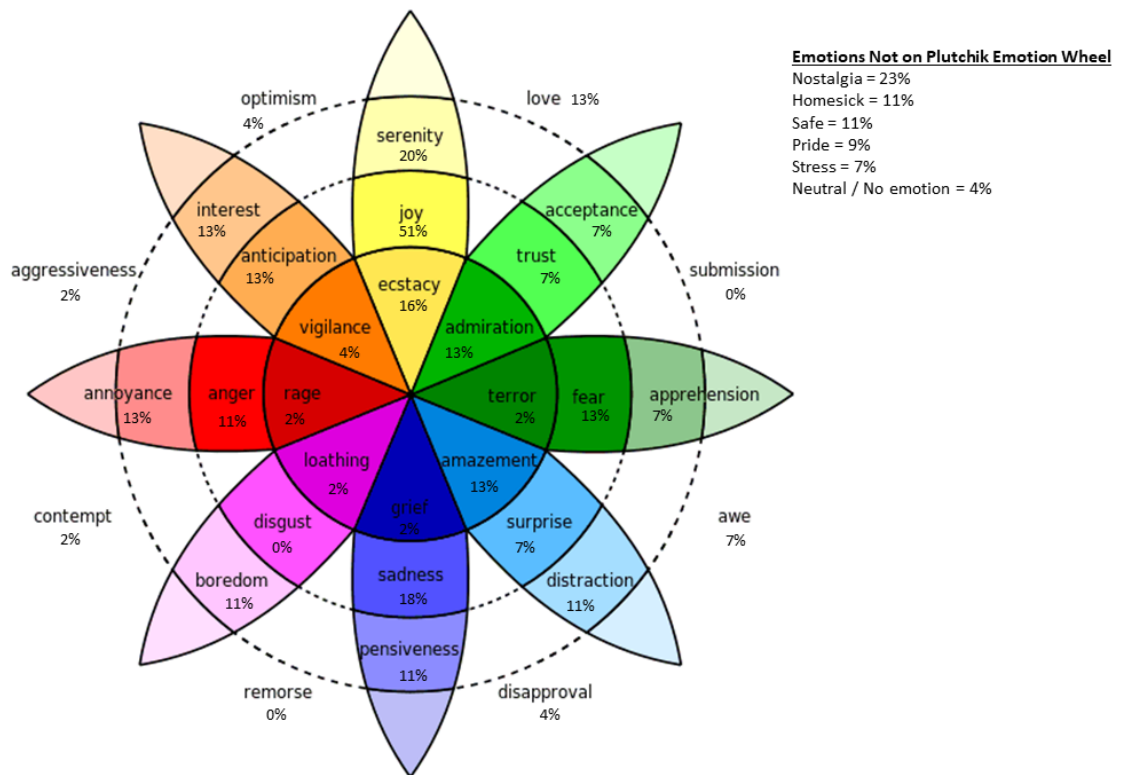


*Figure 4-9 - Emotion wheel with the percentage of occurrence for each emotion in the total number of personally meaningful places in Edinburgh.*

Valence and range of emotions

Participants indicated a total number of 213 emotions being related to the 45 personally meaningful places. Most of these emotions are positive emotions, with 59% of the total number of emotions related to personally significant places being positive. Joy is by far the most common positive emotion and is connected to 51% of all the personally significant places (see Figure 4-9 above), with all participants experiencing joy in at least one of their personally significant places. Other positive emotions often mentioned in relation to emotional person-place relationships are serenity (20%),

ecstasy (16%), love, admiration, amazement, anticipation, and interest (all 13%), distraction and safe (11%), and pride (9%).

Negative emotions are also related to personally meaningful places, accounting for 30% of the total number of emotions.  Sadness is the most common negative emotion related to personally meaningful places, being connected to 18% of the total number of personally significant places. Five out of eight participants identify sadness as an emotion being linked to at least one of their personally significant places. Other negative emotions commonly mentioned in relation to emotional person-place relationships are annoyance and fear (both 13%), and boredom, anger, and homesickness (all 11%).

Eleven percent of the total number of emotions related to personally meaningful places can be classified as neutral. An emotion is classified as neutral if, based on the context provided by the participant, the reported emotion is not expressed as being positive or negative, could be classified as being both positive and negative (i.e., ambivalent), or no specific emotion is being identified as being related to the personally significant place. The most common emotion that falls into the neutral category is nostalgia. Nostalgia is expressed by participants as being both positive and negative at the same time, with on one hand feeling joyful because one is recalling positive memories and experiences while at the same time feeling sad that those are in the past. Nostalgia is related to 27% of the total number of personally significant places, with six out of eight participants reporting feeling nostalgic in at least one of their personally meaningful places. Other emotions that fall in the neutral category are pensiveness (11%), and neutral/no emotion (4%).

<u>Emotional person-place relationships are predominantly perceived as positive attachments to place</u>

Looking at the each individual relationship between each participant and each personally meaningful place, shows that for 47% of the individual emotional person-place relationships the affective component consists of only positive emotions. On the other hand, for only 9% of each individual person-place relationships the affective component consists of only negative emotions. For 44% of the person-place relationships, the affective component consists of both positive and negative

emotions. This indicates that the emotions experienced in personally meaningful places are in only 56% of the individual emotional person-place relationships all positive or all negative, and that in 44% of the individual person-place relationships a combination of positive and negative emotions exist. In contrast to Manzo's findings (2005) that ambivalence might be the norm, this does not imply though that people feel ambivalent about those emotional person-place relationships. In fact, out of the 45 person-place relationships 40 are perceived by participants as a positive attachment to place (89%), four are perceived as a negative attachment to place (9%), and only one participant reported having mixed feelings about one of her attachments to a personally meaningful place (2%), describing the person-place relationship as a "love-hate relationship". So even though negative emotions might be associated with a personally meaningful place, emotional person-place relationships are predominantly perceived as positive attachments to place.

No one-to-one relationship between emotion and place

In total, participants indicated 213 emotions being related to the 45 personally meaningful places, resulting in an average of between 4 and 5 emotions (i.e., 4.7 emotions) being related to a personally meaningful place. Looking at each participant's unique emotional person-place relationships, there are between 2 and 7 different types of emotions related to each personally significant place per participant. Those emotions not only do not need to be all positive or all negative, but can also be a mix of different positive and negative emotions. This means that there is no one-to-one relationship between emotion and personally meaningful place. This is an important finding with respect to emotion maps, which aim to visualise and communicate the emotional relationship between a person and a place, and typically assume a one-to-one relationship between emotion and place. There are several reasons why there are multiple emotions related to one personally meaningful place. There are multiple different emotional experiences-in-place that can contribute to developing an emotional person-place relationship, emotional person-place relationships can evolve over time, and a single emotional experience-in-place can be characterised by different types of emotions. In order to create a better understanding of how these different

emotions are related to the personally meaningful places, the experiences that participants have in these personally meaningful places (i.e., experiences-in-place) and the emotions related to those experiences, will be investigated further in the next section. This resulted in a taxonomy of sixteen types of emotional experience-in-place.

### 4.2.3 Experiences-in-Place

In this section, the different types of experiences-in-place and related emotions that people have in these personally meaningful places, and from which emotional person-place relationships develop, will be discussed. In the Table 4-5 below, an overview of the different types of experiences-in-place is provided. The first column shows the type of experience, while the second column shows the number of participants which reported having this experience in at least one of their personally meaningful places. The third column indicates the total number of personally meaningful places in which this experience is experienced by these participants, and the fourth column shows in what percentage of the total number of personally significant places this experience is experienced. The fifth column indicates which participants reported having this type of experience-in-place. The sixth column indicates the emotions which characterise the emotional experience-in-place, while the last column indicates the name of the places in which this type of experience occurred. The experiences in the table are ranked by the percentage of personally meaningful places in which this type of experience-in-place occurred (column 4) to indicate how common this type of experience is across the total number of personally meaningful places in Edinburgh. If this percentage is equal for multiple types of experience-in-place, the spread across participants in taken into account. Responses related to a personally meaningful could be coded into more than one type of emotional experience-in-place, if the coder viewed it as being different experiences.

| Experience-in-place | #Participants | #Places | % of places | Participants | Emotions | Types of Places |
|---|---|---|---|---|---|---|
| Reminiscing | 7 | 18 | 41% | P1, P2, P4, P5, P6, P7, P8 | Nostalgia, joy & sadness | Park (4x), university campus (3x), castle esplanade (2x), square, bar (2x), hotel, neighbourhood, street, concert hall, art venue, previous flat, coffee shop. |
| Socialising | 7 | 12 | 27% | P1, P2, P3, P4, P5, P6, P7 | Joy | Park (3x), bar (2x), market square, square, gym, historic street, bar, pub, cinema, art venue, previous flat |
| Belonging | 7 | 11 | 25% | P2, P3, P4, P5, P6, P7, P8 | Joy, serenity, comfortable, safe | Park (3x), university campus, bar, neighbourhood, bridge, traditional native restaurant, previous flat, pub, office. |
| Bonding | 6 | 11 | 25% | P2, P3, P4, P5, P7, P8 | Ecstasy, platonic love, trust, safe, acceptance | University campus (2x), park, square, bar, historic street, cinema, café, street, rehearsal room, pub, office |
| Relaxation | 7 | 8 | 18% | P1, P2, P3, P5, P6, P7, P8 | Serenity, Pensiveness, Distraction, Ecstasy, Stress | Park (5x), castle esplanade (2x), gym |
| Romance | 7 | 7 | 16% | P1, P2, P3, P4, P5, P7, P8 | Love, ecstasy, apprehension, sadness | Park (2x), neighbourhood, university bar, hotel, university campus, bar |
| Aesthetic Pleasure | 6 | 7 | 16% | P2, P3, P4, P5, P6, P7 | Joy, admiration, amazement | Park (5x), university campus, bridge |
| Knowledge & Secrets | 5 | 7 | 16% | P1, P2, P3, P4, P5 | Joy, neutral | Market square, university bar, university campus, castle esplanade, historic street, neighbourhood, historic steps. |
| Escaping | 4 | 7 | 16% | P3, P4, P5, P6 | Joy, serenity | Park (3x), theatre, cinema, café, traditional native restaurant. |
| Negative experiences | 5 | 6 | 13% | P1, P3, P5, P6, P8 | Grief, sadness, loathing, annoyance, anger, terror, fear apprehension, vigilance | Dock, bar, hotel, previous flat, monument, art venue. |
| Exploring & Discovering | 4 | 5 | 11% | P3, P4, P5, P7 | Anticipation, surprise, joy, admiration, amazement | Park, bar, cinema, historic steps, airport |

| Interest | 4 | 5 | 11% | P1, P2, P4, P5 | Interest | Pub, museum, theatre, neighbourhood, historic steps |
|---|---|---|---|---|---|---|
| Achievement | 4 | 4 | 9% | P1, P2, P5, P7 | Pride, trust, stress | University campus (3x), concert hall |
| Inspiration & Motivation | 3 | 4 | 9% | P1, P5, P6 | Optimism, interest, anticipation, joy | Museum, concert hall, historic steps, art venue |
| Imagination | 3 | 3 | 7% | P1, P2, P4, | Admiration, amazement | Market square, pub, park. |
| Magical moments | 2 | 3 | 7% | P2, P4 | Ecstasy, amazement, surprise | Park, theatre, hotel. |

**Table 4-5 - Table with the sixteen types of emotional experience-in-place from which emotional person-place relationships in the city of residence develop.**

<u>Reminiscing</u>

The most commonly mentioned type of emotional experience-in-place is reminiscing, selected by all but one participant. Reminiscing is being experienced in 41% of the total number of personally meaningful places in Edinburgh. It is described as being able to connect to their personal past or evoking personal memories. The most commonly mentioned emotions related to this experience-in-place are feelings of nostalgia, expressed by participants in terms of feeling "nostalgic", "misty-eyed romanticism", a "bittersweet" feeling, or feeling a bit of joy and sadness at the same time.

Typically the experience of reminiscing is related to places that played an important role in a person's life in the past, and are often linked to important life stages (Gustafson, 2001a; Manzo, 2005), such as childhood, adolescence, student life and parenthood, or their student days:

> *"Originally I lived there from about 1968 to 1978. We moved when I was 10 years old. So kind of first memories and first school and things like that. [..] Highly enjoyable. Good childhood down there. Yeah. I'll sometimes do long walks through Newhaven… I know it really well, so I kind of…I take different routes down. [..] I just identify them with my childhood. Pure nostalgia." – P4*

Some participants actively and intentionally revisit these places to have access to their mostly positive personal stories and memories. Others have not intentionally or regularly gone back to reminisce and experience a trip down memory lane, even though the place that holds the memories is located in the city where they live. But when the participant does go back to the place, even after many years, it immediately brings back many specific personal memories. This can be seen in the quote below where a participant talks about his university's theatre, bar, sports and recreation complex, where he used to work, live, and go out for drinks with friends as a student:

> *"I haven't been to this place…in…17, 18 years. [..] Where that tree is. I used to be able to sit on that wall. And I remember that that is where I used to revise during first year. [..] Because you just sit there and catch people as they walk back to their flats. So yeah, it was a really, really happy time." – P2*

Reminiscing appears to be experienced more in places where multiple experiences have taken place in the past which make the place personally meaningful, such as university campuses, parks, (former) workplaces or (former) homes. The place attachment and place meaning thus evolve over time. However, some participants also describe reminiscing being experienced at a place which had become meaningful because of one specific experience taking place there, as described below by a participant talking about as specific coffee shop where she went with her supervisor right before and after an important job interview.

> *"I have picked this place because this is where I came on the day of my interview and presentation for my PhD. I came here before it and I came here after it. So whenever I come here, I think of that specific day. In particular, what I remember, is the stark contrast in feelings coming here. Because obviously one was before and one was after. I remember being so, so, so tired afterwards! But then I remember the morning, I was here again with my then supervisor trying to calm me down and talk me through it. Yeah, it was just bizarre. A bizarre day. I actually remember not even having coffee there on that day, because I thought I do not need any more stimulation hahaha!"* - **P8**
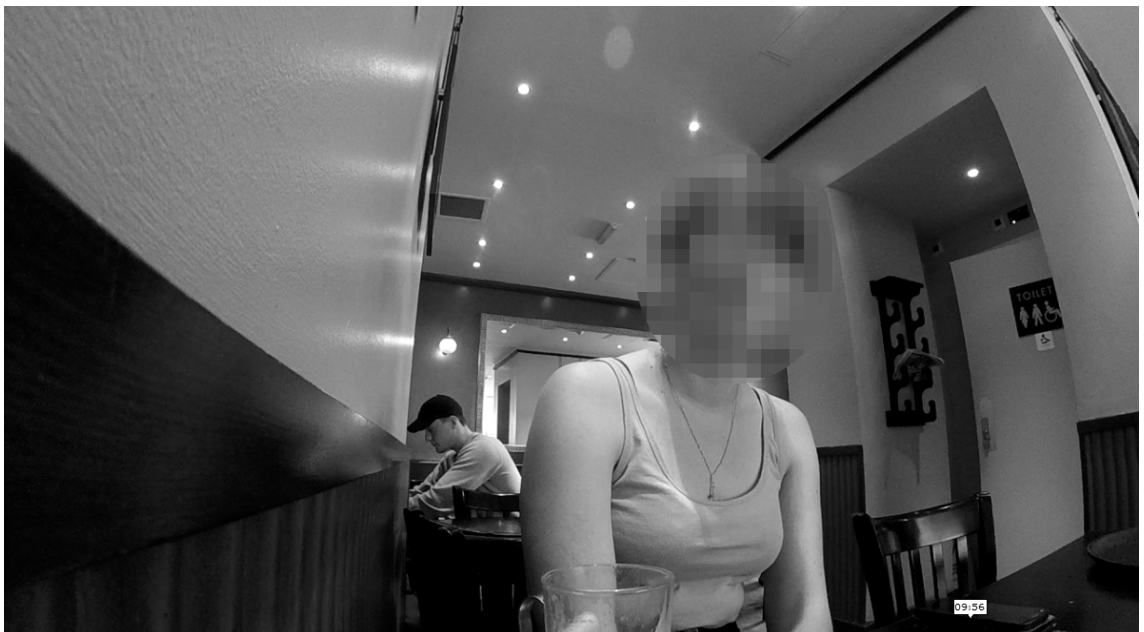


***Figure 4-10- Participant reminiscing about a big job interview inside the coffee shop where she went before and after the interview.***

This example illustrates how a single experience can be engrained in a place and bring back specific memories of that one-off experience. This is typically the case when there are strong feelings or emotions connected to that initial experience from which place meaning develops. It also further illustrates how the type of place, which in the example given above is a coffee shop, is not the main reason of what makes this place personally meaningful for this specific participant. In fact, the participant (P8) recalls not even drinking a coffee there that day.

Socialising

The second most commonly mentioned experience-in-place is socialising, which is experienced in 27% of all personally meaning places, and with all but one participant selecting at least one place where place meaning has developed through socialising. It revolves around the social dimension of place, and participants describe it as being among people in general (i.e., as opposed to being alone), enabling chance encounters, or maintaining social ties with family, friends or colleagues. The first two are illustrated by the quote below, which is a participant's description of going out into a particular street in her neighbourhood, which located in the historic city centre of Edinburgh and is also popular among tourists.

> *"If I am bored and alone at home, I'll feel like I need some air. It's always very simple to walk down the [Royal] Mile and it always cheers me up because there's always people walking up and down, always street artists, always something happening. Especially during the summer period really. [..] There's so many people you can meet and hangout with. Especially as I know so many people here it's quite easy to hang out and get to know people." - **P3**

This participant highlights a few elements of the socialising experience-in-place, such as wanting to be among people in general, having chance encounters with people in the street that she already knows, and the opportunity to meet new people via existing social contacts. If a person's goal is to be among people and have chance encounters, the socialising experience-in-place is typically related to public places where many people pass through on foot, such as certain streets, squares or small

parks. Socialising however also includes deliberate and organised meet ups with existing social contacts to maintain social ties.

> *The Meadows [park]. It mainly brings back happy memories of just chilling out with friends having barbecues and cans of beers during summertime. [..] I loved it. We laughed a lot there. – **P7***

This typically takes place in semi-public places like pubs, bars, gyms and parks, or in private places such as (shared student) flats or houses:

> *"[We had] a lot of gatherings with friends. This is what I liked – our flat was open to everyone. It was a meeting place. Dinners, parties, gatherings…" – **P6***

What becomes evident from these descriptions, is that it are the general experiences of socialising in these places with or among people, which are appreciated. There is not one specific memory or story that stand out.



***Figure 4-11-Participant posing in a large park in the city centre, which is a popular meeting point for students to socialise.***

These experiences do not change the nature of these social relationships for better or worse. The socialising experience-in-place is described in general terms of activities undertaking with other people, such as "going out", "meeting people", "gathering with friends", "having barbecues", "hanging out", "hosting dinners" or "organising parties", "drinking", "going on pub crawls", "meet for coffee", "going for lunch", and "sharing a smoke". This is also reflected in the emotions related to the socialising experience-in-place, which are typically positive but only moderately intense. They are predominantly classified under "joy", often being described by participants in terms of "having fun" or "laughing with others", and "being happy".

The temporal factors also play a role in this type of experience-in-place, as participants comment on how it is not possible to socialise with the desired group of people in the personally meaningful place at any given time during the day or week (P2, P3, P7). For example, certain bars, pubs, and clubs are only open during night-time or attract different types of crowds depending on the time of or day of the week (weekday versus weekend):

> *"I would like to be able to go during the day, but Dropkicks [pub] doesn't open during the day. So I can really only go at night. That why I go more to another pub now." – P7*

Socialising in parks on the other hand is mainly done during summertime (P2, P5, P6, P7). It identifies potential for technological devices and services that support or augment the emotional experience-in-place of socialising in the urban environment.

Belonging

The emotional experience-in-place of belonging refers to the deepening of the bond between a person and a place. Seven out of eight participants selected at least one personally meaningful place where an emotional person-place relationship has developed from belonging. It is associated with 25% of all the selected personally meaningful places in Edinburgh. Participants describe this emotional experience-in-place in terms of "rootedness" or "feeling at home" or feeling they "belong" or "fit in". One participant who is born and raised in Edinburgh and has lived in different parts of

the city his whole life, still describes the neighbourhood where he grew up but does not live anymore as home:

> *"It's just always been my first home really, and I still feel at home there." -* **P4**

Typical places mentioned by participants where they experience a sense of belonging are a current or previous home, neighbourhood, or workplace (P2, P4, P6):

> *"It's that thing about just coming to the same place every whatever it is; 150, 200 times a year. You're just inevitably... sort of become part of it. Because it is a place you spend as much, almost as much time as at your home, when you're awake, that is. And sometimes more. Yeah. So, that is your home away from home, which is why a have a sofa in here. -* **P2**

This does not mean that participants always experience a sense of belonging in in each of those types of places. In fact, none of the participants selected their current home as a personally meaningful place where they have an experience-in-place of belonging. And only one participant (P4) selected his current neighbourhood and described moving from his previous neighbourhood to his current neighbourhood within the same city, as "like moving a thousand miles away" and being "different parts of the world":

> *"This is my home turf. Like, my flat is just down there on the left. So this is my kind of...where I go. Theatre Royal is my favourite pub. It is quite quiet. Good bars, good restaurants. They are different parts of the world. I feel more at home in this area than I ever have. [..] This is, you see, in Scotland this is my bit." -* **P4**

An emotional experience-in-place of belonging can stem from a connection to the physical dimension of place (i.e., physical place attachment) as illustrated in the quote above, but also from the social dimension of place (i.e., social place attachment). The latter is often described by participants as a "village-like" feeling or "knowing each other". It is characterised by having social connections such as friends, family, flatmates or friendly neighbours living close by. The quote below illustrates how the open character of both the physical and social characteristics of the participant's flat contributed to the sense of belonging:

*"We had a bench, so I was just sitting outside…drinking my coffee in the morning in my garden. [..] We usually left the outdoor open…because the one person was going outside, the other person was just entering with a bike…it was a flat that was generally open. I liked it was very open, I felt I was living in a village."* - **P6**



***Figure 4-12-Participant showing her previous flat. In the background, the current resident can be seen sitting on the bench in the front garden, smoking a cigarette.***

This appears to be especially the case for participants who have grown up and had always lived in a small village, prior to moving to Edinburgh. With approximately half a million inhabitants Edinburgh is by no means a megacity, but half of the participants (P1, P5, P6, P7) expressed having struggled with "city life" at one point or another.

The experience-in-place of belonging is often described in terms of "feeling at home" and this is reflected in the emotions associated to places where belonging is experienced, using words such as "safe", "comfortable", "cosy", "calm", "at ease", serenity, and "happy" or joy to describe their feelings. This is also reflected in people's behaviour, as a lot of time is spent in these places, and people often attempt to stay or return to places where they feel they belong. Having some sense of freedom and control over the place is often associated with experiencing belonging (Lewicka, 2011b; Mazumdar & Mazumdar, 2004; Scannell & Gifford, 2010, 2014). This is expressed by

being able to do as one pleases or, by adding personalising or adding homely objects or attributes such as sofas (P2) and kettles (P8) to a place to increase comfort:

> *"This is my little bit. I have total control over this. And eh…., so yeah, I like this space. It is my space to do with it as I see fit. Or how [P2's colleague with whom he shares an office] and I see it to be fit. So it is sort of a happy, safe space." - P2*

Having a sense of belonging appears to be important to participants, and effort is being made to remain or return to those places or increase the sense of belonging.



*Figure 4-13 - Participant on the North Bridge, where the viewpoint over the city provides her with an emotional experience-in-place of belonging.*

This becomes even more apparent when the sense of belonging is absent or lost. This appears to particularly be an issue for participants who are not born and raised in the United Kingdom, with three of in total eight participants reported struggling with feelings of not belonging or feeling homesick in Edinburgh. They seek out and develop attachments with other types of places to have an emotional experience-in-place of belonging. For example, one foreign participant describes her relationship with a particular bridge in the city centre which helps her alleviate feelings of homesickness:

> *"I remember there was the Christmas market, and the castle was lit up. I remember just standing on the bridge and thinking, 'snap out of this'. So whenever I feel like I want to go home, I think of that viewpoint. There is so much going on. I just appreciate it for now. […] It was the first time I felt like I belonged. I felt very grateful and appreciative that I had the opportunity that I can live here. [..] It was looking at this amazing city."* - **P5**

For some participants like the participant above, the experience of belonging is focused on feeling happy and strengthening their bond with the current city of residence. Others seek out, develop and maintain an emotional relationship to places that provide an experiential link to their home country (P5, P6, P7). Participants P7 and participant P6 for example describe how a pub and a restaurant offer a social and cultural link to their native homeland. Being with compatriots and being able to speak their own language results in an experience-in-place of belonging:

> *"It's like a home zone. So it's really connected with feeling a bit back home. [..] It's a feeling of people gathered together. Like, Ok, I'm back home. It sounds like a [home country] family. If I need a break from English I just go there, you know. I get the feeling I need to talk my own language sometimes. Nobody can understand why we can spend seven hours sitting at home eating. [..] It's more about being [home country]. It's cultural. It's the behaviour of others we meet. I can find myself a bit...or find a part of myself I miss. [..] It's like, 'I'm back home'. I hate it, but I'm glad."* - **P6**
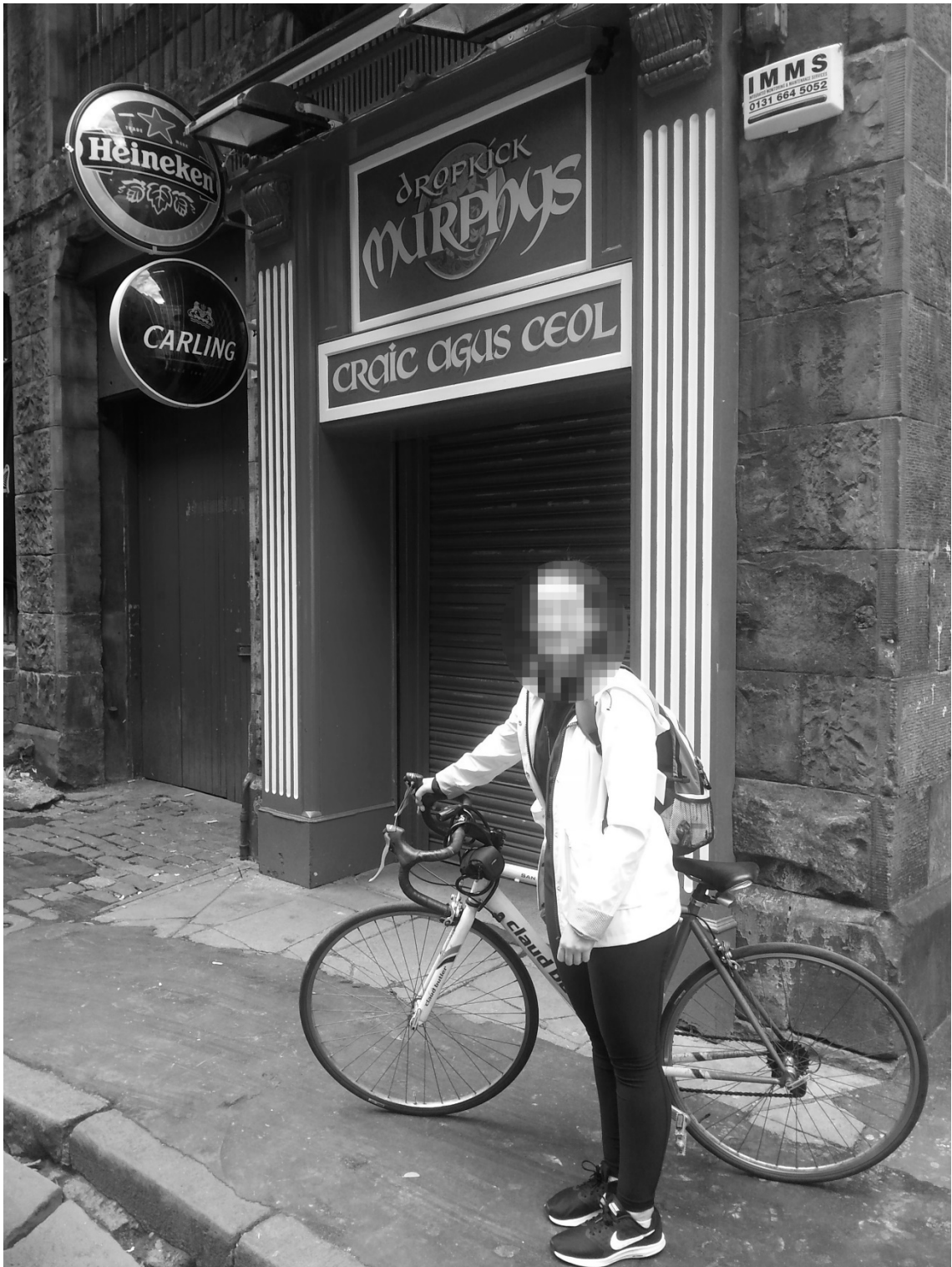
*Figure 4-14-Foreign participant in front of the pub where she goes to alleviate feelings of homesickness.*

These participants regularly and intentionally visit these places to alleviate feelings of homesickness. Three of the five foreign participants also mentioned a large park in the city centre (i.e., Meadows park) as a place which offers a connection to their home

country or home town, partially because of geometrical and geographical similarities with the landscape in their home country (P5, P6, P7):

> *"I think because it's so big. I think the size of it and because you still got the feel of being in a field or out in the countryside in [home country]." - P5*

This is in line with findings in the literature on the process of interchangeability, where foreign students suffering from homesickness seek out similarities between the old and new environment as a coping mechanism (Ryan & Ogilvie, 2001; Scannell & Gifford, 2014).

Places such as pubs, bars, restaurants, and parks can thus provide a link between foreigners living in Edinburgh and their home country or hometown based on similarities in social, cultural, and geometrical and geographical characteristics of place as well as providing links through (symbolic) representations (e.g. food), offering an emotional experience-in-place of belonging away from home.


Bonding

For a quarter of all the selected personally significant places in Edinburgh, an emotional person-place relationship has developed from a bonding experience-in-place. It is the fourth most common emotional experience-in-place, mentioned by six of the eight participants. Like socialising, other people play a key role in this experience-in-place. What makes it different from socialising, is that it is experienced as a key moment in interpersonal relationships. It creates a closer bond between the people involved which goes beyond merely socialising, which is more superficial and more about maintaining social ties. It is described by participants in terms of "connecting" to other people, experiencing a "sense of community" (P4), "being part of a team" (P7) or "feeling like a family" (P8):

> *"It was a sold-out gig. Three and a half thousand people were here on the day. And they were all heading in the same direction. They were all dressed the same as well [smiles]. There was just this sense of... community." – P4*

This interpersonal bond can be formed by all having the same shared experience or "being in the same boat". The participant from the quote above felt part of something

bigger and felt connected to other anonymous concert goers with whom he shared a love for the same band.  For others, the bonding experience-in-place would go beyond anonymously connecting to a specific group people. Especially in workplaces and university campuses there is a social environment and culture of helping each other out and looking after each other, this can play an important role in the attachment to these types of places, as friendships are created there that can last a lifetime:

*"We were all helping each other, and you do help each other, like with the software. [..]There were the four of us in particular. We went through all the stress and near mental breakdowns together. But we got through it. And I'm still to this day very good friends with those three girls." - **P8***
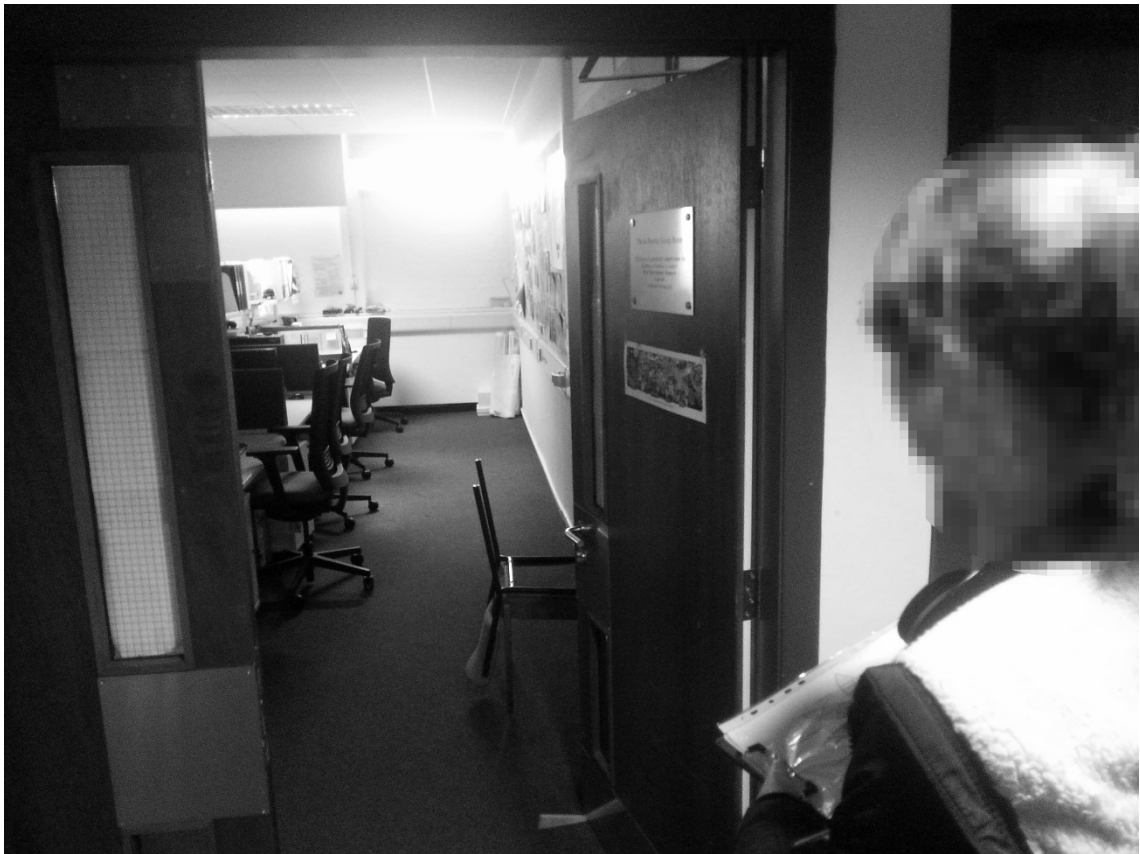


***Figure 4-15 - Participant looking at her desk in the PhD student office where she bonded with other students and made friends for life.***

The bonding experience-in-place can be with a specific group of people, or with one specific person. In case of the latter, this is usually a person that they would already have an existing social relationship with, such as a friend or family member. The

bonding experience-in-place occurs due to the sharing of personal issues with this other person and receiving their support:

> *"I remember a lot of nice conversations happened there. We were always open, but we were really open in this coffee shop. It was a nice setting and nice conversations happened there. I felt very supported. I felt a lot of love, if you want to call it that. Support and love, I suppose. Because it was an environment where we felt we could speak to each other. She was very optimistic with words of encouragement to keep going. I remember the feeling that it was nice to have the opportunity to talk to her like that."* - **P5**

This bonding experience-in-place strengthened their mother-daughter bond, but also created an attachment to this particular café. The place can become strongly associated with the person or group of people that the individual is bonding with. This effect can be so strong, that some participants report that they revisit these places to feel connected to, in the presence of, or the support of those people while being in this place, even though that other person is not physically there:

> *"This street is my mom's favourite street. [..] God at the beginning when I came to this street first, I was very kind of nervous. I feel like my mom is here or something. I feel safe here, and I come here when I feel like I need her support"* - **P5**

Other reasons for revisiting a place where a person has had an experience-in-place of bonding are to share personal issues and receive support from others, or to strengthen social bonds for example through shared celebrations (e.g. birthday parties)/ The emotions and the intensity of the emotions related to this type of experience-in-place are more intense than the emotions related to the socialising experience-in-place, and are characterised by ecstasy, platonic love, trust, acceptance, and feeling safe, supported, and included.


<u>Relaxation</u>

The fifth most commonly mentioned emotional experience-in-place is relaxation. Seven out of eight participants selected in total eight places where place meaning has

developed from a relaxation experience-in-place. This accounts for 18% of the total number of personally significant places selected in Edinburgh. An experience in place of relaxation is conducive to self-reflection, problem solving and physical and psychological relief of stress, often through being able to ground oneself or by connecting with nature. This is also reflected in the emotional component of these person-place relationships, which are characterised by serenity, pensiveness, and distraction.

Various parks and urban greens spaces across Edinburgh are selected as personally meaningful places, accounting for five of the eight places where place meaning developed from an experience-in-place of relaxation. Here people physical connect with nature through a range of different sensory experiences, in particular smell, vision, sound, and touch. For example, enjoying feeling the wind (P5) or walking barefooted though wet grass (P6) enables people tom to ground themselves:

> *"I really like walking barefoot on the grass. When you walk in the morning when it's wet…connecting with nature always makes me feel happy. It's amazing how easy it is. I have a quick walk and everything's fine." -* ***P6***

It are places where activities for physical and psychological relaxation are undertaken, such as meditation (P1), yoga (P6), exercise (P7) and regular walks (P3) to clear one's head and recharge from psychological and emotional stress:

> *"Holyrood Park, because I go there all the time. Nowhere in particular, I just walk around. [..] I literally use it to clear my head a bit. Especially when stuff is bothering me, I'll use it as a walk and usually by the end of it, I'm pretty refreshed." -* ***P3***

This restorative effect can be emotionally intense and invigorating, with some participants describing it as "being in a trance" (P5) or having a "nirvana-like feeling" (P6):

> *"It's more like…pleasure. It's geniality, enjoying the last…like nirvana-like feeling." -* ***P6***

For others the relaxation is rooted in the conduciveness of the physical and social dimensions of place for introspection, reflection, and mental relaxation. These are not

necessarily urban green spaces, but places in the urban environment that are elevated, such like a hilltop (P1, P3, P7). It provides an overview of the city and filterers out the sounds of the city. Participants describe their emotional experience-in-place as being similar to that of meditation. It allows them to organise their thoughts and personal memories:

> *"I think it is a place I like to go and just be silent and look around and think of…think of my life here. You know, because you can see more or less everything isn't it, because it is a hill. Yeah. So you can kind of have an overview of your life here and what happened. And you can look more or less everywhere you have been. All the memories come back to you. So it is kind of a place for meditation. Where you can think about life and things." – P1*

This type of experience-in-place is not only located spatially, but also temporally. All participants comment on the temporal factor influencing their emotional experience-in-place of relaxation. The time of day, weather conditions, and seasons influence the physical dimension of places where people connect with nature (e.g., parks):

> *"The Meadows. This place for me…I love the Meadows [park] in spring, summer, autumn, winter – it's always different. You always experience something different." - P5*

The time of day and the social dimension of place both play an important role in this type of emotional experience-in-place if it the place does not provide a connection to nature. For example, for two participants the esplanade in front of Edinburgh Castle, has developed a personal meaning from an emotional experience-in-place of relaxation. During the day however this is a popular and busy tourist attraction, but during the night it is quiet and deserted:

> *"I don't go there during the day, but for example after a work shift, the castle esplanade is complete deserted. [..] Like, right now, it is not particularly relaxing. It is just full of tourists. [..] During the night what I get out here is serenity." - P3*

Other people do not appear to play a significant role in this type of experience-in-place. It is an experience-in-place that participants prefer to experience individually

and not share with others. This is reflected in their behaviour that they visit these personally meaningful places on their own and when there are no otter people around:

> *"Actually no, it is very personal. That is probably also why I come sit here when there is literally nobody around. That is my chill out time. So I want nobody near." - P3*

So specific characteristics of both the social and physical dimension of place in the urban environment, appear to be conducive in the relaxation experience-in-place. People regularly and intentionally seek out an individual, personal experience-in-place of relaxation in their city of residence, to self-regulate their emotional state.


Romance

In contrast to relaxation, other people do play a significant role in emotional person-place relationship where the place has developed meaning from a romantic experience-in-place. Seven out of eight participants describe a romantic experience-in-place playing a part in their bond with in total seven personally meaningful places. This accounts for 16% of the total number of places investigated. Often these places are linked to romantic experiences that are milestones in people's current romantic relationships, like where they met their partner for the first time, the place where they shared their first kiss, or the place where either the participant or their partner had proposed (P1, P2, P3, P8):

> *"It's a very specific memory. It's where I proposed to [name of P2's girlfriend] at the stroke of midnight, well actually it was ten seconds before midnight, on New Year's Eve. [..] I felt I had to something really dramatic. This is why I chose the Apex [hotel], because you have a view from the hotel if you're looking up, the castle is right there. And so, that's where I wanted it to be, it was the fireworks and then the Castle." - P2*

Interestingly, current romantic partners as well as ex-partners are equally often mentioned in relation to a romantic experience-in-place. Memories of former partners have become associated with these places and act as a reminder of this person

whenever this place is encountered:

> *"Myself and my ex have spent a lot of time here [i.e., park] going for walks. I look back at it very fondly. I think about my ex, when I'm here. We never ended things badly. It was just timing for us, I suppose. So maybe bad feelings would be a bit of disappointment, maybe? It was nice to be here, but now we can't share that place together anymore."* - **P5**

As also becomes apparent from the quote above, is that the romantic experience-in-place is an experience that is shared with their partner at the time, and that the emotions related to the romantic experience-in-place are not necessarily all positive. Particularly in a place has become personally meaningful due to a romantic relationship that did not last, negative emotions such as sadness and disappointment can become part of this emotional person-place relationship. But even when the romantic relationship does last, relationship tensions can result in other negative emotions such as nervousness and stress and drama becoming engrained in the emotional relationship with the personally meaningful place:

> *"I'm a pretty happy person to be honest, but last year when I was in this whole love triangle thing, then I used it [i.e., Holyrood Park] a lot! I was seeing these two guys that I both really liked, and I didn't know what to do. [..] So whenever the stress would get too much, or there was more drama, or I needed to figure out what to do, I would go to the park here."* - **P3**

One of the things that distinguishes romance from a bonding experience-in-place is the affective component of this person-place relationship. Both involve strong, intense positive emotions, in particular "extreme joy" and ecstasy, but the romantic experience, based on the responses of the participants, also includes the emotion love, distinguishing it from a bonding experience. Furthermore, a key aspect of the bonding experience is that it creates or strengthens the bond between people, which is not necessarily the case for a romantic experience-in-place. Several participants (P2, P4, P8) describe places where they go on dates as part of the reason why those places are personally meaningful to them, even if those dates do not work out in the end.

Places that have developed meaning through a romantic experience-in-place can prompt reminiscing when spontaneously encountered, but are also revisited

intentionally on special occasions to commemorate or celebrate the romantic event that took place there (e.g., anniversaries). The participant below recalls returning to the hotel where he proposed with his wife and the friends who were present at the proposal, for a celebratory lunch:

> *"Eventually it was a whole of these very special moments. So, every time we sort of pass that bit there's a sort of hilarious reminiscing of that. So, the Edinburgh bit of our wedding was just the four of us, and afterwards the four of us went to the Apex to have a bottle of champagne and lunch, as a sort of like nod to that."* – **P2**

There is a clear desire in people to preserve these romantic memories and keep them alive, both for them individually as well as within the couple. But there is also a willingness to share these romantic experiences-in-place with other people in their social circle. This is illustrated by the quote below from a participant who secretly went on a blind date to keep an eye on her best friend who was on a date with a creepy older guy and in the same bar, but ended up falling in love with her blind date:

> *"The circumstances surrounding it are actually really funny and still one of my favourite stories to this day [..] The point was to make sure that she wasn't going to be taken away and kidnapped by this dude. There wasn't the intention to meet someone at all. [..] It was quite comical. It's I mean, something you would see in a film. [..] I do share the story.  Because it is just absolutely ridiculous and it's a funny story and I want people to share in that."* - **P8**

**Figure 4-16 - Participant in front of the bar where she went on a memorable blind date.**

This willingness to share personal stories of a romantic experiences-in-place related to this bar, indicates that there might be potential for technological devices and services that share this type of emotional person-place relationship data.

Aesthetic Pleasure

Aesthetic pleasure is an emotional experience-in-place which stems from the appreciation of the physical dimension of place. For 16% of all personally significant places, place attachment has developed from aesthetic pleasure for six out of eight participants. This aesthetic value can come from the architecture in the built environment, or from the beauty of the nature at the place. The following participant for example describes how the beauty of a university building, played an important role in his decision to come study at that particular university:

*"Look at this building. It is an amazing building. This is why I came to Edinburgh. It was this building. I came here and literally that made me go: "I want to come*

> *to this city to study." [..] I remember going into an office which was almost*
> *"Harry Potter-esque". Because it was proper, I mean, who has an office in the*
> *middle of a spiral staircase?  It is SO cool!" - P2*

Although aesthetic pleasure is rarely mentioned as the main reason for place meaning, it is often mentioned as a contributing factor. For personally meaningful places located in the historic city centre of Edinburgh, participants also comment on their appreciation for the architecture of the old buildings at their personally meaningful places (P1, P3, P4, P5). This type of emotional experience-in-place also contributes to the overall perception of the city as already discussed in the Place-theme, with all participants classifying Edinburgh as a beautiful, historic city.

Several participants (P2, P3, P5, P7) also express experiencing aesthetic pleasure in nature settings such as parks. This beauty is attributed to specific features within the nature setting, such as particular flowers, trees, plants, rocks, or hills (Figure 4-17):

> *"Oh, it looks beautiful now with those yellow colours from the flowers! Let's sit*
> *down over there so we can enjoy the view of the Craigs and Arthur's seat with*
> *the flowers" - P3*

Because the aesthetic pleasure in parks is linked to nature, temporal factors such as weather conditions and seasons influence this type of experience-in-place:

> *"It used to be my walk to work, and I loved to watch the flowers grow and*
> *blossom. I liked to see the four seasons, see the nature [..] This is beautiful as*
> *well, the blossom trees. Nice and pink in springtime as well. That's a pity they*
> *only last a few weeks and then they go green again and be bare in the winter. I*
> *like that, you get to see all the seasons."  - P7*

The Edinburgh skyline, which is often clearly visible from these urban green spaces, is also mentioned a few times (P2, P5, P6) as evoking aesthetic pleasure.

***Figure 4-17 - Yellow flowers in Holyrood Park add to the emotional experience-in-place of aesthetic pleasure.***

The emotions related to the experience-in-place of aesthetic are typically moderate in intensity, most commonly joy, with "lovely" being a term often used to the describe the emotion. However, on occasion, more intense emotions can be related to aesthetic pleasure, namely admiration and amazement, but these would be the exception to the rule.

Knowledge & Secrets

Knowledge refers to the experience-in-place where a person is learning or becoming more knowledgeable about a place. For 16% of the personally significant places in the city of residence, a place developed personal meaning from this type of experience-in-place, for five of the eight participants. This knowledge can be geographical, historical, or be an increased familiarity with a place over time. The participant in the quote below for example describes his intimate geographical knowledge of a former workplace:

> *"I used to run this place. I mean, I literally know every nook and cranny of it, because I had to lock it up and go around and do all the things. So those used to be the offices. Hilarious that it still has the same alarm system. I wonder if my old code would still work?" - **P2***

For others the place-based knowledge revolves around the history of the place rather than geographic knowledge. The participant in the in the quote below talks about how he developed a personal relationship with a particular neighbourhood (where he had not lived) by studying the history of it:

> *"Just suddenly realising you're living in a very historical place. At the time I didn't really – I hadn't studied enough about Scottish history or Edinburgh history. I have now. That was kind of like the trigger [..] Old Town I know physically, but I haven't studied it like New Town." - **P4***

When this knowledge is historical, sharing historical background stories with others becomes an important part of the personal relationship with the place. This typically happens spontaneously when a place of historical significance is encountered while in the company of others.  The knowledge of these places is often acquired through having spent a significant amount of time in the area, or through the person's particular personal interests, like P4's interest in history as mentioned above. These local histories are often shared in combination with a person's own personal history with the place:  as the following participant does when talking about both the historical history and his personal history behind the BBC studios in the New Town neighbourhood:

> *"It is The Jam House now. It used to be BBC studios. They used to work on…not major things, but news bits and the occasional TV comedy and things like that. It has changed quite a bit now. They used to broadcast here during the war. I used to deal with them quite a lot, but then they did us out of several thousand pounds that we still never got. So we don't deal with them at all now hahaha. That is a shame." - **P4***

What makes this type of experience-in-place different from belonging, is that the relationship with the place is more cognitive rather than an affective one.  It is expressed in cognitive terms rather than emotional ones, such as "knowing" the place,

"knowing it like the back of my hand" or "knowing every nook and cranny". Affective terms used to describe this emotional experience-in-place are positive but low in intensity or even neutral, such as "likeable", "cool" or "enjoyable", "neutral":

> "I have no particular emotions attached to it [i.e., New Town neighbourhood] to be honest. No, no. It is just a likeable place." - **P4**

This is in line with what Chawla (1992) refers to as "affectionate identification". In these cases, the place is considered personally meaningful, but the emotional person-place relationship is typically described in less empathic ways. This is also in line with models of place attachment in the literature, which classify ties to a place as cognitive because they include geographical- and route knowledge, history of the place, and mental models (Lynch, 1960; Scannell & Gifford, 2010)

Having intimate knowledge about a place can add to the personal significance or personal meaning of a place though, especially if this knowledge is secret or perceived as being secret, or unknown to the general public. For example, the following participant describes how a secret, hidden area in the touristy neighbourhood where she lives, as an important aspect of her relationship with this neighbourhood:

> "It is a cool little hidden area, as well. A little secret set of…you know, old buildings and stuff like that. You know, that you normally would not know." - **P3**

Another participant also describes the perceived secret location of a historic burglar alarm incorporated in the steps of a historic building, as an important aspect of this person-place relationship:

> "It is an unassuming attraction. It is not "in your face". I feel like I am the only person in Edinburgh that knows about it. But I know all the tourist tours bring you here. But I still think it is good! I like it!" - **P5**

*Figure 4-18 – Unobtrusive old burglar alarm built into the steps of a historical building (see top left corner).*

The (perceived) secret knowledge regarding an aspect of a place can thus contribute to the enjoyment and personal significance of the place, as well as to the sharing of this knowledge.

Escaping

The Escaping experience-in-place contributes to the development of an emotional person-place relationship for 16% of all personally meaningful places in Edinburgh, and is mentioned by half of the participants. This experience-in-place is typically described in terms of escaping or getting away from another type of physical place or environment, or getting away from certain people within that place. The places where a person escapes to are experienced as "bubbles" or safe havens in comparison to the other physical place or environment within the same city that the person is trying to get away from. The following participant for example describes his relationship with a cinema. It became a place to escape school as well as the bad neighbourhood he was living in:

> *"Rather than going to classes, I spent most of my time in here. [..] Just a place to get away. It was escapism I guess. I think a lot of it was just about getting out of Sighthill [bad neighbourhood]. Have you been to Sighthill? It is not very nice."* - **P4**

These places offer an escape from the built environment of the city itself or from other elements of hectic city life, such as work, tourists, and city noises. One participant her favourite café as a nice and calm bubble in the middle of a busy city:

> *"It felt like I was locked in a bubble in the middle of the town. It is nice and calm in there, but it is quite busy out here."* - **P5**

Several participants (i.e., P2, P5, P6) also describe having such an experience-in-place in a large park in the city centre, juxtaposing it as a green oasis in the middle of the busy built urban environment of the city centre, and away from the many tourists:

> *"On a day like this, you feel you're abroad. You're in the middle of this really big city and it's all quiet. Okay's I know there's music and all but…It's just nice to have this big, huge, green space in the middle of the city [..] I like to go here because I don't think a lot of tourists know about the Meadows. They all go to the Princes Street Gardens [i.e., park in the historic city centre], which are usually crowded when the weather is nice."* - **P5**

Emotions typically associated with the escaping experience-in-place are joy and serenity, and it is closely related to the relaxation experience-in-place. However, escaping is not necessarily about relaxation, but primarily about physically or mentally escaping a place. It is about having a change in scenery or getting away from, or not being in, the juxtaposing physical or social environment. In addition, where people typically have a relaxation experience-in-place in places that are elevated or in green spaces, an escaping experience in place also occurs in cafes, cinemas, and theatres.

Negative Experiences

Most emotional experiences-in-place from which emotional person-place relationships develop are positive and result in positive emotional person-place relationships, even if some negative emotions are linked to the experience-in-place. However, more than half of the participants (P1, P3, P5, P6, P8) also express having a negative experience-

in-place in 13% of the total number of selected places in their city of residence, which for 9% of all places results in a negative emotional person-place relationship. For some, a negative person-place relationship developed from one, intense, and very personal negative personal experience, such as the death of a loved one (P1) or becoming the victim of a crime (P8):

> *"My girlfriend… She died almost two years ago now. She left our flat that morning and never came back. There are several places that I could have picked. The place where they found her. In the harbour, next to the… what is that boat there called again? The Queen's boat, you know, the Royal Yacht Britannia."  - P1*

Another participant describes developing a negative relationship with her previous flat, after a series of incidents eventually culminated in a personal traumatic event:

> *"I associate it with bad things, basically. I guess the worst one is the one I remember most. She hit me across the face, and I fell to the ground, and she kept hitting me with her bag. There were quite a few people there, because we had gone for a picnic at [a park]. Everyone left us in the front room to sort it out and it escalated and that's when she said I was being selfish and hit me, and I ran out." - P8*

It can involve an unexpected loss, conflict, escalation, or break down in interpersonal relationships. This would not only impact the interpersonal relationship, but can also impact a person's relationship with the place where the negative experience(s)-in-place occurs.  In case of a lost loved one, there is a desire to honour or commemorate that person by erecting a personal monument or shrine at the place where tragedy struck:

> *"I have been back there, to the flat, but also where they found her. I went there afterwards, right after it had happened, to lay down some flowers. And I have been there a few times since to put some flowers as well." - P1*

This was further evidenced by observations during the Walking & Talking interviews with several participants in the urban environment, during which several personal monuments for lost loved ones are encountered. These are typically erected at the

place where the negative event took place, or at a place that is considered to be a personally meaningful to the person or people in question. They are revisited at special occasions to mourn, commemorate, lay flowers or burn a candle. This includes a white painted bicycle, erected by friends and family of a man who had died in a traffic accident, outside the bar where participant P8 had a memorable blind date (Figure 4-19).



*Figure 4-19-Personal white bicycle monument for a loved one who has died in a traffic accident.*

It illustrates how virtually the same location can have a very different emotional personal meaning to different people. Several participants also commented on the memorial benches located in a large park in the city centre (Figure 4-20). These special benches are erected by friends and family in memory of loved ones that had passed away, and for whom this park had been a personally meaningful place.

*Figure 4-20 - Personal monument in the form of a memorial bench*

When talking about negative relationships with place, participants often emphasise the negative affective component of this person-place relationship as being the main component. The specific emotions can differ per experience-in-place, but are typically intense and negative, namely grief, anger, and vigilance:

> *"I lived there for another year, until May the following year. Yeah…things just weren't ever the same. It was terrifying. [..]I think sadness as well… confusion definitely being the big emotion. Never knowing what you did wrong without meaning to. Looking over my shoulder all the time…" - P8*

Not all negative personal experiences and emotions resulting in negative relationships with place are this intense and serious in nature, nor do they always lead to developing a negative emotional relationship with place. But it can result in having mixed feelings about the place.

Experiencing or reliving these intense negative emotions if the place is to be revisited is also the main reason for place avoidance behaviour (P1, P5, P8). Participant P1 for

example does occasionally go back to the dock where his girlfriend's body was found, but only once he has mentally and emotionally prepared himself to do so. Participant P8 also describes how, after she was finally managed to move out of the flat where she underwent a personally traumatic event, she actively tries to avoid going near it:

> *"I never used to be able to walk down the street at all, or even look at it. So, if the bus was going that way, I used to turn the other way."* - **P8**

There is no specific type of place that people have a negative emotional person-place relationship with. Most of these places are mundane, public and semi-public places that the average person in the street would not look at twice. A dock in a harbour, a sidewalk next to a bar, a flat in a residential area, and one of the many hotels in the touristic city centre of Edinburgh. However, for each participant who selected each of these places, it is that particular place has a strong, negative personal meaning. It further illustrates that for is not the place itself that is important here, but the negative experience-in-place and the negative emotions from which this emotional person-place relationship develops. Interestingly, also the negative experiences-in-place and emotions of other people can also result in developing a negative person-place relationship, like a known suicide spot:

> *"Every time I see that monument, the Scott Monument… Ehm, I don't know. I don't like it. No. Now, I have never been on it, but I suppose because someone took their own life…from there. So whenever I see it, I kind of think of that person."* – **P5**

These findings are in line with place attachment studies showing that places where individuals or communities have unexpected lost members in disaster, accidents or acts of terror, emotional bonds with these places and impromptu shrines at those locations are created (Manzo, 2003). However, although the negative experience-in-place itself involves other people, participants describe it as being a personal, individual experience of place and prefer to not share their negative emotional person-place relationship with others.

<u>Exploring & Discovering</u>

The emotional experience-in-place of Exploring and Discovering is associated with 11% of all personally significant places and is experienced by half of the participants. This can be the exploring and discovering of the physical urban place or environment, or refer to the exploring and discovering a specific aspect of place. Several participants mentioned developing an attachment to places that enable exploring or adventure (P2, P7), like the airport (P7) or a park where one can leave the official path to explore it on foot:

> *"What I would usually do is just put in music and just walk around. And especially I love exploring it a bit. So going off the tracking and finding kind of a little weird track. And you usually...like you can walk in here for sometimes half an hour or an hour without actually running into anybody. So that is actually really nice! Because a lot of people kind of only do the same tracks. But when you go off that, it is actually really sweet." - P3*

For those participants the experience of exploring and discovering is related to physically moving through the environment. For other participants it is more related to exploring and discovering the cultural or historical dimension of a place, such as music, films, literature, drinks and food. One participant described his attachment to an independent cinema as a place where he discovers and explores foreign films and art-house films:

> *"This is where I...well...surprisingly got into proper films. I wasn't really exposed to anything particularly cultural. [..]I decided to go into French cinema and Italian cinema things. Good films. I think it's where I learned there were films other than blockbusters. This is before the days of thousands of films on cable telly."  - P4*

Another participant describes her attachment to a live music bar as a place for exploring and discovering different kinds of music:

> *"I like it for the different styles of music they play here as well. For example, there is a Ceilidh band that I know that played here the other day that was really good. Folk music sometimes, then it is rap or Scots, a bit of everything. It is really good for discovering different kinds of music." -  P3*

This emotional experience-in-place is described as a journey, in which exploration ultimately can lead to a discovery. This discovery can be great film (P4), a nice, secluded spot in the park (P3) or an unobtrusive historical monument in the form of an ancient burglar alarm built into the stairs of a house, while exploring Edinburgh on foot:

> *"It stands out because it is not in your face, it's not highlighted. An art gallery does nothing for me. Seeing the Mona Lisa did nothing for me. So for me, walking around a city and seeing something different… No plaque, no gold marking the spot. [..] I just kind of thought it was very clever. So…I think that's how I felt. Admiration. That's my favourite place in Edinburgh."- **P5***

This journey of exploration leading to discovery is reflected in the emotional component of the resulting emotional person-place relationship. The exploration is characterised by joy and anticipation, while discovery is characterised by admiration, amazement, and surprise. It should be noted though that people do not only have such an emotional experience-in-place in historical or cultural heritage sites, but also in more mundane places like bars, cinemas, and airports. It are also these emotional experiences-in-place that shape participants' overall perception and experience of Edinburgh as a vibrant, cultural city as discussed in more detail in the Place-theme (Section 4.2.1). It shows that this type of emotional experience-in-place is not only valued by tourists visiting an unfamiliar city (Urry, 2000; Urry & Larsen, 2011) but also by the residents of that city. It identifies potential for technological devices and services that support an emotional experience-in-place of exploration and discovery within the city of residence. This potential is further evidenced by current use of technology in this context, with seven out of eight participants indicating they use navigation and recommendation services like Google Maps and Google reviews to explore tourist locations, bars, and restaurants in their own city of residence.

Interest

In this category of emotional experience-in-place, an individual experiences attachment to the place because they identify with it, and it matches their personal values or interests. The place aligns with the person's sense of self. Other than the

experience of bonding, which is a type of social place attachment, and belonging which is a type of physical place attachment, interest is an experience-in-place that is a self-based cognitive place attachment. This alignment between person and place is based on personal and professional interests which have shaped or reflect who they are as a person. Examples from the data corpus include a music agent who discovered his love for rock music over repeated visits to see bands perform live at a local concert venue (P4), a student in engineering's admiration for the clever invention of an ancient burglar alarm (P5), and a participant's attachment to a Sherlock Holmes-themed pub because of his childhood interest in those stories:

> *"I actually didn't know before I moved here that Arthur Conan Doyle was Scottish. I always enjoyed reading the books and watching the videos and watching the series. The decoration, it made me remind all the stories that I had read. [..] There would be different pubs that would have different meanings you know. Where you meet up with other people or you would go for drinks. But I just decided this one because on an intellectual level…I would identify with it." -* **P1**

This experience-in-place is characterised by feelings of interest which on the Plutchik Emotion wheel are classified as an emotion with low intensity. But from the stories of participants, it becomes clear that they personally feel strongly about this type of emotional person-place relationship, and therefor want to share it with other people:

> *"The two big loves of my life are film and music. And back in the day, or even fairly recently, I must have seen…maybe 150-odd bands and players over the years, from sort of 1981 to the present day. [..] I spent a lot of time here, and that was with a lot of other people" -* **P4**

However, because it is based on personal interest, the people close to them who they share it with do not always feel the same way:

> *"Maybe because I'm an engineer, I feel like it was very clever. Whenever I have visitors, like when my sister and cousin came over, I bring them to see it. But I don't feel they appreciate it as much as I do." -* **P5**

Other participants express feeling attached to places because they reflect similar personal values. The participant below describes her preference for the down-to-earth style in etiquette and decoration of her favourite café, in comparison to the more posh and pretentious establishments located in the same affluent area of the city:

> *"It's also a very raw place. It's not fine dining, it's a bit scattered. I don't know if their etiquette is that great. That's the charm of it. [..] It is just a bit raw." - **P5***

For eleven percent of all personally meaningful places in the city of residence and half of the participants, place meaning has developed from an experience-in-place of Interest because personal or professional interests or values align. This is related to the concept of place identity, where self-definitions are derived from places as individuals draw similarities between self and place (Gustafson, 2001a; Proshansky, 1978; Scannell & Gifford, 2010, 2014; Twigger-Ross & Uzzell, 1996). It is a special type of place attachment to environments that individuals feel match their personal values and appropriately represent them as a person (Scannell & Gifford, 2010, 2014; Twigger-Ross & Uzzell, 1996). It identifies potential for technological devices and services to explore and share emotional person-place relationship data of personally meaningful places in the city of residence, based on shared personal and professional interests, or matching personal values. This potential is further evidenced by current use of technology in this context, with seven out of eight participants indicating they use recommendation services like Google Reviews and TripAdvisor to explore historical and cultural locations, bars and restaurants in their own city of residence.

<u>Achievement</u>

Nine percent of the selected places are personally meaningful where participants experience a sense of personal achievement, selected by half of the participants. This sense of achievement is often the result of accomplishing personal or professional goals, such as obtaining a degree as a student (P1, P5, P7), reaching a certain professional status (P2), or being successful in one's profession (P1, P2, P7). Participant P1 for example talks about how the experience of doing a PhD is related to the emotional experience of his old university campus.

> *"[Initially] you would want to start and work 10 hours a day. Then the feeling kind of changes a bit, but I always liked what I was doing. And now I have a feeling of accomplishment and ehm…I reached the finish line. So I wouldn't really want to continue there, although I, you know, go back. But I have a feeling of…you know, it is enough. I reached the finish line, I have nothing against it, but…no more for me no." - **P1***

This participant talks about the experience of achievement in terms of "accomplishment" and "reaching the finish line". Another participant talks about being proud of a professional achievement in the workplace, and how it made him realise that he is now an expert in his field:

> *"And things like building the [user experience lab], I feel really proud of that. [..] I feel great pride in having created it seven years ago. And what it means, and the way I can talk about that, is always a thing that makes me go "Alright, I DO know what I am talking about." It is not I am a fraud pretending. I actually know what I am talking about hahaha. And this is one of the first things that made me realise that this is actually the case." - **P2***

For others the experience of achievement is related to a specific event or to the place where the achievement is celebrated, as for example participant P5 recalls her sense of achievement and how proud her family members were at her graduation ceremony when talking about her personal relationship with the Usher Hall concert hall where the graduation ceremony took place:

> *"For my Masters graduation everyone came over. There's five of us in the family, but also, my extended family, cousins, and auntie, flew over plus ones. So there was like 13 of us for my graduation. I have good memories [..] Remembering kind of my master's graduation and remembering my mum and dad and my cousins and my family were all taking pictures here." - **P5***

The reported experiences of achievement are mostly of an academic or professional nature, creating an emotional person-place relationship between people and their workplace, university campus or place of celebration. Looking at the emotional component of this relationship, it is not only described as a feeling of pride or accomplishment, but as an emotional journey with ups and downs and struggles along

the way which have to be overcome This ultimately results in an experience-in-place of achievement and feelings of pride, accomplishment, responsibility and confidence, which can bolster their self-esteem. It identifies potential for technological devices and services that support the celebration of personal achievement in these personally meaningful places.

Inspiration & Motivation

For 9% of the total number of selected personally significant places, three out of eight participants reported that an emotional experience-in-place of Inspiration and Motivation contributed to the development of place meaning. Often this is related to one's professional interests or goals (i.e., place identity). However, unlike the concept of place dependence (Scannell & Gifford, 2010), the places do not necessarily directly support the achievement of those goals by, for example, providing a suitable workplace or access to tools or other kinds of resources.  In fact, only one of the selected places was a participant's current or former workplace. Instead, it are often cultural places like museums, historical or cultural heritage sites, and art venues that inspire people on an intellectual level, inspire creativity, and motivate them to strive for greatness (Figure 4-21):

> *"You have a few nice statues as well inside of the most important scientists. That is why I like this place [i.e., National Museum of Scotland]. It just represents everything I work for. And want to accomplish in the future. [..] It makes me want to work more so I can be here as well hahaha! If I can do something productive like this for society, that would be good. Then I can have my own statue in the national history museum of [home country]."- **P1**

*Figure 4-21 - Statue at the entrance of the National Museum of Scotland.*

Other participants get inspiration and motivation from another type of place, namely the place where personal achievements are celebrated. For example, the venue of their graduation ceremony:

*"This is where the big day is going to be hahaha! I suppose everyone can enjoy the place, but also that it's just kind of that motivation for me to keep going and doing what I'm doing. Yeah. That's it. [..] It was always a motivator. Always motivated me to be like, 'Finish your PhD now…' I can picture myself graduating. Even now I think, 'we're almost there' – almost anticipating the celebration of it." - P5*

For others the inspiration comes in the form of creativity. The following participant for example describes how events and exhibitions at a local art venue, are a source of inspiration and creativity for her work as an architect:

*"I guess, it's creative. A creative, cultural space. It is stimulating. It's more about creativity. [..] If I come to see an exhibition, for me it's maybe part of my part of my work. I will connect directly with the ideas I have. Projects I do, with thoughts. So it's not like a place I come to chill with a friend. It is always related to working. With projects." - P6*

These places where people feel motivated and inspired are regularly and intentionally revisited to help them keep going when the going gets though, and to help stay focussed on their professional goal. Some prefer to (re)visit these places alone because for them it is part of their creative process (P6), while others enjoy visiting these places with friends and family who visit them from abroad, to provide them with an experience-in-place of exploring and discovering Edinburgh and Scottish culture and history (P1, P5, P7):

*"I just feel that it is really nice to go and visit. So I have been there five or six times. Usually with everybody that comes over, I try and go there with them you know. So that is associated with all the people that came over. So my parents, Laura, my friends, everybody…I try to bring them there." - P1*

Participants indicate that they enjoy going to places and spending time in places where they experience inspiration and motivation. This is reflected in the emotional component of this emotional person-place relationship, which is characterised by interest, anticipation, and joy, resulting in feelings of optimism:

> *"Optimism as well for the future. Because you can see that a lot of people did so much with so little. And you think you have to do something amazing as well with whatever you have these days." -* **P1**

This optimism and admiration for achievements in science and engineering in the past, which are exhibited at these personally meaningful places, also makes participants wonder what they can achieve in their field with the technological advances at their disposal today (P1, P5).

Imagination

Imagination is an experience-in-place where a person can imagine being at the same place, but in a different time in history. This emotional experience-in-place is not related to one's personal history, but to the history of the place itself. As already discussed in more detail section 4.5.3, all participants indicated that they perceive Edinburgh as a beautiful, historic city, mainly because of the physical environment or physical dimension of place. This is also reflected is the imagination experience-in-place, where the old historic buildings and decoration in combination with historical background stories, creates an atmosphere that give a person the experience of being able to imagine what being in a different moment in time would have been like. This illustrated by the quote below, where a participant describes why he enjoys being at a historic market square in the city centre:

> *"It is just a place that I like to go to and I sit and think about all the marketers that were there selling their fish, selling meat. [..] You can imagine how it would be 200 or 300 years ago from all the stories you hear [..] So you kinda get the same feeling as the rough people, sitting on straw, drinking beer, selling fish outside, selling meat, fighting. It is nice to imagine" -* **P1**

Another participant describes how his experience of a small park covered in snow, made him feel like he found himself in a story of Dickens situated in the Edinburgh of 250 years ago:

> *"It had been snowing, it was one of those rare white Christmases. And apart from the cars, there was just a couple of cars on the street, you could have gone*

> *back 250 years, and it would have looked exactly the same. And my brain was*
> *going back to like, Dickens. [..] It was just one of these filmic moments…I didn't*
> *expect it. Like seeing through time."* - **P4**

An important aspect contributing to this experience-in-place, is that the physical features and characteristics of the place dimension have changed a little over time. This preserves the "look and feel" or the "atmosphere" of the place being the same as it was many years ago. This can lead to a realisation or awareness of being in a historical place.

Awareness, realisation, and imagination are cognitive processes that play a part in place attachment developing form the imagination experience-in-place, with the emotions related to this experience-in-place typically being a combination of admiration and amazement. So although this experience-in-place is rooted in the physical dimension of place, it goes beyond mere appreciation of (i.e., aesthetic pleasure) or interest in a place. It is the atmosphere and character of a place that sparks the imagination and can result in a personal attachment to it. These findings are supported by Urry (2000,2011) who argues that imagination, daydreaming, and fantasy are particularly important for tourists, who choose their travel destinations based on the atmosphere, character, or perceived image of a city. For example, many tourists travel to Paris because it has the carefully cultivated image of being a romantic city. It also offers different senses such as sounds and smells, compared those normally encountered by the tourist in their own city of residence. The combination of those factors then results in anticipation and an intensely pleasurable experience of the destination for the tourists. However, as discussed in this section, this emotional experience-in-place is also valued by the residents of the city, and it identifies potential for technology that supports an experience-in-place of imagination in the urban environment.

## Magical Moments

A magical moment is an emotionally intense, one-time experience-in-place which has a lasting impact on the person-place relationship. Seven percent of the selected places in Edinburgh have become personally meaningful because of such a magical experience-

in-place. This magical moment can be rooted in the physical dimension of place, in other people or in the self. For example, one participant describes how a park became personally meaningful to him due to a magical experience-in-place:

> *"On Christmas Day 1986, I was getting a cab to work. It had been snowing, it was one of those rare white Christmases. I remember just coming through the Drumsheugh Gardens [i.e., small park].  [..] And it was one of these moments where you go "Jesus! What a city to live in!"  I just got all romantic about it, and always remembered it. So…I just realised how lucky I was living there, it was just the loveliest place. It was like a snapshot moment. I can still picture it in my head, it was great." -  P4*

However, a magical moment can also stem from the social dimension of place. The participant in the quote below for example describes how he got to see his personal hero, a famous American singer called Tom Waits, perform live at his favourite local concert venue:

> *"I'm a big fan of an American singer called Tom Waits. So in 2008, he announced a small tour. [..] And it sold out in 7 minutes, the two gigs. And I thought, 'That's a shame, I'll never get to see him.' And [P2's wife], she overheard a part-time IT guy at work say, 'I've got a spare ticket for Tom Waits, does anybody want it?' [..] So, free of charge, got tickets to see my hero. [..] It was probably the best night of my life! Best 2 ½ hours of my life. Extraordinary!"*
> *- P4*
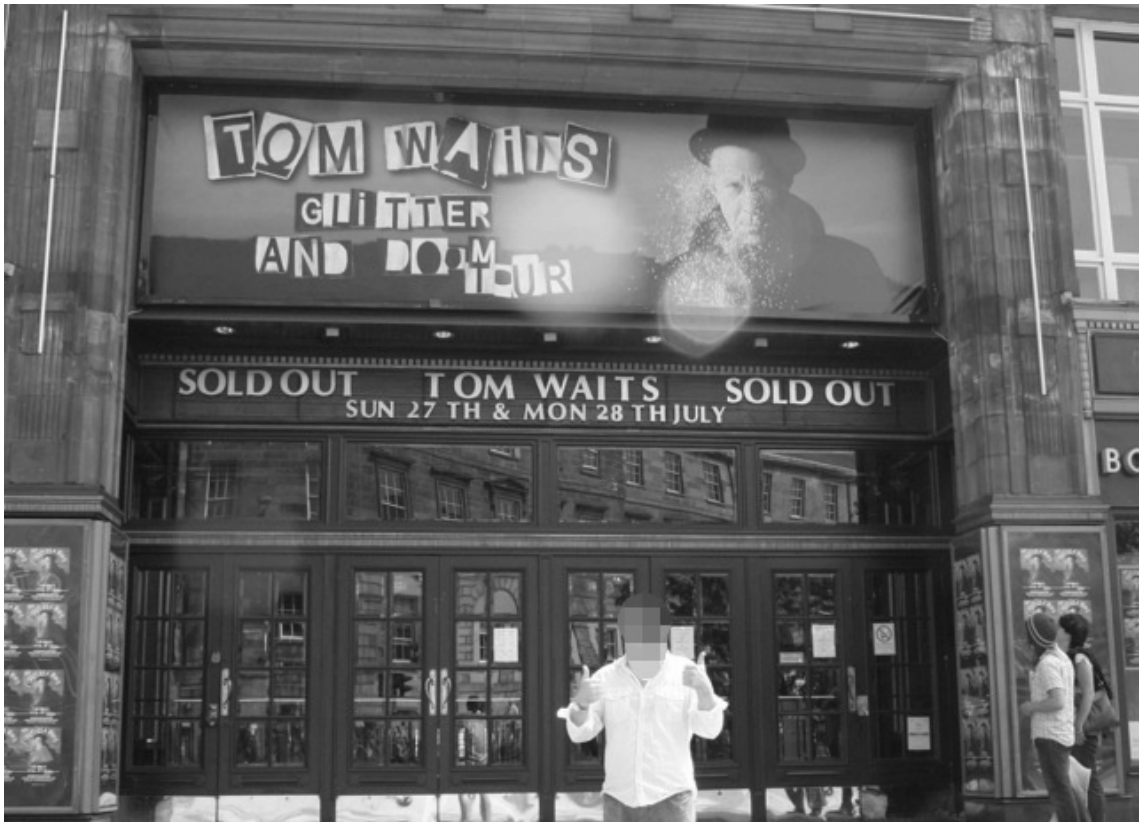
*Figure 4-22 – Representation of a Magical Moment experience-in-place, a memento of a participant posing at the concert venue prior to seeing his hero Tom Waits perform live on stage.*

These magical moments have made a lasting impact on the person and define the person-place relationship. They are considered highlights in a person's life, and this is reflected by the intense positive emotions in the affective component of the person-place relationship, namely ecstasy, amazement, and surprise. Participants describe this emotional experience-in-place using phrases like feeling "overwhelmed with love, ecstasy and relief" (P2) and "probably the best night of my life! Best 2.5 hours of my life. Extraordinary!" (P4). Another indication of the personal significance and lasting impact of the emotional experience-in-place is that all these participants remembered and mentioned the exact date that these magical moments happened, even though they took place 9-31 years prior.

In addition, also the uniqueness of the experience-in-place adds to the impact and personal significance. Participant P4 describes getting to see his hero perform live as a "once in a lifetime opportunity", while participant P2 describes proposing to his girlfriend as "ideally you only propose once". This also means that revisiting the place

where a magical moment took place is unlikely to lead to the same intense reliving of the emotional experience-in-place. All the participants who had a magical experience-in-place reported having revisited those places. But even though the place would sometimes physically be identical (e.g., P4 has intentionally returned to the small park several times after it had snowed), the experience of place would never be the same, and all that is left are the memories:

> *"I just got all romantic about it, and always remembered it. [..] It was like a snapshot moment. I can still picture it in my head, it was great." - **P4***

As a result, these emotional person-place relationships tend to evolve over time from a magical moment into one where the place evokes an experience-in-place of reminiscing with feelings of romantic nostalgia:

> *It's not somewhere... it's not like a destination place. It just a somewhere, if ever you're walking past there, it sort of brings a little smile to your face every time."*
> *- **P2***

### 4.2.4 Concluding remarks

In section 4.2, the different types of experience-in-place and emotions that people have in personally meaningful places in the urban environment and from which emotional person-place relationships develop, have been identified and characterised. This has resulted in the following taxonomy of sixteen types of emotional experience-in-place, namely reminiscing, socialising, bonding, belonging, relaxation, romance, aesthetic pleasure, knowledge and secrets, escaping, negative experiences, exploring and discovering, interest, inspiration and motivation, imagination, and magical moments. This taxonomy provides urban interaction designers with a framework to create a better understanding of the different types of emotional experiences-in-place in the urban environment in general, and the city of residence in particular. It also serves as an initial framework for identifying and analysing the potential for technological devices and services that aim to support or augment these emotional experiences-in-place in a hybrid city of the near future, while taking into account the richness and complexity of emotional person-place relationships in the urban environment.

## 4.3 Opportunities for Technology to Capture, Represent, Consume, and Share Emotional Person-Place Relationships

In this second results section, opportunities and motivations for technological devices and services to capture, represent, consume, and share emotional person-place relationships are identified and discussed. This is based on participants' reflections on their current use of technological devices and services in the urban environment, and on their interactions with the speculative social map and emotion map of Edinburgh. This identified potential for technological devices and services based on the different types of positive and negative emotional experience-in-place presented in the taxonomy in the previous section, different types of representations and sensorial experiences selected by participants, the closeness of social relationships and shared personal and professional interests, and to support the self-regulation of emotions. It addresses how people (would like to) capture, represent, consume, and share representations of their emotional person-place relationships using technology and the different forms this data can take (Research Question 2). Also the potential value or relevance of sharing this personal emotional person-place relationship data with other people is discussed (Research questions 3).

Participants currently already use a variety of technological devices and services in the urban environment to capture, represent, share, and augment their emotional experiences-in-place in a variety of ways. This technology use in the context of personally meaningful places provides some indication of how technology savvy the participants are, and which type of technological devices and services are currently popular or commonly used to this end. However, the focus will be on their underlying needs, desires and motivations for technology use in the context of personally meaningful places in the first place, or preference for not wanting to use technology this context. The rationale for focusing on the underlying needs, desires and motivations rather than the specific types of technological devices and services, is that the former are expected to remain more stable over time.

Furthermore, by reflecting on the current use of technology in the context of emotional experiences-in-place in the urban environment, this can inform the design of- and speculate about the potential for new technological devices and services that augment this urban lived experience in a hybrid city of the (near) future (i.e., Research

Question 4). It provides a starting point for further speculation, which will be discussed in more detail in Chapter 5.

| Current Technology Use | #Participants | Participants |
|---|---|---|
| Capturing & creating representations | 8 | P1-P8 |
| Sharing & consuming representations | 8 | P1-P8 |
| Socialising, Bonding & Romance | 8 | P1-P8 |
| Navigation and route planning | 8 | P1-P8 |
| Exploring & Recommendations | 7 | P1, P2, P3, P4, P5 P7, P8 |
| Monitoring Wellbeing | 6 | P2, P3, P5, P6, P7, P8 |
| Augment experience by creating personalised bubble | 6 | P1, P2, P3, P4, P6, P7 |
| Protection | 3 | P1, P2, P5 |
| No technology used | 8 | P1-P8 |

*Table 4-6 - Underlying needs, desires and motivations of technology use in the urban environment*

From an analysis of participants' current use and interactions with technology in personally meaningful places, several trends identifying opportunities for technology to augment the urban lived experience in the city of residence emerged (see Table 4-6). It highlights the current use of technology for capturing, creating, sharing, and consuming representations, and the emerging trend of using technology for monitoring wellbeing in the urban environment. These underlying needs for current technology use in personally meaningful places in the urban environment, are supported by the five more general contexts of use for mobile applications identified by Jones and Marsden (2006). They identify opportunities for mobile applications as information services (e.g. for weather or travel), for self-enhancement (e.g. memory aid and health monitoring), relationships (e.g. maintaining social contacts and social networking), entertainment (e.g. games and personalisation) and commerce (e.g. commercial transactions and payment) (Benyon, 2014a; Jones & Marsden, 2006). In the remainder of this section 4.3, the potentiality for applications leveraging emotional person-place relationships in the urban environment for individual and shared use, will be discussed in more detail. These will focus on the themes of self-regulation of

emotions, using technology for capturing and creating different types of representations and sensory experiences of emotional experience-in-place, and opportunities and motivations for sharing and consuming emotional person-place relationship data.

### 4.3.1   Emotion Regulation

Residents actively and intentionally use their personally meaningful places to regulate their emotional state. This mainly individual use of personally meaningful places in the city of residence is observed in several different types of emotional experience-in-place, namely reminiscing, socialising, belonging, relaxation, negative experiences, and inspiration and motivation. It can be based on the physical and social dimensions of place, or the personal place meaning. All eight participants report that they consciously and intentionally visit and revisit at least one of their personally significant places because it has a positive effect on their emotional state.

For the reminiscing experience-in-place the main thing is having access to happy memories and the feeling of nostalgia that recalling these memories evokes. However, when using personally meaningful places for emotion regulation, participants typically use these places as a tool to enable the transition from a negative emotional state to a positive emotional state. When feeling bored or lonely, participants seek out a socialising experience-in-place to improve their mood. This can be a planned meetup with friends, or a spontaneous visit to a personally meaningful place to be among people or enable chance encounters:

> *"If I am bored and alone at home, I'll feel like I need some air. It's always very simple to walk down the [Royal] Mile [i.e., touristic street] and it always cheers me up because there's always people walking up and down, always street artists, always something happening. Especially during the summer period really. [..] There's so many people you can meet and hangout with." - **P3***

The two main types of emotion regulation identified in the data corpus are personally significant places being used to experience belonging and relaxation. Belonging is experienced at 25% of all selected personally meaningful places, and relaxation in 18%. As already discussed in more detail in section 4.2.3 (Belonging), three out of the eight participants reported struggling with homesickness in their current city of residence.

This resulted in participants reporting feeling personally attached to places and visiting places where the experience-in-place alleviates feelings of homesickness and provides a sense of belonging (P5, P6, P7).  This type of emotional person-place relationship accounts for more than half of the places in the belonging experience-in-place category, and is often related to pubs, bars, restaurants and parks. The following participant for example, describes her relationship with a pub as a place where she goes when she feels homesick:

> *"Dropkick Murphy's [pub], because it is a home away from home. Sometimes I can get very homesick. I miss my friends and family back home in [home country]…yeah. [..] On the inside you feel like you're back in [home country] again. It is a place you can go if you feel homesick." – P7*

Participants use these places to change their mood from feeling homesick to experiencing a sense of belonging often described in terms of "feeling at home". The place where a person can regulate their emotions from feeling homesick to a sense of belonging is often specific to the individual. For people who are not form the same nationality as that participant, that specific pub is unlikely to enable them to regulate their emotions in a similar way, nor does it imply that every person with that nationality will be able to use this place to transition from feeling homesick to a sense of belonging. In can depend on an individual's highly personal experiences, like another foreign participant (P5) had on the North Bridge. This bridge in the city centre of Edinburgh has no links to national identity or culture of P5, but the individual experience this participant had on at the bridge has the same effect on her feelings of homesickness and resulted in the same type of emotional person-place relationship (see section 4.2.3 – Belonging).

The second main type of emotion regulation occurs when people experience physical or psychological stress, and seek out places where they have a relaxation experience-in-place, which has already been discussed in more detail in section 4.2.3 (Relaxation) and is experienced in 18% of all personally meaningful places. In these places people experience an emotional transition from physical and psychological stress to serenity, pensiveness, and distraction, often through being able to ground oneself or by connecting with nature. Participants use places as tools to enable the transition from a

negative emotional state to a positive emotional state, depending on their specific emotional needs. For example, participant P3 reports using a specific park as a place to clear her head when something is bothering her, going to a touristic street in the historical city centre when she feels lonely or boredom to cheer her up, and going to the esplanade in front of Edinburgh Castle when she needs to wind down after a shift at work or can't sleep at night:

> *"Holyrood Park, because I go there all the time. Nowhere in particular, I just walk around. [..] I literally use it to clear my head a bit. Especially when stuff is bothering me, I'll use it as a walk and usually by the end of it, I'm pretty refreshed." - P3*

> *"When I can't sleep, I sometimes sneak into this little garden bit just below the Edinburgh Castle Esplanade. It is open to people, but it is just relaxing there. It's got like little pebbles, and fantastic garden bit as well, and trees and all that. So it's really chilled out to sit there with some wine and chill out." - P3*

Emotion regulation based on the relaxation experience-in-place stems from the characteristics of the (physical and social) place dimension, meaning that this place can evoke the same emotional experience-in-place across different people. For example, half of the participants reported having a relaxation experience-in-place in a park (P2, P5, P6, P7).

Negative experiences-in-place and places people have a negative person-place relationship with can also be used for the self-regulation of emotions. Where for the other types of emotion regulation the transition from a negative emotional state to a positive emotional state happens within one visit, for place with a negative experiences-in-place this is a more gradual process. It requires multiple visits to the same place in order to deal with and process feelings of grief, loss, sadness and fear. For example, the participant (P8) who suffered a personal traumatic event in her previous flat, on one hand tries to avoid this place. On the other hand, she also gradually exposes herself to this place as she realises that the repeated encounters she has with this place over time help her deal with processing this trauma, as it has gradually reduced her feelings of fear related to this place:

> *"The negative association with this place has changed a bit. It is still not positive, but it's not as negative. And I don't think that there will be a time where it's not negative, where there isn't a negative feeling. There will always be feeling. The meaning hasn't changed, but the strength has, if that makes sense. [..] And if I hadn't walked past it with friends or passed the flat while I was on the bus because it happened to be on the route, that wouldn't have happened." -* **P8**

This finding is in line with findings by Manzo (2005, 2008, 2014), that negative emotional person-place relationships with one's places of residence can also contribute to or be indicators of overcoming traumatic events.

Finally, when struggling for motivation or inspiration at work, people use places where they experience inspiration and motivation to change their emotional state into a state of optimism. This is for example described by the following participant, who is struggling to finish writing her PhD thesis. Once a week purposefully seeks out the steps of the concert venue where the graduation ceremony will take place, to have lunch and keep herself motivated:

> *"It's just kind of that motivation for me to keep going and doing what I'm doing. Yeah. That's it. [..] It was always a motivator. Always motivated me to be like, 'Finish your PhD now...' I can picture myself graduating. Even now I think, 'we're almost there' – almost anticipating the celebration of it." -* **P5**

As discussed in this section, people actively and intentionally use their personally meaningful places as a tool to regulate their emotional state. This is because the experience-in-place evokes positive emotions or reduces negative emotions, enabling enable a transition from a negative emotional state to a positive emotional state. This transition also offers an additional explanation as to why there is no one-to-one relationship between person and place as discussed in Section 4.2.2, and why multiple positive and negative emotions can be related to the same place for the same participant.

The finding that there might be potential for technological devices and services that leverage emotional person-place relationships to self-regulate emotional states, is further supported by the current use of technology in the urban environment to track

and monitor a person's individual health and wellbeing. Six out of eight participants currently already use dedicated technological devices and services to this end as can be seen in Table 4-6. Wearables such as smartwatches (P2, P8) and activity trackers with GPS and cardio sensors (P3, P5, P6, P7) are to track and monitor their step count, heart rate, sleep patterns, and physical exercise in personally meaningful places in their city of residence.

An emerging trend is that some participants have also started monitoring their emotional- and mental health at home, using a dedicated journal or diary (P3, P5) to keep track of and reflect on their emotional wellbeing:

> *"I have a book at home where I write…it's a book for one sentence a day, so it's kind of like a journal. I write one sentence a day on if I've done something or a quote I've heard or how I felt. It's a 5-year journal. But I think it'll be fun when I look back and see what I did on this day five years ago. I feel a bit more like capturing things…In 2015 I wasn't very well, and I didn't do anything. So now when things happen I kind of appreciate it a bit more. It's important to look back and reflect." - P5*

These quantified-self technologies and personal informatics track and monitor one's health mostly for personal, individual use. However, there also appears to be some potential for sharing this type of personal data. Some participants currently share their data, especially when it is related to physical exercise or wellbeing, on social media. It is shared within their own social circle (P5, P7, P8) or with people who have a similar personal interest such as members of a running club (P7, P8). This adds a playful, motivational or competitive element to maintaining and improving their individual wellbeing:

> *And if I am happy with my progress, I will share it on Strava too hahaha. That is actually quite nice, because other people can see what you have done, and you can get encouragement from other people to keep going." -  P8*

The finding that personally meaningful places are used to self-regulate emotional states is supported by the literature on the restorative effect of nature settings, which can help individuals sustain levels of physical health and activity (e.g. Korpela & Ylén, 2007). The findings presented in this section expand on this, by identifying emotional

experiences-in-place that leverage a person's individual relationship with places in the urban environment and the city of residence for the self-regulation of emotions. This finding supports an emerging trend in studies in the field of place attachment and urban interaction design, that regularly seeking out personally meaningful places from the everyday environment (rather than simply nature places) can improve and individual's mental and emotional wellbeing (Knez, 2014; Korpela & Ylén, 2007; Manzo, 2014; Matassa & Rapp, 2015; Quercia, Schifanella, et al., 2014). Therefore, there appears to be potential for more personalised technological devices and services that support the self-regulation of emotions based on a person's individual emotional person-place relationships with personally meaningful places in the urban environment.

### 4.3.2 Representations

A second opportunity for technology identified in the data corpus, is the desire to represent personal, emotional relationships with personally significant places in the city of residence, or aspects thereof, using different types of representations and sensory experiences. These different types of representations can be for individual use likes personal mementos or to augment an experience-in-place, or for shared use to capture, communicate, and share emotional person-place relationships and experiences-in-place (or aspects thereof) with other people using different forms of data.

Places offer multisensory experiences of environments, which play an important role in the perception of place and development of place attachment (Gehl, 2011; Lentini & Decortis, 2010; Lynch, 1960; Matassa, Console, Angelini, Caon, & Khaled, 2015; Pallasma, 2007; Relph, 1976; Tuan, 1977). An analysis of the different types of representations selected by participants, shows a wide range of different types of preferred physical and digital representations of emotional person-place relationships or aspects thereof. These representations also provide different sensory experiences to represent and reflect the important sensorial properties of personally meaningful places (i.e., vision, smell, audio, touch, and taste). In Table 4-7, an overview of the different types of representations is provided, ranked by the number of times this representation was selected by participants. In case multiple different types of representations are selected an equal number of times, the representation that is

selected by the most participants is ranked higher in the table. As participants are allowed to select as many representations as they like, this means that for some personally meaningful places, multiple (different types of) representations have been selected.

| Type of Representation | # | #Participants | % Significant places | Representations | Types of Places |
|---|---|---|---|---|---|
| Visual representations | 23 | 8 | 44% | Pictures, videos, paintings, postcards, drawings, tattoos | Park (5x), castle esplanade (2x), neighbourhood, hotel, pub, cinema, theatre, bridge, café, historic steps (2x), art venue, previous flat (2x), airport, office, bar |
| Smells | 16 | 6 | 13% | Flowers, daffodils, wet grass, cut grass "autumnal" smell, "smell of summer", cannabis, cherry blossoms, barbecues, pizza, coffee, mulled cider, traditional native food | Park (13x), Christmas market, traditional native restaurant, neighbourhood |
| Food & Drinks | 12 | 6 | 16% | Bad canteen food, cider with mint leaf, Scottish whisky, Portuguese chicken, Brazilian cachacas and caipirinhas, traditional native food, vegetables from own garden, mulled wine, coffee | University campus, bar (4x), neighbourhood, restaurant, café, previous flat, Christmas Market, airport, park. |
| Monuments | 11 | 4 | 20% | Sherlock Holmes statue, shrine for deceased girlfriend, statues of scientists, David Hume statue, statue for Olympian Sir Chris Hoy, Scott monument for writer Sir Walter Scott, white bicycle shrine for traffic victim, memorial benches | Monument (2x), historic street (2x), pub, dock, museum, café, historic steps, park, bar. |
| Sound & Music | 8 | 4 | 18% | Owl, folk & ceilidh music, wind, rain, Fatboy Slim song, cobblestones, voices speaking native language, native music, podcasts, upbeat music | Park (3x), castle esplanade, pub (2x), previous flat, traditional native restaurant. |
| Flowers, Plants & Trees | 8 | 6 | 16% | Flowers, yellow flowers, chestnut trees, daffodils, flowers, cherry blossom trees, plants & vegetables in garden | Park (5x), dock, square, previous flat. |
| Historical background stories | 7 | 4 | 9% | Literary pub tour, historical walking tour, BBC studio, House of inventor of anaesthetics Dr Simpson | Neighbourhood (3x), historic street (2x), historic steps, market square. |
| Objects | 7 | 4 | 13% | Old computers, sofa, kitchen table, kettle, front door | University campus (3x), office (2x), previous flat (2x) |

| Clothes & Accessories | 6 | 5 | 13% | T-shirts and spencers, band clothes, jewellery, t-shirts, make up, smart clothes for job interview | University bar, theatre, art venue, pub, airport, coffee shop |
|---|---|---|---|---|---|
| Books and Movies | 6 | 4 | 13% | Sherlock Holmes books and movies, Braveheart movie, Friends episode, Harry Potter books and movies, Dickens, Russell Brand comedy | Pub, castle esplanade, hotel, university campus, park, concert hall. |
| Texts | 5 | 3 | 11% | Diary and journal entries, reviews | Castle esplanade, park, theatre, café, bridge. |
| No representations | 2 | 2 | 4% | Mental image / Memory | Park, bridge. |

*Table 4-7 - Representations of emotional person-place relationships*

<u>Visual representations</u>

As can be seen in the table above, the most popular type of representations for (aspects of) emotional person-place relationships are visual representations. All participants (P1-P8) selected at least one visual representation to represent their experience-in-place or (aspect of) their emotional person-place relationship of a personally meaningful place, resulting in 23 visual representations being selected in total for 44% of all personally meaningful places. The most popular visual representations are pictures and videos, with some participants also mentioning paintings (P6), postcards (P6), drawings (P3, P8), and tattoos (P5). Participants use these types of visual representations across the different types of emotional experience-in-place. The visual representations are captured or created to record the experience-in-place itself or highlight other important elements of emotional person-place relationship that shape, form or symbolise their relationship with their personally meaningful place. For the aesthetic experience-in-place for example, pictures are used to capture the key elements that comprise the beauty of the place, such as the view from a particular viewpoint (P1, P2, P5, P6), iconic buildings (P1, P4, P5, P8) or certain weather conditions which bring out the beauty of a place (P2, P4).

For an emotional experience-in-place where interpersonal relationships play an important role, such as socialising, bonding or romance, it would be a picture of the experience-in-place which includes those specific people that are part of or shape the emotional experience-in-place (P2, P3, P5, P7, P8). For example for the following participant whose socialising experience-in-place in a large park in the city centre is represented by a few pictures that one of her friends spontaneously took of them talking in the park:

> *"There's some lovely pictures I have with friends. One of my friends has a Canon camera, and there's some lovely photos of us just talking and just walking away. They're lovely to have." -* **P5**

***Figure 4-23 - Picture provided by a participant as a visual representation of a socialising experience-in-place in the Meadows park.***

Videos are specifically used to capture and communicate the atmosphere of a place (P3, P5). The following participant indicates how such a video could adequately capture her socialising experience-in-place of dancing with friends to music from a band she likes at her favourite pub, in way that a picture cannot:

> *"I guess because of the whole experience and the people and the whole like, atmosphere, a picture wouldn't quite capture that. So maybe…maybe a piece of film actually. Just filming a minute of it or something. Filming us dancing in front of the stage and the band playing. Yeah, yeah that! That would be a good way of showing the liveliness of the place and how nice it can be."* - *P3*

Another reason why visual representations in the form of pictures and videos are the most popular type of representation, is because current technological devices and services makes it easy to capture and share this type of representation. All participants (P1-P8) indicate that they have a smartphone that they carry with them at all times, which have built-in high-quality cameras enabling them to spontaneously capture and share an experience-in-place as it occurs in-situ. Some participants even use dedicated,

high-end cameras to this end (P1, P2, P4), in particular when the emotional experience-in-place is anticipated (e.g. graduation ceremony). These digital visual representations can be kept as mementos for personal use (e.g. reminiscing):

> *"I have lots of pictures. I just love having the memories. I want to remember things. To be able to look at them in a few years time."* - **P5**

Alternatively, these digital visual representations can also easily be shared online with other people. All participants (P1-P8) report using direct messaging (e.g. email or WhatsApp) or social media (e.g. Facebook, Snapchat, Instagram) to this end. For example, the following participants uses Facebook as a standard depository for sharing pictures and videos with other people:

> *"Facebook is my standard depository for sharing, even for people who aren't on Facebook, because you can still... there's quite a nice gallery system that you can make and then... And they keep them at quite reasonable quality."* - **P2**

Desire to represent, consume, and share emotional person-place relationships using a variety of different types of representations and sensory experiences.

However, what also becomes apparent from the table with different types of physical and digital representations, is a desire to represent, consume, and share emotional relationship with personally significant places using a variety of other (non-visual) physical and digital representations, which provide other sensory experiences such as smell, taste, audio, and touch. Seventy-nine percent of all selected representations do not fall in the category of visual representations. And for 56% of all personally meaningful places, a different type of representation is selected. In particular, there appears to be potential to use smells as a representation of emotional person-place relationships. Smells are the most popular type of non-visual representations, with six out of eight participants expressing a desire to represent their emotional person-place relationship with a personally meaningful place in Edinburgh with a smell. These can be divided into two types; nature smells and smells of food and drinks. Some of these smells are linked to a personally meaningful place at a specific moment in time (e.g. a specific season or weather conditions), highlighting the importance of the temporal

factor of emotional experience-in-place. These smells can enhance the person's emotional experience-in-place:

> *I don't like it when it's cold. But now [i.e., in spring], in the Meadows [park], straight away I can smell the cut grass which I absolutely love. So, when we go through here you kinda feel like you're disconnecting from the busy traffic and city life. I love the smell of cut grass and the smell of flowers" - **P7**

As illustrated above, smells can enhance the experience of the place and enable people to ground themselves by connecting with nature through smells, resulting in an augmented relaxation experience-in-place. Also smells of food and drinks can be linked to a personally meaningful place at a specific time, like the smells of barbecues being linked to a popular park located in between university campuses and a residential area in summertime (P5), or the smell of mulled cider being linked to the Christmas market during winter (P1).

However, for some participants, certain smells from nature and food and drinks encountered in a personally meaningful place are strongly linked to the experience of a place other than the location in which they are encountered (i.e., spatially located). For example, for some participants the smell of daffodils (P7) and the smell of grass (P5) in the Meadows park are linked to their native home country, while the smell of food in a restaurant is linked to another participant's native home country. All the participants who reported struggling with feelings of homesickness, also reported having a personally meaningful place where a certain smell instantly makes them feel like they are back in their home country again:

> *"In springtime, there's lots of daffodils here [in the Meadows park]. I would have picked the smell of a daffodil. They remind me of home in [home country], so there you go. And because I'm from the countryside as well, in the Meadows I feel like I'm away from the city again. The daffodils are typical from the place in [home country] where I'm from." - **P7**

***Figure 4-24 - Participant smelling daffodils in the Meadows park to alleviate feelings of homesickness and augment her emotional experience-in-place of belonging.***

Another participant describes how she regularly goes to her favourite restaurant that serves food from her home country, the Richmond café, to alleviate her feelings of homesickness. The smell of authentic food from her home country makes her feel like she is back home in her mother's kitchen again:

> *"You enter to the smell of [home country] food cooked well and it's like, [P6 snaps her fingers], back to my mother's kitchen. [..] It's really connected with feeling a bit back home." - **P6***

These quotes also illustrate the almost instant effect that smell can have in enhancing the emotional experience-in-place and on improving a person's emotional state.

However, unlike visual representations, smells are limited to being augmentations or representations of the experience-in-place of belonging (grass, daffodils, food from home country), socialising (barbecues, cannabis, mulled cider), escaping and relaxation (flowers, grass, cherry blossoms, cannabis, "autumnal" smell, "smell of summer").

These smells are almost all related to outdoor places where nature or drink- and food stands are present such as parks and markets, and restaurants.

It should therefore be noted that not all representations are suitable for representing, augmenting, or sharing every type of emotional experience-in-place. Food and drinks provide both taste and smell and are selected as representations for the same types of emotional experience-in-place as smells. In addition, food and drinks are also used to represent, enhance, and communicate an emotional experience-in-place of socialising, bonding, and romance. This stems from the social activities typically undertaken as part of such an emotional experience-in-place, like going for a meal, going for a drink, or having a date, which typically involves having a drink or a meal together. These are shared experiences undertaken with their friends or loved ones in these personally meaningful places such as pubs, bars, coffee shops, restaurants, parks, and markets.

Monuments are representations which are linked to a specific person (or sometimes a beloved pet or animal). This person is either a person of historical or cultural significance (e.g. statue of a scientist at a museum), or an important person in someone's personal private life, such as a romantic partner, a family member or a close friend. In case of the former, these monuments can represent and provide an experience-in-place of inspiration and motivation. In case of the latter, these personal monuments can take the form of personal shrines to commemorate or mourn a lost loved one, representing a negative emotional experience-in-place (Figure 4-25). This has already been discussed in more detail in section 4.2.3. Monuments can also trigger an experience-in-place of Exploring and Discovery P1, P4, P5, P7, P8). They encourage people to explore and discover the physical monument itself, as well as the place meaning, or emotional person-place relationship related to the monument.

*Figure 4-25 - Personal monument for a loved one who died in a traffic accident.*

Sounds and music can create an experiential bubble and affect a person's emotional state. Environmental sounds (or a lack thereof), and in particular nature sounds, have a calming effect and enable a person to ground themselves, contributing to an emotional experience-in-place of relaxation (P2, P3, P6, P7). Music is intentionally used by participants to create their own private bubble to affect their emotional state and augmented their emotional experience-in-place. They seek out pubs, bars and concert venues (P3, P4, P7) based on the type of music played there and the emotions it evokes. Others use headphones to listen to music on their mp3 players or smartphones to intentionally enable a personalised, augmented emotional experience-in-place of relaxation or inspiration and motivation while exercising in the park or commuting to work (P2, P3, P7).

Flowers, plants, and trees can provide both a visual and olfactory experience. Nature smells can represent and augment an emotional experience-in-place of relaxation or belonging as discussed prior. The visual beauty of these flowers, plants, and trees however also cause them to be selected as representations of an emotional

experience-in-place of aesthetic pleasure (P2, P3, P5, P7), like the cherry blossoms in a park (P5, P7)( Figure 4-26).



**Figure 4-26 - Cherry blossom trees in the Meadows park, representing and augmenting the emotional experience-in-place of Aesthetic Pleasure.**

Historical background stories are typically associated with historical, cultural places and represent and contribute to the imagination experience-in-place (P1, P3, P4, P5). It enables people to travel through time by imagining what the experience of a place may have been like many years ago. These representations are typically shared in in person and at the location, like the historical background stories told by a tourist guide at a historical market square (P1).

All objects are representations which in one way or another are linked to the home or the workplace. They represent and augment an experience-in-place of belonging. This sense of belonging is symbolised by these objects such as a sofa (P2), kitchen table, and kettle (P8) and are used to personalise the workplace and create a homely feeling.

Clothes and accessories represent and contribute to an experience-in-place of bonding, where participants describe feeling part of a group or community. This is

expressed and reinforced by members who are part of the specific group all wearing the same clothes or accessories (P2, P4, P6 ,P7, P8) or by giving clothes and accessories that represent a personally meaningful place as gifts to other members of a specific social group to strengthen their interpersonal relationship (P6, P7).

The stories portrayed in well-known movies and books are specifically used by participants to represent and communicate the ambiance or atmosphere of a personally meaningful place during the experience-in-place. What makes this type of representation particularly suitable for sharing an emotional experience-in-place, is that any person familiar with the cultural reference, immediately has a sense of what the experience-in-place and the emotions related to must have been like for the person in question. Although movies and books could be used to represent any type of experience-in-place, in the data corpus they are mostly used to represent an experience-in-place of imagination and aesthetic pleasure, like participant P2 who described the beauty of his old university campus as "Harry Potter-esque".

Unlike books, texts are written by the participants themselves. This type of representation appears to be particularly suitable for representing personally meaningful places that play a role in the self-regulation of emotions where people engage in self-reflection (P3, P5). This type of representation might take the form of a diary or journal entry for individual use, while reviews and recommendations are shared online in blog posts or review or recommendation websites (P4).

For the Magical Moment experience-in-place, participants sometimes prefer their own mental image or memory of the emotional experience-in-place over a representation or artefact. The fact that they can easily recall this mental image on demand, and that no type of representation would be able to adequately capture or reflect their emotional experience-in-place, appears to reduce their personal need for a picture, souvenir or other kind of memento as a representation of this experience-in-place. Other motivations for not using technology to capture and create representations are that it disrupts the emotional experience-in-place or ruins the moment (P1, P4, P5, P6), being selective in what to capture and share (P1,P2,P5,P8), it can lead to overly positive and unauthentic representations of experience-in-place (P2, P5, P6, P8), the

unavailability and technological limitations limit the adequate capturing and sharing of the emotional experience-in-place (P2, P4).

The potential for technology to capture, create, and share representations of emotional person-place relationships and emotional experience-in-place in particular, is evidenced by participants' current use of technology in this context. All participants (P1-P8) indicate that they use smartphones, dedicated high-end cameras, and social media in to capture, create, and share visual representations to this end. However, the twelve different types of digital and physical representations identified and discussed in this section also illustrate that this data can take many different forms. It identifies potential for technological devices and services that support this desire to represent emotional person-place relationships or aspects thereof using different types of representations and sensory experiences for individual and shared use, based on the type of emotional experience-in-place.

### 4.3.3 Sharing

There also appears to be potential for communicating and sharing of emotional person-place relationships with personally meaningful places in the city of residence, or representations thereof, with other people. In order to investigate the potential relevance of this type of data to other people, there is a need to first understand who these other people might be.

<u>Social Relationships</u>

Other people and interpersonal relationships can play a role in a person's relationships with their own personally meaningful places in Edinburgh, and in particular in the emotional experiences-in-place from which those emotional person-place relationships develop (Gustafson, 2001a; Lentini & Decortis, 2010; Paay & Kjeldskov, 2008; Paulos & Goodman, 2004; Satchell & Foth, 2010; Scannell & Gifford, 2010). How they are connected to the emotional experience-in-place, depends on the specific type of emotional experience-in-place and the social dimension of the personally meaningful place where it is experienced, as discussed in section 4.2.3. In some types of emotional experience-in-place, other people and interpersonal relationships are an integral part of the experience, namely socialising, bonding, belonging, romance, and negative experiences. In other types of emotional experience-in-place like aesthetic

pleasure for example, other people and interpersonal relationships play a much more limited or no significant role.

Table 4-8 below provides an insight into the different types of people that shape or are a part of the emotional experience-in-place, and the type of social relationship an individual has with those people. It also provides some insight into the potential for sharing and consuming emotional person-place relationship data with other people depending on a person's social relationships. Twelve different types of social relationships that are connected to a person's relationship with their own personally meaningful place have been identified. The first column indicates the type of social relationship, while the second column by which the table is ordered contains the total number occurrences in the data corpus belonging to that type of social relationship. The third and fourth column show the number of participants who mention this type of social relationship in connection with a personally meaningful place and their participant ID. The fifth column indicates to which percentage of the personally meaningful places in the city of residence this type of social relationship is related, while the last column lists all the places to which this type of social relationship is related.

| Type of Social Relationship | # | #Participants | Participants | %Places | Social relations | Types of Places |
|---|---|---|---|---|---|---|
| Friends | 33 | 8 | P1, P2, P3, P4, P5, P6, P7, P8 | 49% | Childhood friends, university friends, best friends, friends with the same interests, work friends, friends from home country/town | University campus (4x), park (3x), bar (3x), neighbourhood (2x), museum (2x), pub (2x), square, hotel, historic street, theatre, café, airport, office. |
| Strangers | 19 | 7 | P1, P2, P3, P4, P5, P6, P7 | 31% | Tourists, homeless people, drunk people, dog walkers, pub goers, concert goers, locals, suicidal people, bystanders, shoppers | Park (3x), shopping street, square, university bar, hotel, castle esplanade, historic street, pub, theatre, bridge, historic steps, monument. |
| Colleagues | 17 | 7 | P1, P2, P3, P5, P6, P7, P8 | 24% | Colleagues, managers, supervisors, students, support staff | University campus (4x), bar (2x), market square, art venue, pub, coffee shop, office. |
| Romantic partners | 13 | 7 | P1, P2, P3, P4, P5, P7, P8 | 29% | Girlfriends, boyfriends, former romantic partners, fiancée, wife, dates | Park (3x), bar (3x), hotel, neighbourhood, dock, castle esplanade, cinema, university campus, pub. |
| Family | 13 | 7 | P1, P2, P3, P4, P5, P7, P8 | 27% | Parents, sisters, brothers, cousins, sister-in-law, mother, father | Concert hall (2x), museum, park, neighbourhood, pub, historic steps, café, traditional native restaurant, hotel, street, university campus, airport |
| Celebrities | 13 | 6 | P1, P3, P4, P5, P7, P8 | 16% | Writers, musicians, actors, scientists, athletes, comedians | Monument (2x), pub, museum, historic street, theatre, neighbourhood, concert venue, concert hall, former house. |
| Flatmates | 5 | 5 | P1, P2, P5, P6, P8 | 9% | Current and former flatmates | Previous flat (3x), neighbourhood, bar. |
| Performers | 4 | 4 | P3, P4, P5, P6 | 13% | Street artists, local bands, choir singers. | Historic street, pub, theatre, rehearsal space, park. |
| Compatriots | 4 | 4 | P1, P3, P6, P7 | 7% | Scots, Dutch, Brazilians, Greeks, Irish | Bar, castle esplanade, traditional native restaurant, pub. |
| Staff | 3 | 3 | P3, P4, P5 | 7% | Gym instructors, bar staff, tourist guides. | Gym, cinema, historic steps |
| Animals | 4 | 4 | P1, P2, P3, P5 | 7% | Dolly the Sheep, pet dog, owl, famous dog. | Museum, park, castle esplanade, monument, graveyard. |
| Regulars | 2 | 2 | P3, P7 | 4% | Regulars at pubs and cinemas | Bar, pub |

***Table 4-8 - Types of Social Relationships***

These twelve different types of social relationships are the types of people that can shape an individual's emotional experience-in-place, and that an individual can have a shared emotional experience-in-place with. They are also the type of people that an individual would potentially want to communicate or share (an aspect of) their emotional person-place relationship with, using technological devices and services and the different types of representations identified in the Representations-theme (see section 4.3.2). In the next section, the different opportunities and motivations for sharing one's emotional person-place relationship data with the different groups of people identified in this section, will be discussed.

<u>Emotional Person-Place Relationships are shared with a specific person or specific group of people</u>

Emotional person-place relationships or representations thereof are typically not broadcasted on social media or shared publicly with everyone, but rather shared directly with a specific person or a specific group of people. These are people that are present during the experience-in-place, close social relationships who would understand the personal significance or relevance of the emotional experience-in-place, or people with similar personal- or professional interests. The following participant for example only shares pictures and videos he takes of important family events which typically revolve around places (e.g. new home or travelling) or people (e.g. weddings or baby's "firsts"), with the other members of his family:

> *"Yeah, certain ones. Particularly ones which are based on family I will share with family, like, directly. So, I'll message [the pictures and videos to them] directly." - **P2***

The sharing in the example above is based on the type of social relationship (i.e., family) and the relevance of the emotional experience-in-place to that group of people (i.e., family event). Another participant also describes not broadcasting digital representations of an emotional experience-in-place or her emotional person-place relationships on social media, but specifically sharing them via her social media account on Snapchat because she knows she has only allowed close friends to follow her and access to her posts on Snapchat:

> *"Sometimes I share photos on Snapchat. My personal friends follow me, so I don't have a huge following and anything very personal will be on Snapchat. [..] I'm more comfortable sharing on there, because I know I only have close friends on there. On Facebook I have a lot more random people, so I would have to select them individually." -* **P5**

Participants are thus selective with whom they share aspects of their emotional person-place relationships and emotional experience-in-place with, as well as the representations associated with it. What becomes apparent though, is that it is not just the type of social relationship that is a criterion for sharing, but even within the same group of people (e.g. friends) the emotional person-place relationship is shared with a specifically selected individual or individuals rather than the entire group. This identifies potential for technological devices and services that support the sharing of emotional person-place relationships on an individual level.

<u>Sharing of emotional person-place relationship data happens at the personally meaningful place, either in person or mediated through technology</u>

If the desired representation can be digitised like is the case with pictures and videos, these digital representations can easily be shared online with others. All participants (P1-P8) report using direct messaging (e.g. email or WhatsApp) or social media (e.g. Facebook, Snapchat, Instagram, Flickr) to this end. If a digital representation is used for sharing (an element of) the emotional person-place relationship with a personally meaningful place, this online sharing tends to happen at the personally meaningful place and preferably during the experience-in-place or otherwise as closely to it as possible:

> *"A picture of maybe more inside of the park. Just a nice view I suppose or a place that it is nice and secluded. [..] I would send it to close friends or maybe family. Or who I feel like texting that at that moment or whatever. And usually just like send the picture and "Look where I am!" or "Oh this is pretty and relaxing." Something like that. [..] I usually share it in the moment or just like, shortly afterwards. But not like hours later." -* **P3**

Due to the personal nature of the emotional person-place relationships, sharing emotional person-place relationship data is preferably shared directly with the person

and at the location of the personally meaningful place. This can be done by visiting the place to have a shared experience-in-place or by sharing representations of the person-place relationship. For example, participant P6 who goes to the restaurant that serves native food from her home country to alleviate feelings of homesickness and have an experience-in-place of belonging, prefers to have a shared experience-in-place with another friend form the same country, by regularly going there for lunch or dinner together. If the sharing in person is planned, this is usually organised in advance around an activity, like in the example above having a meal together. However, if the personally meaningful place is encountered by chance or spontaneously, the sharing of the emotional person-place relationship can also occur spontaneously:

> *"It is not a place I would specifically show to anyone. I have mentioned it to people over the years. If I had been with someone and we would be walking through, obviously I would bore them with that story of my taxi run in the snow."* - **P4**

Sometimes the emotional person-place relationship is not shared face-to-face, but is shared publicly in-place by leaving a self-created representation at the meaningful place. Some examples in the data corpus include a technical drawing on the wall of a shared office space (P8), graffiti (P5) or an abstract painting on the wall at an art venue (P6), or a monument or shrine with flowers on a public sidewalk or dock (P1, P8).

<u>Motivations for Sharing Emotional Person-Place Relationship Data</u>

Participants expressed several motivations for sharing emotional person-place relationships with other people. In general, the individual doing the sharing must feel that the emotional person-place relationship data is somehow relevant to or relatable for other people in order to be willing to share it. The most common reason for sharing a person's emotional relationship with a personally meaningful place, is to enable others to have the same, potentially shared, positive emotional experience-in-place:

> *"I took my [foreign nationality] mom to watch the rugby with us when she came over. I am always telling her about it and that it is something that I do quite often with friends, but she has no idea of what it is really like. But I knew it would be something that she would really enjoy. And the best way for her to see what it is like, is to go there and experience it yourself."* - **P3**

Another reason can be to promote the personally meaningful place itself (P1, P3, P5) or performers performing at the place (P3, P4) to strangers with similar interests who might also be interested in attending. This is supported by the current use of technology in the urban environment for exploration and recommendations (see table 4-6).

On other occasions, the motivation for sharing is to create, maintain or strengthen social ties through social interactions. This can be to keep friends and family updated on what is happening in one's life, especially when they do not live in the same city or country. It serves to strengthen or maintain already existing social bonds and make people feel part of a group, or to create an experience-in-place of bonding amongst member of a certain social circle or community. This sharing of location-based social knowledge was also found by Angus et al. (2005) and Lane et al. (2008), and besides practical usefulness and information is also considered to be enjoyable and strengthens social ties. This result is also supported by Leahu et al. (2008), who found that a main motivation for sharing a person's arousal map of the city with a group of friends was to improve social connectedness among this groups of friends.

Another motivation to share representations can be to provide other people with mementos of a shared emotional experience-in-place, which can be used for personal or group reminiscing:

> *"I have very specific memories of it. Bonding with my brother and with some of my friends [..] Those photos. I would share with them. Sort of aid the memoir more than anything else." -* **P2**

Finally, the motivation for sharing emotional person-place relationships can be part of a person's emotion regulation to generate understanding, sympathy, empathy, or emotional support from others (P1, P5, P6, P8). For example, for the foreign participant struggling with feelings of homesickness, appreciates the fact that she can share this with a friend with the same nationality at the Richmond Café:

> *"I have a [foreign nationality] friend I always go there with. [..] Sometimes I want to just sit with my friend and get grumpy, you know. It's…it's this type of [foreign nationality] thing" -* **P6**

Being able to share this emotional experience-in-place belonging with someone who has the same nationality and understands her situation and culture, helps her deal with these unwanted feelings of homesickness.

<u>Motivations for not sharing: Emotional person-place relationship data is considered to be personal and private</u>

Six out of eight participants (P1-P5 + P8) also expressed reasons for not wanting to share certain emotional person-place relationships with other people. The emotional person-place relationship can be considered too personal to be of interest or relevant to other people, or that the person prefers to keep the emotional person-place relationship private. When the person-place relationship is considered too personal, the participant considers the person-place relationship only to be relevant to themself. They would be willing to share this person-place relationship with others but anticipate that there would be a lack of interest. This is the case when the emotional person-place relationship is considered to be mundane or every day, like with a current or previous home or workplace:

> *"I don't think I would explicitly share it. It is like "Well I don't want to hear about your office, so I am pretty sure you don't want to hear about mine." Even though to me personally it is obviously a lot more than that." - **P2***

In other cases, the place meaning or the representation chosen to represent the emotional person-place relationship, would be too personal for other people to understand the personal significance. This could potentially draw unwanted attention:

> *"[I keep them] in a drawer. Because A1 drawings are big...And people would go like "Why do you have that on the wall?!" Because it wouldn't really mean anything to anyone else. They wouldn't understand the personal aspect that there went a lot of pain and effort into making them." - **P8***

Other emotional person-place relationships or representations thereof are considered to be private. Other people might be interested in them, but they are not shared because the person would like to keep it too themselves. These can be personally meaningful places where a person prefers to go alone to have an experience-in-place

on an individual level. These are typically an experiences-in-place of relaxation or a negative experience-in-place:

> *"This is just my place. A place for reflection, you know. It is something for solitude." - **P1***

Negative experiences-in-place, and in particular places that a person negative person-place relationship with, are not easily shared with others. These places tend to evoke negative memories and emotions, like the previous home of P8 where she underwent a personal traumatic event:

> *"I used to not tell anyone about how I felt about this street if for whatever reason we would have to come down here. So I never, ever told anyone about how I reacted with this street. I've told people about what happened and what not, but not like where, or the fact that I used to get really bad anxiety about coming up and down the street." - **P8***

This results in avoidance behaviour and keeping the negative emotional person-place relationship private.

Participants are also aware of current technological services allowing people to "check in" at a location. This would make their current location or the location of their personally meaningful place visible to others. This functionality is for example supported on Facebook, Snapchat, Twitter, and Google Maps. However, most participants indicate that they do not use this type of functionality because of privacy concerns:

> *"I like to be very private. I don't like people to know where I am. I'm not on SnapMap [i.e., which is part of Snapchat]. I don't like the new map thing that they have where you can see where your contacts are. And they can see where you are." - **P7***

Emotional person-place relationships in the field of urban interaction design are standard represented, communicated, and shared using emotion maps, but these findings suggest that this is not the preferred interface by participants due to privacy concerns. This indicates that there might be potential for technological devices and

services that share emotional person-place relationship data that does not use a map-based interface or reveal the location of the personally meaningful place.

In this section, several opportunities and motivations for technology to share individual emotional person-place relationships (or representations thereof) with other people have been discussed. In the next section, opportunities and motivations for technology to support the consumption of this individual emotional person-place relationship data from other people in the urban environment, will be presented.

### 4.3.4 Consuming

In this section the relevance of and interest in emotional person-place relationship data of an individual to other people will be discussed. In particular where interests and preferences lie in exploring and interacting with emotional person-place relationship data. This is based on the analyses of participant responses to and interactions with the speculative social map of Edinburgh and emotion map of Edinburgh (see section 4.1.2), as well as participants' interactions with the urban environment observed during the Walking & Talking sessions. The trends that emerged regarding the consumption of emotional person-place relationship data are discussed in more detail below.

<u>Interest in emotional person-place relationship data is based on close social relationships and shared interests</u>

The social map of Edinburgh contains the location of 15 personally meaningful places in Edinburgh of three different types of people that the participant has different social relationships with (e.g. friend, stranger, and one other participant in this study that the participant currently has a social relationship with). The specific type of social relationship each participant has with that specific person taking part in the study, is shown in Table 4-9 below.

| Participant | Relationship with specific person on customised social map of Edinburgh |
|---|---|
| P1 | Acquaintance of Researcher |
| P2 | Colleague of Researcher |
| P3 | Girlfriend of P1 |

| P4 | Brother-in-law of P2 |
|----|----------------------|
| P5 | Friend of P7 |
| P6 | Acquaintance of Researcher |
| P7 | Friend of P5 |
| P8 | Friend of P5 |

*Table 4-9 Type of social relationship between the participant and the specific person whose personally meaningful places in Edinburgh are depicted on their customised social map of Edinburgh.*

So for example, participant P3 has been shown a customised social map that contains the personally meaningful places selected by her boyfriend, who is participant P1. All participants (P1-P8) indicate an interest in the emotional person-place relationships with personally meaningful places of people they have a close social relationship with or have a shared interest with over that of strangers. The main reason for this is that they would like to get the know the other person better, and see potential to bond over the other person's emotional relationship with a personally meaningful place (P3, P4, P5, P6, P7, P8):

> *"All the places that [boyfriend P1] mentioned, because I know him really well. So it would be interesting to see what his connection is with the places. Because he is my boyfriend and maybe I will learn something about him that I don't know yet." - **P3***

This is especially the case if the other person has shared an attachment to a place that the participant examining the social map does not know the personal meaning of, even though the participant and the person sharing know each other well:

> *"See I know [friend P5] quite well. So I know that, that was an old flat. But then, I wonder why those two are important. They're a surprise to me. But if I know why she's got attachment to it, it would make me be interested as to why the others are important." - **P8***

Furthermore, when participants are asked who's personally meaningful places they would be interested in knowing more about if they could freely pick anyone they liked, all participants picked someone they already have a close existing social relationship

with, such as a childhood friend (P4), their dad (P5, P7), a boyfriend (P7), or their own parents (P8):

> *"My parents I think that would be interesting because I know, I don't know my parents' relationship with Edinburgh. But I know that they came [to Edinburgh] for their honeymoon for example. So, they've got their own memories here that are not related to me, so that would be interesting to me."* - **P8**

Participants also express a potential interest in the personally meaningful places of people they have less strong or even no social ties with. In these cases, the focus of interest is not so much the person in the person-place relationship, but the place in the person-place relationship. In case of the latter, participants speculate about using the person-place relationship data of someone who has similar personal or professional interests, to have an emotional experience-in-place of exploring and discovering or of interest themselves at those places:

> *"If there was such thing of a map that shows the people who are interested in Science and Engineering, go here. [..] I definitely think that would be useful that, if I could see where people similar to me go to visit and like, I would be more likely to go and visit that."* - **P5**

The rationale here is that people who have a similar personal or professional interest or similar person-place relationships, perhaps also have personally meaningful relationships with other places in the city that this participant is unfamiliar with, but could be of interest to this participant. These findings suggest that there is an interest in sharing and consuming emotional person-place relationship data of and with individuals that a person has a close, existing social relationship with to improve social connectedness and bonding. Or has a shared personal or professional interests with to have an emotional experience-in-place of interest or exploring and discovering.


Emotional person-place relationship data is engaging and private

All participants when presented with the emotion map specifically enquire about the personal story of the emotional experience-in-place related to the emotional person-place relationships they express an interest in:

> *"Well that [place]…I think I know the story. But I would like to know what the*
> *story is. Are you allowed to tell me what that person's story is?"* - **P7**

That participants go beyond what is required of them in this respect (i.e., they only needed to indicate which emotions on the emotion map they would be interested in), is an indication that there is a genuine interest in other people's emotional person-place relationship data in their city of residence. However, several participants also indicate that they consider the emotional person-place relationship data of other people to be private information (P4, P5, P6, P7, P8). They express an awareness that exploring and enquiring about this type of privacy sensitive data might be considered inappropriate and could be classified as "being nosy" or an invasion of privacy:

> *"I'm just inquisitive to hear it [i.e., the emotional experience-in-place]. I don't*
> *know whether it's… I won't admit it's me being nosy."* - **P5**

It indicates that interaction with this type of data is engaging for participants, partially because it invites people to engage in otherwise socially unacceptable behaviours, such as overt public voyeurism, gossip, and curiosity. This has been shown in the literature to engage stakeholders with urban environmental data, while the data itself has the power to transform their perception of urban landscapes (Kuznetsov et al., 2011). These findings indicate that there is interest and potential for technological devices and services that use this type of data beyond the typical self-centred use seen in Personal Informatics and Quantified-Self technologies. However, privacy and unacceptable behaviour regarding interactions with this type of data appear to be potential issues of concern.

<u>Desire to experience positive emotions and have a positive emotional experience-in-place</u>

All participants express having an interest in positive emotions on the emotion map. There appear to be two reasons for this. Firstly, participants express an interest in those emotional person-place relationships of other people where the affective component of the person-place relationship aligns with their self-identity (P3, P4, P5, P6, P7, P8):

> *"I would be interested in optimism and love, because they fit me as a person."* -
> ***P2***

In these cases, their interest is not so much in the place itself, but in the other person's emotional relationship with that personally meaningful place, as also expressed by the participant below:

> *"I would prefer to explore their relationship with a place, not my relationship with their place."* - ***P2***

For more than half of the participants (P3, P5, P6, P7, P8), the desire to learn more about another person's emotional person-place relationships, is that this will evoke the same positive emotions as those indicated on the emotion map. This can be through representations or the personal story of the person's experience-in-place, or by visiting the place themselves:

> *"For me now, it's like I will be curious to have this map, the colours and the feelings and just go from place and place and see if I can feel something like the same."* - ***P6***

That is, if the emotions that are connected to a place on the emotion map are expected to be generalizable across different people (i.e., because they are evoked by the physical and social dimension of place), then there is an interest in these places in the urban environment because people have a desire to visit that place to have the same emotional experience. This finding is further supported by the finding in the Sharing-theme in section 4.3.3, that one of the main motivations for sharing one's emotional person-place relationships is to enable other to have the same (potentially shared) emotional experience-in-place.

Interest in extreme positive and negative emotions in city of residence, but only interest in positive emotions in unfamiliar city

There is a significant difference in the way emotional person-place relationship data is used and consumed depending on the person's familiarity with the city. In particular, participants expressed an interest in extreme positive and extreme negative emotions connected to personally meaningful places on the emotion map of their city of residence. In Table 4-10 below, and overview of each of the emotions on the emotion

map, and the number of participants interested in that type of emotion connected to the personally meaningful place, is provided.

| Emotion on emotion map | #Participants interested | Participants |
|---|---|---|
| Sadness | 7 | P2, P3, P4, P5, P6, P7, P8 |
| Love | 5 | P2, P4, P5, P6, P8 |
| Anger | 5 | P2, P4, P5, P6, P7 |
| Optimism | 5 | P2, P3, P5, P7, P8 |
| Fun/Joy | 3 | P3, P4, P8 |
| Serenity | 3 | P3, P7, P8 |
| Distraction | 3 | P4, P5, P8 |
| Home/Acceptance | 2 | P5, P7 |
| Surprise | 1 | P7 |

*Table 4-10 – Expressed interest of participants per emotion on the Emotion Map of Edinburgh.*

This shows that more than half the participants are interested in emotional person-place relationships where the affective component consists of intense positive or negative emotions, namely sadness, love and anger. This is supported by responses from participants when interacting with the emotion map of Edinburgh, expressing an interest in emotions that reside at both ends of the spectrum, and are grounded in the personal emotional person-place relationship rather than the place dimension (P2, P3, P4, P7):

> *"I want the extreme stuff! Give me love, and anger! Why was that person angry there?" - P2*

Participants express an interest in extreme positive and negative emotional person-place relationships because it allows them to sympathise or empathise with the other person's positive or negative emotional experience-in-place (P2, P3, P4, P5, P6, P7, P8):

> *"I think because this person has probably opened up some sort of vulnerability to you. I think that's quite a vulnerable story for that person to probably have...experienced there. So I think because that person, yeah, their*

> *vulnerability I'd be intrigued about. [..] I'm sure if I heard the story I could*
> *understand or empathise." -* **P5**

Sympathising and empathising with another person's emotional person-place relationship can lead to bonding a bonding experience if the other person is someone the participant already knows. As identified in the Sharing-theme in section 4.3.3, this was also one of the main motivations for sharing one's emotional person-place relationship with others, to get other people to sympathise and empathise with their emotional experience-in-place for emotional support.

Other emotional person-place relationships that spark some interest within the city of residence, are personally significant places where the related emotion is perceived to be odd or out of place (e.g. optimism in a busy shopping street) or that are located near to the participant's home or are even the same as a participant's own personally significant place (P3, P5, P6, P7). For the latter, they are curious to see if someone else picked that personally meaningful place for the same reason. What is interesting in this respect though, is that a conflicting personal, emotional place meaning is acknowledged, but does not result in the participant re-evaluating or redefining their own emotional person-place relationship (P3, P5, P6, P7). Not even when it is an emotional experience-in-place of a person they have a close interpersonal relationship with, nor when the emotional experience-in-place is extremely positive or negative:

> *"Because like a lot of people do that with the North Bridge [i.e., commit suicide],*
> *and that is one of my favourite places. [..] North Bridge I associate it with a nice,*
> *positive feeling. Even though more people have died from that." -* **P5**

The participants are sympathetic to alternative place meanings, but at the same time these are not deemed very interesting and are therefore easily ignored and discarded in favour of one's own personal place meaning.

> *"I'm not interested in other people's opinion of the Meadows park because it's*
> *place that already has a meaning for me, and I don't think someone else's*
> *experience is going to change my opinion. That's not going to change how I feel*
> *about it." -* **P7**

This is an indication that a person's personal emotional relationships with their own personally meaningful places are indeed strong bonds that are not easily influenced or changed by other people's alternative or conflicting emotional person-place relationships. These findings also indicate that there is potential for technological devices that support the exploration and consumption of intense positive and negative emotional person-place relationships of other people within the city of residence (or a city a person knows well), in particular if the affective component of the person-place relationship is characterised by emotions of sadness, love, or anger.

On the other hand, participants clearly express only having an interest in the positive emotions and emotional person-place relationships in a city or urban environment they are unfamiliar with, even if those positive emotions that are not strong or intense. This scenario would for example happen when they visit a city as tourists. This is because when visiting a city as a tourist, people want to have a positive experience and will seek out places with an emotion connected to that place which corresponds with their desired emotional experience-in-place:

> *"Exactly! I would be interested in serene spots. Because if I would visit a city I would...I always love looking at green spots and like, secluded nice little spots as well here and there. [..] So if I didn't know the city, that [points at place with Serenity connected to it] would stand out for me as well." - **P3***

In addition, participants are not interested in any negative emotions on the emotion map of an unfamiliar city (P3, P5, P6, P7, P8):

> *"Because if I know the city I suppose, I'm going to the ones like the sadness or the acceptance or the anger one. I'd like to know more about those. But I wouldn't if I was visiting, and I wouldn't go near a sadness place. I probably, definitely go with the love one, and the serenity one and the fun one. So yeah, I think, that whatever, I'm intrigued about, it would be the opposite for a place I don't know." - **P5***

Participants express two reasons why they are not interested in negative emotions connected to places in an unfamiliar city. Firstly, because they want their holiday and their emotional experience of visiting this unfamiliar urban environment to be a positive one and not experience any negative emotions. And secondly to ensure their

personal safety and not visit an unsafe area of the unknown city.  These findings are supported by findings by Urry (2000, 2011), who found that due to the "tourist gaze", tourists tend to have a more positive perception of unfamiliar cities the visit. This appears to extend to emotional experiences of the urban environment, where the focus is on only having a positive emotional experience-in-place.

As a result of this, there is also a difference in which positive and negative emotional person-place relationship data is consumed. If it is inferred that the positive emotion is grounded in the place dimension, participants desire to go visit the place in person and access any emotional person-place relationship data in-situ in order to further enhance their emotional experience of place. This holds true for emotion maps from a familiar city as well as an unfamiliar city. However, if the emotions related to a place on the emotion map are negative, participants are very interested in exploring this emotional person-place relationship data for their city of residence, but at the same time they indicate that they do not want to visit this place in person and prefer to consume the data remotely:

> *"I don't think I want to go there, but I would be curious to visit the monument. Because lots of people commit suicide there. So I have like, I don't have a good feeling about it. I was too afraid to go in case someone commits suicide that one time that I go visit it. I don't want to witness anything like that." - **P7***

This indicates that technological devices and services using emotional person-place relationship data should allow this data to be accessed and explored remotely as a well as in-situ to enhance the emotional experience-in-place of the urban environment.

<u>Tension between willingness to share and interest in consuming negative emotional</u>

<u>person-place relationship data</u>

When comparing participant's willingness to share and consumption of emotional person-place relationship data, there appears to be a discrepancy between sharing and consumption of negative emotion data. As discussed in Section 4.2.2, only 9% of all emotional person-place relationships with personally meaningful places in Edinburgh are negative person-place relationships. These negative person-place relationships are often not shared, not even with people they have a close social relationship with as

discussed in more detail in Section 4.2.3. Emotional person-place relationship data is considered to be personal and private in general, but is considered to be particularly privacy sensitive for negative emotional person-place relationships. However, when looking at the interest in emotional person-place relationship data on the emotion map of Edinburgh in Table 4-10, sadness ranks the highest. All participants express an interest in this negative emotional person-place relationship. In addition, the only other negative emotional person-place relationship on the emotion map indicated by anger, ranks third for overall interest from participants, with more than half of the participants expressing an interest. These results indicate that there is a discrepancy between on one hand people's willingness to share their own negative emotional person-place relationships with others, and their interest in consuming this type of data from other people on the other hand. This is expected to lead to potential privacy issues and unwanted behaviour, in particular in the context of negative emotional person-place relationships.

## 4.4   Concluding remarks

This chapter presented the results of the Walking & Talking sessions conducted in the city of Edinburgh over a nine-month period from November 2016 to July 2017. It investigated 45 emotional person-place relationships of eight participants with their personally meaningful places in the urban environment.

This resulted in a taxonomy of sixteen different types of emotional experience-in-place from which emotional person-place relationships in the urban environment develop, namely reminiscing, socialising, bonding, belonging, relaxation, romance, aesthetic pleasure, knowledge and secrets, escaping, negative experiences, exploring and discovering, interest, inspiration and motivation, imagination, and magical moments. This taxonomy provides urban interaction designers with a framework to create a better understanding of the different types of emotional experiences-in-place in the urban environment in general, and the city of residence in particular. It also serves as an initial framework for identifying and analysing the potential for technological devices and services that aim to support or augment these emotional experiences-in-place in a hybrid city of the near future, while taking into account the richness and complexity of emotional person-place relationships in the urban environment.

Based on the taxonomy of emotional experiences-in-place, several opportunities for technological devices and services to capture, represent, consume, and share emotional person-place relationships for individual and shared use to augment the urban lived experience have been identified. These are the self-regulation of emotions, the representation of emotional person-place relationships using different types of representations and sensorial experiences, and the sharing and consuming of emotional person-place relationship data. The sharing of emotional person-place relationships is based on the closeness of social relationships and shared interests, and the extreme positive and negative emotional experiences-in-place in the city of residence characterised by feelings of sadness, love, and anger.

# Chapter 5:  Speculative Design Fictions

In this chapter, the develop-phase of the second diamond of the double diamond model will be addressed (Figure 5-1). The focus is on diverging the solution- or design space, by using a variety of design techniques, research methods and tools in a speculative design approach. The aim is to explore and speculate about a wide variety of future possibilities grounded in- and inspired by the trends and themes in the data corpus outlined in the previous chapter. To this end, a suite of three Speculative Design Fictions in the form of two short films and a comic will be developed as provocative conversation pieces to inform the design of future technological devices and services for the urban environment of the (near) future (Research question 4).
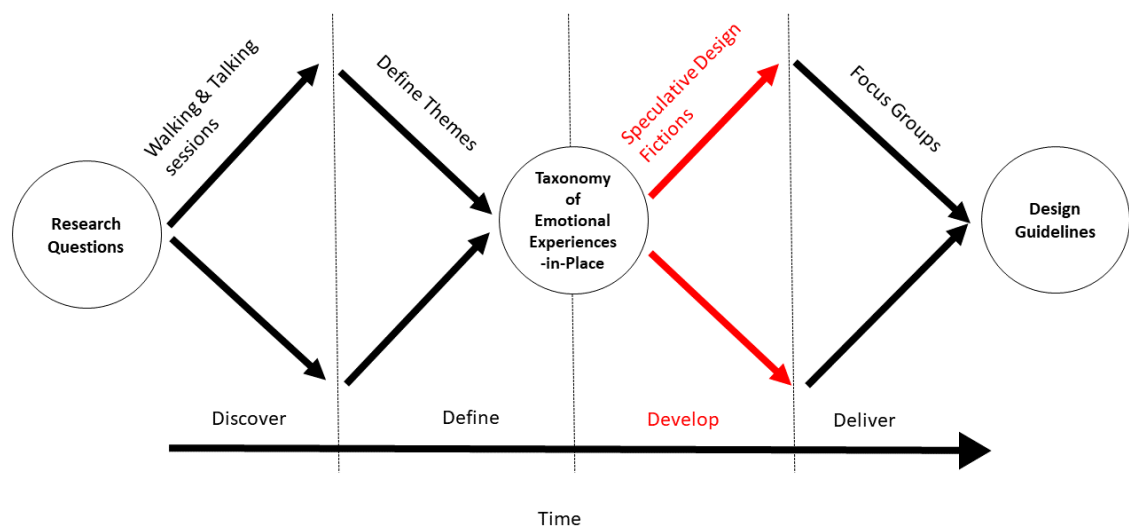


*Figure 5-1 - Double Diamond Model - Crafting a Suite of Speculative Design Fictions in the Development phase.*

This development stage is followed again by a converging stage known as the deliver stage, which will be discussed in Chapter 6. In this final stage, a series of focus groups will be used to discuss the suite of speculative design fictions with non-expert citizens of Edinburgh. This will produce knowledge leading to a better understanding of the relationship between person, place, and technology in the urban environment. It will inform a set of design guidelines for urban interaction designers, aiming to design of interactive, emotive technological devices and services which leverage emotional

person-place relationships in the city of residence, to augment the urban lived experience for the hybrid city of the near future (i.e., Research Question 4).

## 5.1 Speculative Design

***Speculative Design*** is a methodology or approach which uses design to speculate about possible futures (Auger, 2013; SpeculativeEdu, 2018). It is a critical, discursive design practice, based on critical thinking and dialogue, which questions the practice of design and its modernist definition, and instead uses design to envision possible future scenarios (Mitrovic, 2015). Traditional design focuses on solving problems, finding answers to questions, and producing products for the consumer market. Speculative Design however uses design in a different way. In particular in the domain of technology, design has been used as a method to express, communicate, and reflect on ideas and concepts and to ask questions, in order to create a better understanding of the problem space and move beyond iterative improvements of existing technological devices and services (Auger, 2013; Dorst, 2006; Dunne & Raby, 2013; Helgason, Smyth, Rosenbak, & Mitrovic, 2015; Mitrovic, 2015; Mitrović, Golub, & Suran, 2015; Smyth & Helgason, 2011, 2013).

In speculative design, the disciplines of art, design, media, and technology have converged. As such, there is yet no clear definition of the term speculative design. It is open to several interpretations, with definitions often being descriptive and lacking formal or specific evaluation criteria (Auger, 2013; Baumer, Blythe, & Tanenbaum, 2020). A variety of different terms, practises and definitions exist in the literature (Auger, 2013; Dunne & Raby, 2001; Mitrovic, 2015; Sterling, 2012), and often speculative design is discussed in relation to alternative and related approaches such as discursive design, critical design, and design fictions (Auger, 2013; Tonkenwise, 2015). However, there are three key elements to Speculative Design as identified by Auger (2013). Firstly, a need to move away from the constraints of commercial practice steered by the market and industry, meaning the focus should not be on the applications of technology or problem solving, but on the implications of technology and problem finding. So unlike more traditional design practises typically employed in Human-Computer Interaction, speculative design focuses on using design to create a better understanding of the problem and the design space. Secondly, the use of fiction

to speculate on future products, services, systems, and worlds that do not exist yet, and reflectively examining the role and impact of new technologies on everyday life. This speculating about the future enables reflection on the present. Finally, the ability to act as conversation pieces to initiate a dialogue between on one hand experts such as scientists, engineers and designers, and on the other hand the audience as the non-expert users of these new technologies (Auger, 2013).

***Speculative Design Fictions (SDF)***, also often referred to in the literature as "design fictions" or "fictions", are a specific genre of speculative design which finds its origins in science fiction (Bleecker, 2009; Bleecker & Nova, 2009). In speculative design fictions, design, science fiction, and science fact come together and are intertwined. Bleecker (2009) defines speculative design fictions as the creation of fictionalised designs, as an approach for exploring the design space that lies beyond the here and the now, by contextualising this approach at the edges of our current knowledge (Bleecker, 2009; Smyth & Helgason, 2011). In a similar manner to cinema, such fictions have the capacity to immerse an audience in worlds and situations with technologies that do not exist yet. They have the potential to project the audience into different possible futures. These trajectories are grounded in science fact, and project current scientific trends and themes into possible future scenarios.

Bleecker and Nova's (2009) speculative design fictions are inspired by work by Dourish and Bell (2014), who explored the relationship between computer science, and in particular ubiquitous computing, and science fiction. They identified similarities and contrasts in aspirations, concerns, as well as plots, and questions about social and cultural contexts. They argued that like in science fiction, the use of props, devices and artefacts, could also help academics and researchers reflect upon assumptions within technological research in the field of ubiquitous computing (Dourish & Bell, 2014).

Dourish and Bell are careful not to say ubiquitous computing is science fiction and keep a clear divide between science fact and science fiction. Bleecker (2009) argues however that science fiction and science fact are intertwined, with science fiction following science fact, and science fact following science fiction. Design in the form of fictional narratives and artefacts can thus be used as probes to explore future technological possibilities. Through a combination of fictional and factual special

effects, those props became an integral part of the story depicted in the movie. It allows to create a vision of the future without current technological restraints, and to share that vision with a large public audience. It allows the circulation of new knowledge and ideas more effectively than any science journals or conference papers ever could (Bleecker, 2009).

Bruce Sterling (2012) defines speculative design fictions as the creation of stories that speculate about social practices that may be constructed around and through designed artefacts and systems, known as ***diegetic prototypes*** (Sterling, 2009, 2012). These diegetic prototypes in speculative design fictions can be understood in a similar way as props used in science fiction movies. However, unlike regular prototypes that exists as a model or representation of some concept, the diegetic prototype exists as a fully functional piece of technology within the world of the speculative design fiction. Kirby (2010) explains that the "diegesis", or the world in which these technologies live and exist, create the diegetic prototype through dialogue, plot rationalizations, character interactions and narrative structure. Unlike a prototype, it helps craft stories that the regular prototype fails to create (Kirby, 2010; Levine, 2016). Bleecker (2009) presents it as the creation of artefacts that foster imagination about possible near future worlds, in order to tell stories that provoke reactions and raise questions.

As speculative design fictions needs to be grounded in science fact, a key characteristic is the construction of the ***perceptual bridge*** by which designers engage their audiences and provoke an emotional response, which requires careful crafting and management of the speculation (Auger, 2013). The creation of this bridge establishes the link between science fact (i.e., trends and themes in the data corpus) and science fiction (i.e., the projection of those trends and themes into a possible future scenario). If it projects too far into the future and presents implausible concepts or alien technological environments, the audience will struggle to relate to the proposed speculative design fiction resulting in a lack of engagement or connection. Therefore, a design speculation requires a bridge to exist between the audience's perception of their world and the fictional element of the concept (Auger, 2013). This perceptual bridge provides a link for the audience between the familiar present, and an unfamiliar future.

***Critical Design*** is a specific approach to Speculative Design. It applies a critical lens to the design speculation by using design as a medium to engage their audiences and provoke an emotional response. It asks carefully formulated "What if"-questions to make the audience think and open up issues to discussion regarding current practices and future possibilities (Dunne & Raby, 2001, 2007).
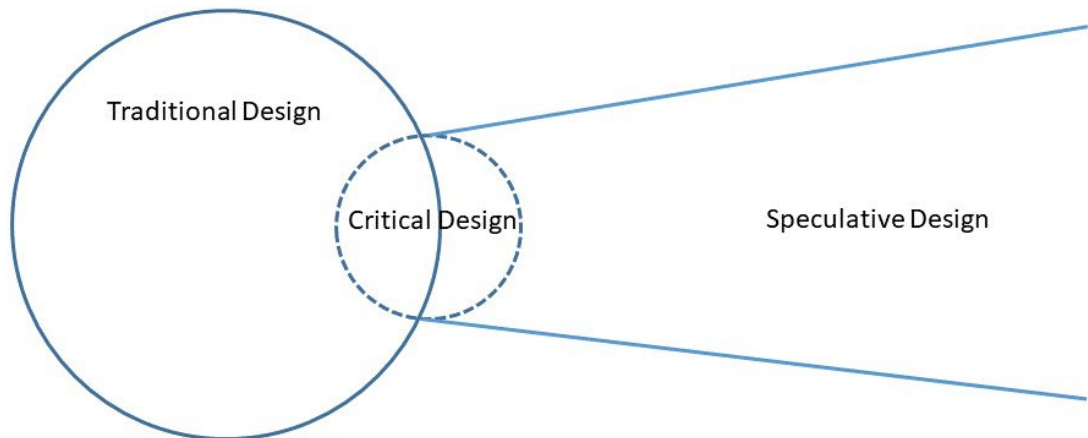


***Figure 5-2 - Traditional Design, Speculative Design, and Critical Design. Redrawn from (Mitrovic, 2015).***

In a critical design approach, the speculative design fictions (including the diegetic prototypes) depicting possible future scenarios are used as a critique or commentary intended to cause reflection on existing needs, desires, values, priorities, behaviours, habits, rituals, social practices, and experiences surrounding technological devices and services, and speculate about how this might be in the future (Dunne & Raby, 2007; Smyth & Helgason, 2011). It uses speculative design proposals to highlight and challenge narrow assumptions and preconceptions about the role technological devices and services play in everyday life, and makes it subject to discussion and debate (Auger, 2013; Dunne & Raby, 2007, 2013). When applied to Speculative Design Fictions, these fictions become conversation pieces that intend to provoke an emotional response from the audience, and act as a catalyst for critical discussion of the present and multiple possible futures.

The popular Netflix series Black Mirror could be seen as an example of speculative design fictions (Baumer et al., 2020). Each episode is based on a different current

technological trend. This trend is projected into the (near) future by creating a dystopian science fiction story around the potentially negative implications of the use of technological devices and services on people's everyday lives. However, unlike Black Mirror episodes, Speculative Design Fictions could be utopian, dystopian, or anything in between. The possible futures depicted in the speculative design fictions are grounded in science fact, but are not predictions of the future, or prototypes or final design solutions. They are conversation pieces that speculate about the social practices that may occur around future technological devices and services. They are intended to provoke thought and reflection, and enable a discussion to produce knowledge. This will lead to a better understanding of the problem and the design space, and potential implications of future technological devices and services on people's everyday lives, which can subsequently inform the design of those future technological devices and services.

In recent years, speculative design and its encompassing and related design practices Critical Design and speculative design fictions, have been increasingly employed in the field of Human-Computer Interaction, as a way to envision future technologies and design spaces, critique current practice, and reflect critically on social and technological trends (Baumer et al., 2020; Blythe, 2017; Blythe & Buie, 2014; Elsden, Chatting, et al., 2017; Helgason et al., 2015; Pschetz, Pothong, & Speed, 2019; Ratti, 2016; Smyth & Helgason, 2013). Also in the field of Urban Interaction Design, speculative design fictions are extensively used to envision and reflect on future technological devices and services for hybrid cities of the (near) future, and reflect on current practices and interactions in the urban environment (Baumann, Caldwell, Bar, & Stokes, 2018; Bleecker & Nova, 2009; Ferri & Ferri, 2017; Girardin, 2015; Kinsley, 2013; Matassa & Vernero, 2014; Matsuda, 2016; Mitrovic, 2015; Ratti, 2016; Smyth & Helgason, 2013; Smyth et al., 2015; Stals et al., 2014; Veracruz & Dajci, 2013). They have been used to speculate about human interactions in the hybrid city of the (near) future, where innovative technological devices and services address urban themes such as the sharing economy (Balestrini, Engel, Hadžić, & Matassa, 2013), the shared use of crowded public places (Veracruz & Dajci, 2013), issues around privacy in a hybrid city full of digital sensors (Cumbo & Hobye, 2013), big urban data (Mitrovic, 2015), connecting to cultural heritage and urban history (Baumann et al., 2018),

human interactions with self-driving cars (Ferri, Korte, & Schouten, 2017; Girardin, 2015) and the creation of augmented urban experiences using wearables and augmented reality (Matsuda, 2016).

For example, Veracruz and Dajci (2013) use a speculative design fiction to address the urban theme of overcrowding of public spaces by locals and tourists. It takes the form of a short film, speculating about a possible future scenario in which a system for the Coordination of Urban Busy Areas (CUBA) exists (link to short film: https://vimeo.com/74186790). In this future scenario, the historic city centre is being overcrowded and the use of public space has become regulated. Citizens have to pay taxes when using public space, in a similar way that currently a toll needs to be paid for using certain bridges and roads (i.e., this is the perceptual bridge). The cost of using a public space depends on its popularity among locals and tourists, and the income that area generates for the city. The CUBA-smartphone app shows citizens how much it will cost per hour to be in a public space, and how much credit they have left (Figure 5-3).



*Figure 5-3 - CUBA app, a diegetic protytpe used in the speculative design fiction short film CUBA (Veracruz & Dajci, 2013).*

This credit can be topped up again by providing a community service, like taking care of a community garden. This speculation enables citizens to critically reflect on how public space is currently shared in the city, discuss how the sharing of public space might be mediated through technology in the hybrid city of the near future, and what the implications of this technology might be.

Also in this thesis, a critical design lens will be applied to a speculative design approach. A suite of speculative design fictions will be created to explore and investigate how people's emotional experiences-in-place and emotional person-place relationships with personally significant places in the hybrid urban environment of the near future, could potentially be augmented by innovative technological devices and services (i.e., Research Question 4). This will enable reflection on current practices and interactions in relation to urban places that are meaningful to residents on a personal level. It will also enable speculation about the potential desirable and undesirable implications of those technologies on the emotional experience-in-place, and on emotional person-place relationships in the city of residence. This will contribute to a better understanding of the relationship between person, place, and technology in the urban environment and inform the design of future technological devices and services.

### 5.1.1   Rationale for using a Speculative Design Approach

There are several reasons for taking a speculative design approach using speculative design fictions in this thesis. First, the philosophy and approach of speculative design and Urban Interaction Design align. As speculative design aims to move away from the commercial practice steered by the market and industry, Urban Interaction Design aims to move away from the constraints of industry and their traditional top-down, technology-driven smart city approach. Instead, Urban Interaction Design is a bottom-up human-centred design approach which focuses on the needs, desires, rituals, human activities, experiences and behaviours of the citizens in the smart city of the (near) future, where the smart citizens are in control. Therefore, the focus is on implications of technology rather than the applications (Auger, 2013; Mitrovic, 2015).

Second, both speculative design and Urban Interaction Design focus on problem finding, rather than problem solving. The aim is to create a better understanding of the relationship between person, place and technology in the urban environment, by focusing on the social practices that may be constructed around new technological devices and services, and the potential positive and negative implications for the everyday urban lived experience (Sterling, 2012).

Third, speculative design and Urban Interaction Design both aim to engage the public and non-experts with an unfamiliar design space. A survey conducted by the Institution

of Engineering and Technology (IET) in May 2016, showed that 82% of British people do not know what a smart city (or hybrid city) is (Engelbert, van Zoonen, & Hirzalla, 2019; IET, 2016). Speculative design fictions can communicate the findings of the Walking & Talking sessions to the public in an easily accessible and engaging way, enabling non-expert citizens to engage in a discussion about this unfamiliar, future world.

Fourth, a speculative design approach also enables the exploration of multiple findings, trends, and themes that emerge in the data corpus to explore the design space. A key aspect of speculative design is that there is not just one future but a whole taxonomy of multiple different futures (Dunne & Raby, 2013). Speculative Design uses Gaver et al.'s (2003) concept of ambiguity about the future as a resource for design, by crafting multiple futures that are engaging and thought provoking. These multiple future scenarios enable designers to go beyond the limits of current technology and speculate about what kind of interactive devices and services there might be in each of those futures, and what the implications and consequences might be on people's everyday lives. People are required to interpret these possible future scenarios for themselves. This encourages them to start making sense of those future technologies and their contexts conceptually, and what the meanings and implication of those technologies might be for them personally. The ambiguity is in the interpretive relationship and requires the audience to participate in meaning making (Blythe & Encinas, 2016; Gaver, 2019; Gaver et al., 2003).
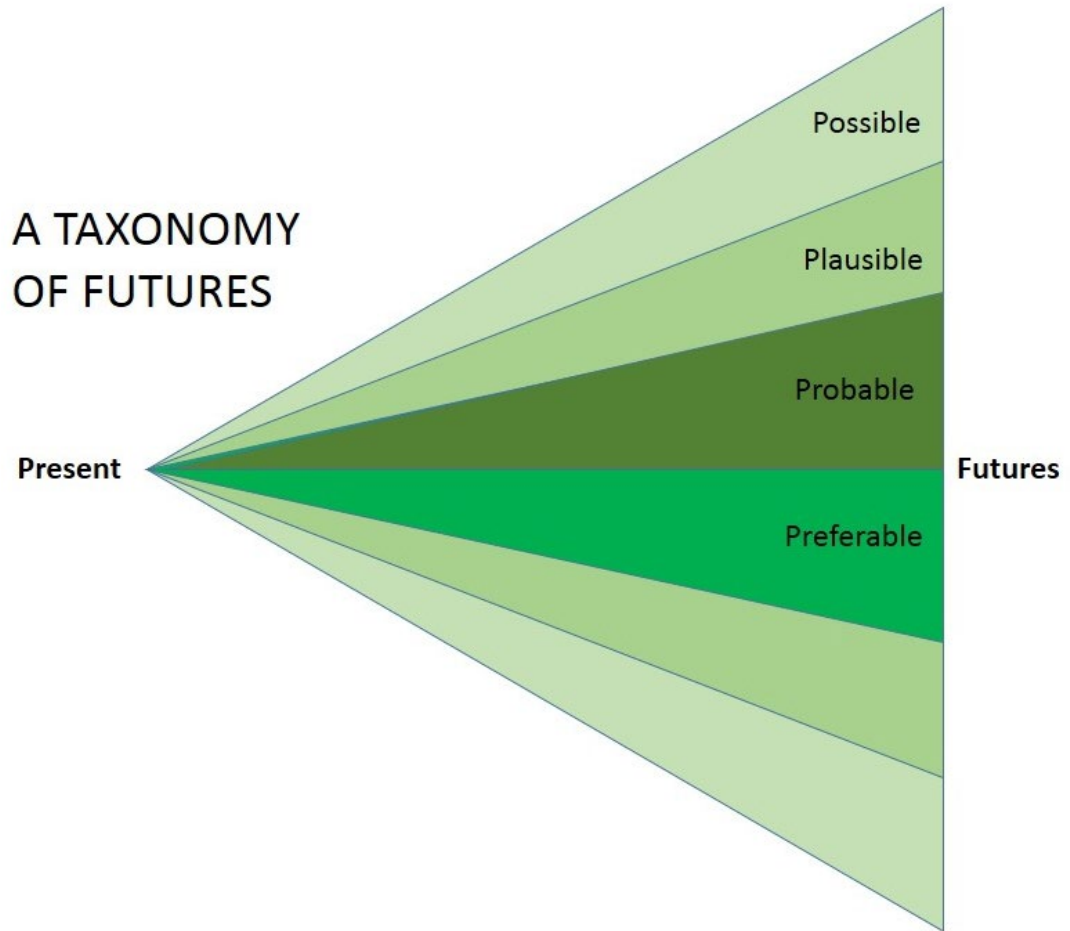
*Figure 5-4 - Taxonomy of multiple futures. Redrawn from (Dunne & Raby, 2013).*

Because indeed not all possible futures are equal. As defined by Dunne and Raby (2013), there is a taxonomy of futures, consisting of the probable future, which is the traditional design space; the plausible futures, which are alternative futures linked to how the world is today but are perhaps less probable; and the possible futures, which are more extreme scenarios of what the future might be like, but are still scientifically possible (Figure 5-4). Each of the trends and themes identified in the data corpus can be projected into one of these future scenarios. A speculative design approach is used to generate a discussion between experts and non-expert member of the general public, regarding which possible future scenarios would be preferable and which would be undesirable (Dunne & Raby, 2013). The fact there are multiple possible futures instead of just one, also means the public can more freely react positively or negatively to each of the possible future scenarios in the speculative design fictions.

And finally, the current form of emotion maps typically used in the field of Urban Interaction Design to capture, represent and communicate the complex emotional relationship between person, place, and technology in the urban environment, are of limited efficacy (Stals et al., 2018). Both physical emotion maps as well as digital emotion maps in interactive systems tend to oversimplify the complexity of emotional person-place relationships and emotional experiences-in-place due to technical limitations and for visualisation purposes. These limitations are not adequately addressed, in particular when it comes to affective mapping using GPS outside a laboratory setting (Frodsham, 2015). In addition, maps offer an often static, abstract, high-level experience of the urban environment. This is counterproductive when the aim us to create a better understanding of the complex relationship between person, place and technology in the context of the urban lived experience. It is therefore argued to move away from high-tech imagery and visualisations of places and spaces on emotion maps, and towards emotional experiences-in-place and implications for people in recognizable situations in the urban environment (Brewer & Dourish, 2008; de Lange, 2013; Stals et al., 2019). As part of the Undersound-project for example, a speculative music sharing application for the London Underground was designed to explore and communicate rider's individual and collective experiences of the London Underground (Bassoli et al., 2007). It was positioned at the human-level of the urban experience in the context of a ride on the metro. It addresses, incorporates and reflects the social and ethnic diversity of London, the complex relationship between above ground and below ground, and the non-functional aspects of public transportation in design of the music sharing application to foreground the complexities of this urban experience. In a similar fashion, speculative design fictions are better suited to capture, represent and communicate the rich, complex, emotional relationship between person, place, and technology in the urban environment in comparison to emotion maps, and open up those topics for discussion.

### 5.1.2   Limitations of Speculative Design Fictions

There are also several limitations to the use of speculative design fictions, which need to be taken into account. Firstly, the creation of the link between science fact (i.e., quotes, trends, and themes in the data corpus) and the speculative design fiction (the projection of trends and themes into a possible future scenario) is a crucial step in the

creation of Speculative Design Fictions. All too often speculative Design Fictions tend to remain black boxes, leaving them vulnerable to criticism that they are "made up" (Baumer et al., 2020; Lindley, 2017; Lindley & Coulton, 2016; Ward, 2019). Therefore, the burden of proof falls on the researchers and designers to provide a clear link between the familiar present in the form of current themes and trends in the data corpus, and the projected future scenarios in the process of creating the speculative design fictions.

Secondly, the process of creating a suite of speculative design fictions typically requires a team of designers and researchers to identify and interpret the current trends and themes in the data corpus, and subsequently extrapolate those into projections of multiple possible future scenarios. This task falls on the shoulders of the designers and researchers, although this can be partially mitigated by taking a participatory design approach in which the participants and researchers co-create the possible future scenarios (Baumann et al., 2018; Forlano & Mathew, 2014; Knutz, Lenskjold, & Markussen, 2016). In addition, the resulting speculative design fictions need to be presented in an easily accessible format for the general public or intended audience of non-experts and need to be engaging and thought provoking. One of the criticisms of critical design and speculative design in general, is that they are often created by researchers and designers, for researchers and designers. This limits the debate to the research- and design community and results in a self-congratulatory echo chamber (Ward, 2019).  However, in line with the human-centred design approach in the field of Urban Interaction Design, speculative design fictions can also be used to engage non-expert citizens in this discussion. To this end, speculative design fictions can take many creative, easily accessible, and shareable formats (Auger, 2013; Ward, 2019), such as a designed artefacts (Bleecker, 2009; Dunne & Raby, 2013), a theatrical performance (BlastTheory, 2021; Elsden, Chatting, et al., 2017), fictional user manuals (Girardin, 2015), fictional research papers (Blythe, 2014), brochures or magazines (Figure 5-5) (Bleecker & Brown, 2015), a comic, poster, or pamphlet (Bach et al., 2018; Bleecker & Nova, 2009; Helgason & Smyth, 2020; Sturdee et al., 2018; Tribull, 2017; Wang et al., 2019), or a short film (Balestrini et al., 2013; Matsuda, 2016; Veracruz & Dajci, 2013).

*Figure 5-5 – Speculative design fiction in the form of a speculative Ikea brochure for the shared smart home of the near future, including a co-owned, time-shared, data collecting sofa that adjusts in real-time to the mood of the people sitting on it (Bleecker & Brown, 2015).*

The creation of an accessible suite of speculative design fictions based on current trends grounded in science-fact, can thus be challenging task. Especially for a single researcher who does not have a team of researchers or designers with all the necessary research-, analytical-, and creative design skills at hand (Stals et al., 2019; Wang et al., 2019).

Thirdly, speculative design fictions are often presented to the general public in the form of an exhibition (Dunne & Raby, 2013; Pschetz et al., 2019; Smyth et al., 2015; Ward, 2019). What is often lacking in an exhibition setting, is a way to more formally engage in a discussion with the intended audience of non-experts, and collect responses to the speculative design fictions in such a way that they can be properly analysed (Pschetz et al., 2019). Exhibitions in museums and art galleries also tend to attract a particular, elitist crowd, making it difficult to engage the intended audience or communities of non-experts, and scale up or generalise responses (Dalton, Moreau, & Adams, 2016; Ferri & Ferri, 2017). Recently this has resulted in a push for speculative practices to go into the communities and engage with people outside the gallery or museum context, to reach those people it wishes or intends to reach (Ward, 2019).

There is currently also a lack in formal or specific evaluation criteria of what constitutes as a good or effective speculative design fiction, which depends on the type of knowledge the speculative design fiction seeks to produce (Baumer et al., 2020). Only recently have researchers started to attempt to mitigate these issues, by

publishing and sharing speculative design fictions online to reach (a larger part of) their intended target audience (Dalton et al., 2016; Ferri et al., 2017) or by presenting the suite of speculative design fictions in focus groups for a more formal gathering and evaluation of responses (Pschetz et al., 2019).

## 5.2   Crafting a Suite of Speculative Design Fictions

Following the speculative design approach outlined in section 5.1, a suite of speculative design fictions was created to which a critical design lens has been applied. First, the themes and trends that emerged from the data corpus were projected into the possible future scenarios and will be explicitly linked to each of three speculative design fictions in the suite. Then the design techniques that were used to craft the suite of speculative design fictions will be discussed. PACT-analysis (Benyon, 2014a) was used to create the speculative technologies (i.e., diegetic prototypes) for each of the speculative design fictions to ensure the design is grounded in the data corpus. Tactics for Ambiguity (Gaver et al., 2003) and the SCAMPER-technique (Eberle, 1996) were used to create the necessary critical design provocation. Finally, the crafting of the different formats in which these speculative design fictions have been articulated, namely a comic and two short films, will be discussed

### 5.2.1   Designing the Suite of Speculative Design Fictions

The selection of trends and themes for further exploration and speculation using speculative design fictions, is based on their significance and frequency of occurrence of the trends and themes in the data corpus and the taxonomy of Emotional Experiences-in-Place (Section 4.2), and their potentiality for technology to capture, represent, consume and share emotional person-place relationships data in the context of different types of emotional experience-in-place in the urban environment (see Section 4.3). Each Speculative Design Fiction will only be inspired by and grounded in a subset of these trends and themes and emotional experiences-in-place (see Table 5-1.

| Speculative Design Fiction | Themes Explored |
|---|---|
| SDF1 Smellification | Places<br><br>Representations<br><br>Sharing |
| SDF2 Emotion-based Place Access | Emotions<br><br>Emotion Regulation |
| SDF3 Personal Virtual Monuments | Negative Experiences-in-Place<br><br>Consuming |

***Table 5-1 - Overview of themes explored in each speculative design fiction***

For the design of the overall suite of speculative design fictions, the practical guidelines outlined by Elsden et al. (2017) are followed. This means the suite of three speculative design fictions will revolve around a speculative device, a speculative event, and a speculative service (Elsden, Chatting, et al., 2017; Elsden et al., 2016; Elsden, O'Kane, et al., 2017).

There is a taxonomy of many possible future scenarios, ranging from probable to extremely unlikely (but still scientifically possible), and from utopian to dystopian and everything in between (Dunne & Raby, 2013). In turn, the suite of speculative design fictions will consist of a plausible future scenario (Speculative Design Fiction #3, Personal Virtual Monuments), a less likely but still possible future scenario (Speculative Design Fiction #1, Smellification), and a dystopian future scenario (Speculative Design Fiction #2, Emotion-based Place Access).

### 5.2.2 Using PACT-analysis for the design of the speculative technology

Several design techniques are used to create the link between the data corpus and the speculative design fictions, create the critical design provocations, and develop the final formats in which the speculative design fiction will be articulated (Stals et al., 2019). PACT-analysis is used to develop a speculative design fiction around a speculative technology (i.e., diegetic prototype) and ensure the design is be grounded in and informed by the themes, trends and findings identified in the data corpus. PACT-analysis is a framework for the human-centred design of interactive technologies

and systems (Benyon, 2014a). This method for analysis and design activities is used by designers in the fields of User Experience Design and Interaction Design as the first step in the design of a new technological device or service to scope out the problem and the variety of different elements of the PACT-acronym that are possible or likely in the domain and the relationships between them; People, Activities, Contexts, and Technologies. It enables the designers of interactive technological devices and services to think about and understand the different people that will be using their device or service, the different activities they would need or like to undertake with this technological device or service, the different contexts, places, and environments in which these activities will take place, and the different interactive technologies that will be used to this end. This is done by using brainstorming and envisionment techniques, typically combined with and inspired by data gathered through observations, interviews or workshops (Benyon, 2014a). In the context of this thesis, the data gathered using the Walking & Talking sessions will be used to this end. How PACT-analysis was applied in the creation of each of the individual speculative design fictions will be discussed in more detail in sections 5.3, 5.4, and 5.5.

### 5.2.3 Using Tactics for Ambiguity and the SCAMPER as Design Techniques for Creating the Provocation

Having the Speculative Design Fiction firmly grounded in the analysis of the data corpus and projected into a future scenario is not sufficient. An important part of applying a critical design-lens to speculative design fictions, is to provoke an emotional response from the audience. This will enable the speculative design fiction to act as a conversation piece for discussion, provoking thought and reflection on both the potential future it depicts as well as the present. To this end, the SCAMPER-technique (Eberle, 1996) and Gaver et al.'s (2003) Tactics for using Ambiguity are used.

The rationale for using the SCAMPER technique, is that it is a creative brainstorming technique which is extensively used in HCI and User Experience Design to encourage thinking outside the box, avoid fixating on one solution or design, to develop atypical solutions to problems, generate multiple new ideas, and spark creativity. SCAMPER is an acronym, which stands for Substitute, Combine, Adapt, Modify (or Maximize and Minify), Purpose (or Put to other use), Eliminate, and Reverse (or Rearrange) elements of the concept, device, service, or situation (Dam & Siang, 2018; Eberle, 1996; Moreno,

Blessing, Yang, Hernández, & Wood, 2016; Serrat, 2017). In the context of this thesis it is particularly useful because the researcher does not have a team of designers at his disposal to help spark creativity and avoid design fixation (Stals et al., 2019). How the SCAMPER design technique is applied in the creation of each of the individual speculative design fictions, will be discussed in more detail in sections 5.3, 5.4, and 5.5)

The rationale for applying tactics for ambiguity in the creation of speculative design fictions, is that it has been used in the field of Human-Computer Interaction and User Experience Design to encourage a close personal engagement of users with interactive systems and encourages criticality and reflection (Auger, 2013; Blythe & Encinas, 2016; Gaver et al., 2003; Pierce et al., 2015; Stals et al., 2019).  It gives designers the ability to suggest issues and different perspectives for consideration without imposing solutions. It advocates the use three types of ambiguity as a resource in design, namely ambiguity of information, ambiguity of context, and ambiguity of relationship. It provides several heuristics or tactics for achieving each of these types of ambiguity to help designers recognise, understand and use ambiguity. Enhancing the ***ambiguity of information*** focuses on tactics for creating or reflecting uncertainties that are noticeable by people. This tactic could be used to make the device or service look mysterious or impressionistic, but more importantly it can engage people into making sense of the technological device or service and the context and environments in which it operates. Creating ***ambiguity of context*** is a tactic that blocks the interpretation of a technological device or service in terms of an established discourse. This enables people to approach a particular technological device or service with an open mind and to question the assumptions they have about this technology. Finally, provoking ***ambiguity of relationship***, is a tactic which creates the conditions for a deeply personal projection of imagination and values onto the design of the technological device or system. This enables self-reflection by letting people take on new roles, identities, or to change perspectives and question their own values and activities (Auger, 2013; Blythe & Encinas, 2016; Gaver, 2019; Gaver et al., 2003; Pierce et al., 2015). How the Tactics for Ambiguity design techniques are applied in the creation of each of the individual speculative design fictions, will be discussed in more detail in sections 5.3, 5.4, and 5.5.

### 5.2.4 From Future Scenarios to Comic and Short Films

The next step is to decide which form the speculative design fiction will take and articulate it in more detail into a specific format. Following Auger's (2013) guidelines on using contemporary media formats and delivery methods for disseminating speculative designs that are popular in the culture of the intended audience, the speculative design fictions will take the form of a comic and two short films. This is inspired by the current success and popularity of comics and the Netflix series Black Mirror. The proven ability of short films and data comics to communicate the main findings of research to non-experts for further speculation and discussion, and their accessibility and shareability, make these suitable formats for speculative design fictions (Bach et al., 2018; Wang, Wang, et al., 2019).

Based on the speculative future scenario, a more detailed script is written for the comic and each of the short films by the researcher using Celtx, an online industry-standard script editor for film, TV, and theatre (Celtx Inc., 2019). These detailed scripts are based on the personal stories related to personally meaningful places that participants told during the Walking & Talking sessions. It inspired the characters, places, and events in the scripts, adding detail, depth, and authenticity to the speculative design fictions.

The comic is created by the researcher using Pixton Plus (Pixton Comics Inc., 2019), an online comic, storyboard, and graphic novel creation software that comes with a suite of customizable environments, characters, and artefacts (Figure 5-6).



*Figure 5-6 - Pixton Plus, online comic creation software with a suite of customisable environments, characters, and artefacts (Pixton Comics Inc., 2019).*

For the creation and production of the short films, the researcher collaborated with a small team of digital media students experienced in directing, filming, sound design, and VFX design, and eight professional actors. Standard Hollywood techniques are employed for the creation of the short films, that have previously been used to make speculative design fictions in the form of short films more convincing (Flint, 2016). Storyboards and diegetic prototypes are designed as props for the short films to help bring the story to life.

For storytelling, the standard 3-Act story structure also known as Field's Paradigm (Field, 1984) is used to structure and communicate the stories (Figure 5-7). It consists of the following three key acts: the opening act (setup), the middle act (confrontation or journey) and the end act (resolution). This is story structure helps pace the story and is a structure that audiences are familiar with. This helps the audience to understand and follow the storyline (Flint, 2016). Each of the resulting speculative design fictions will therefore also be presented based on those three key scenes in Sections 5.3, 5.4, and 5.5.
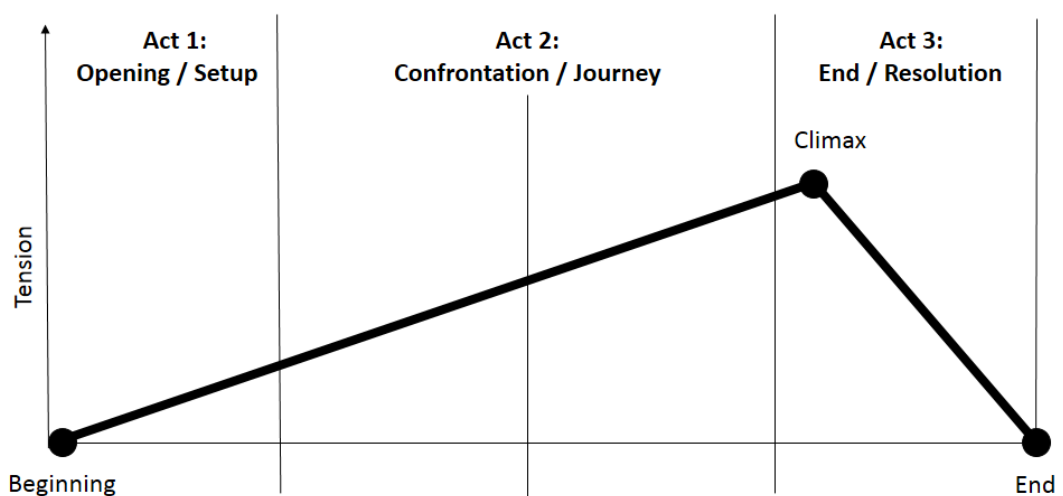


*Figure 5-7 - Three-Act story structure. Redrawn from (Field, 1984).*

## 5.3 Speculative Design Fiction #1 – Smellification

The first speculative design fiction is a short film named "Smellification". It is based on an communicates the main finding in the Representations-theme in the data corpus that there is a desire to represent emotional person-place relationships with personally significant places using different types of representations and sensory experiences, in particular smells (Section 4.3.2). After visual representations, smells are the second most popular representation, with six out of eight participants indicating a desire to represent at least one of their emotional person-place relationships (or aspects thereof) using smells. Furthermore, it communicates the finding in the Place-theme that parks, bars, and pubs are the most common type of personally meaningful place in the urban environment (Section 4.2.1), and explores the Sharing-theme for sharing emotional person-place relationships (Section 4.3.3). Following the guidelines by Elsden et al. (2017) for developing a suite of speculative design fictions, this speculative design fiction will be developed around a speculative device. This informed and inspired the initial, broad speculation of an innovative future smell technology device that allows people to capture, consume, and share smells as representations of (aspects of) their emotional experiences-in-place and emotional person-place relationships with personally meaningful places in the hybrid city of the near future (Stals et al., 2019).

### 5.3.1 PACT-analysis

PACT-analysis (see Section 5.2.2) is used as a framework for brainstorming and designing the speculative technology, which is grounded in the trends and themes in the data corpus. The result of the PACT-analysis for the speculative smell technology are summarised in Table 5-2.

| People | Locals and students having relaxation- and socialising experience-in-place; Immigrants feeling homesick and seeking experience-in-place of belonging; Sharing experience-in-place with friends and compatriots; |
|---|---|
| Activities | Sharing a BBQ, smoke, or drink in the park; Exercising alone in the park; Walking the dog alone in the park; Sharing a meal in a food place. |
| Context | Parks; Food places |
| Technology | Based on current smartphone use and dedicated high-end cameras for capturing and sharing pictures directly with selected individuals. |

*Table 5-2 - PACT-analysis for speculative smell technology*

Sixteen smells have been identified in the data corpus. These can be divided into two types of smells; nature smells, and smells of food and drinks. Nature smells represent and augment emotional experiences-in-place of relaxation, while smells of food and drinks represent emotional experiences-in-place of belonging to alleviate feelings of homesickness (see sections 4.3.2). This is projected into a possible future scenario, where speculative smell technology can thus be used to this end. Most of these smells (twelve) are encountered in a large park in the city centre, the other smells are encountered in or near food places. Locals, students, and immigrants typically encounter these smells while having an individual or shared experience-in-place in a park or in a food place. To create the perceptual bridge between the familiar present and the unfamiliar future, the use of a speculative smell technology device will be based on the familiar current use of smartphones to capture, consume and share the pictures of emotional experiences-in-place of personally significant places.

The aim is to get people to reflect on their current practices and interactions around capturing, consuming and sharing visual representations of their emotional experiences-in-place in personally meaningful places using pictures, and envision an alternative future scenario where people will be using the more intimate sense of smells to this end (Stals et al., 2019).

### 5.3.2 Provocation

To create the critical design provocation, the SCAMPER-technique and Tactics for Ambiguity are used (see Section 5.2.3). Rather than adding smell technology to existing smartphone technology, all smartphones (and cameras) are replaced by smell technology. This sole focus on smells without offering an explanation as to why smartphones and visual representations have been replaced by this speculative technology is a tactic to provoke ambiguity in the relationship. It encourages the audience to reflect on the meaning of smells in their urban environment.  By setting the future scenario in the city of residence of intended local audience (i.e., Edinburgh) is an ambiguity designed to attract the audience to engage with this future scenario. Potentially disturbing side effects of the speculative smell technology are also introduced alongside potential positive aspects to create ambiguity around the desirability of this future scenario.

These provocations are intended to enable this speculative design fiction to act as a conversation piece exploring the following carefully formulated "What if…"-question: ***"What if, in a city of the near future, there will be technology that allows experiences and memories to be recorded as smells?"*** It speculates about the possible use, practices, interactions, and implications of a speculative smell technology that enables people to capture, consume, and share smells as representations of (aspects of) their emotional person-place relationships with personally meaningful places in the urban environment (Stals et al., 2019).

### 5.3.3 Storyboard and diegetic prototypes

To help bring the story to life and speculate about social practices that may be constructed around and through this speculative smell technology, a storyboard and diegetic prototypes of an interactive "smellstick" device and disposable smellsticks are designed as artefacts and props for the short film (Stals et al., 2019). Following the established perceptual link between smartphone use and the use of smell technology, the speculative interactive smellstick device is the same size as a smartphone and can be used to spontaneously capture new smells or consume and share previously collected smells. Diegetic prototypes in the form of disposable smellsticks can be used to consume or share one specific smell related to one specific place, time, or event in

the past. They reflect that the emotional experience-in-place can be located spatially and temporally (Figure 5-8).



*Figure 5-8 – An interactive smellstick device and two disposable smellsticks with the smell of the "Beach in Greece" and "Christmas 1987", used as diegetic prototypes in the speculative design fiction short film "Smellification" (Stals et al., 2019).*

The specific smells used for the disposable smellsticks are informed by specific stories of participants (p4 and P6) in the data corpus.  However, what the specific smell of the beach in Greece and of Christmas 1987 might be in the context of this speculative design fiction, is up for discussion and is left for the viewers to interpret (Stals et al., 2019).

Prior to the creation of the short film, a storyboard is created to design the key scenes (Figure 5-9).

*Figure 5-9 - Storyboard Speculative Design Fiction #1 - Short film "Smellification" (Stals et al., 2019).*

### 5.3.4  Short film "Smellification"

For each of the speculative design fictions, the speculation in the form of the "What if"-question is presented to the audience on a slide first (Figure 5-10).
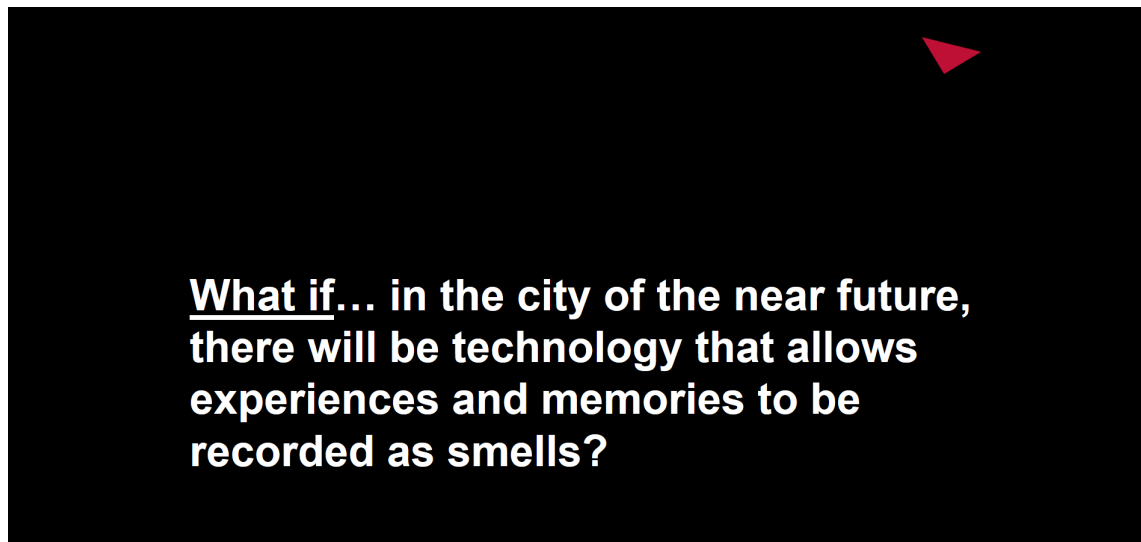
*Figure 5-10 – Speculation in the form of a What if-question for short film Smellification.*

This is followed by a slide setting the scene to contextualise the opening act, followed by the showcasing of the film or comic (Figure 5-11).
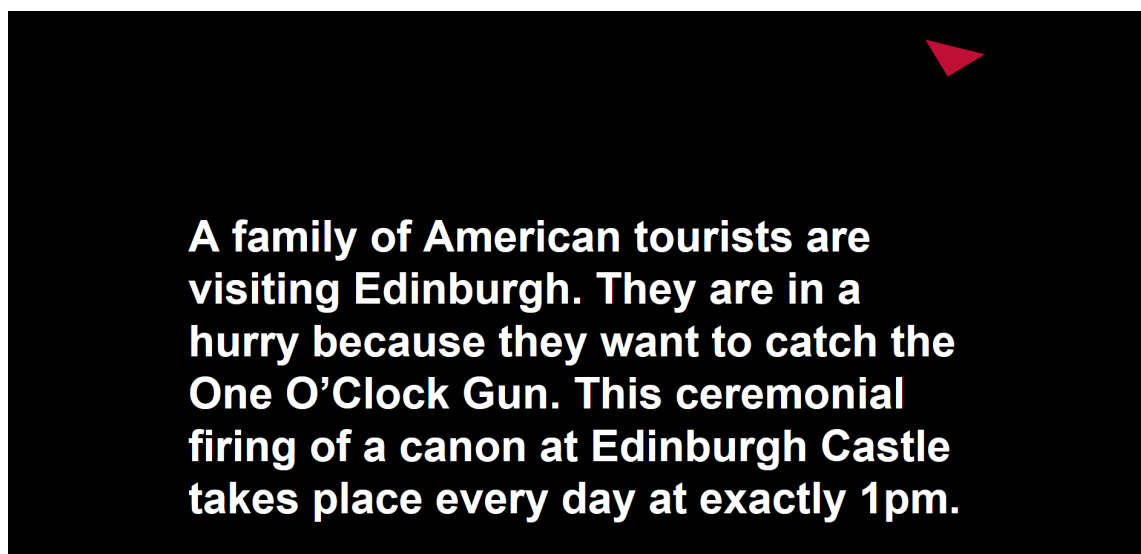


*Figure 5-11 - Setting the scene for the opening act of the short film Smellification.*

Below, the short film will be presented based on the 3-act story structure. Per act, first the scene of the short film will be outlined, followed by an explanation explicitly linking elements in that scene to the themes, trends and findings from the data corpus.

It is advised to watch the short film "Smellification" first, before continuing reading. To watch the full three-minute short film "Smellification", please follow this hyperlink:

https://youtu.be/O3a-cZCOFMw

**Opening Act: Tourist family uses interactive smellstick device to capture their holiday in Edinburgh**

In the opening scene depicted in the Figure 5-12 below, a family of tourists consisting of a father, mother, and child, use their interactive smellstick devices to capture their experience of their holiday in Edinburgh. It shows the tourist family having a shared emotional experience-in-place of Exploring and Discovering in the for them unfamiliar tourist city Edinburgh. They ask a local businessman who is passing by for directions, in order to try and to find the best spot to witness the ceremonial firing of a canon at Edinburgh castle (Experience-in-Place of Aesthetic Pleasure), which is a popular tourist attraction.

This setup-scene establishes the perceptual bridge, linking the familiar use of smartphones to take pictures and videos, to the unfamiliar future smellstick device used to capture typical smells of the holiday location (Figure 5-12). Instead of a viewpoint, it shows the tourist family trying to capture this typical gunpowder as a memento from the ideal "smellpoint", as the smoke descents on the busy shopping street of the city below (i.e., aesthetic emotional experience-in-place). This scene also illustrates to perception of Edinburgh as a beautiful, historic, vibrant cultural city that is popular among tourists (see Place-theme in Section 4.2.1).

*Figure 5-12 - Opening Act: Tourist family uses interactive smellstick devices to capture smells of gunpowder coming from the ceremonial firing of a canon at Edinburgh Castle (Stals et al., 2019).*

The opening act concludes with a group of students living in Edinburgh getting annoyed with the tourists blocking the street to capture the gunpowder smell. They decide to escape the tourists by going to the Meadows park. This depicts the troublesome relationship between locals and tourists (Section 4.2.1), and the experience-in-place of Escaping (Section 4.2.3).

**Middle Act: Students go to the Meadows park to relax and alleviate feelings of homesickness using disposable smellsticks**

The middle act consists of two scenes. Both scenes in the middle act are situated in the Meadows park, as parks are the most popular type of personally meaningful places in the city of residence (see Place-theme in Section 4.2.1), and the PACT-analysis showed that most smells chosen as representations of emotional person-place relationships, are encountered in the Meadows park (Section 5.3.1).

In the first middle scene, the group of students go to the Meadows park to escape the tourists and relax. The group of student characters consisting of two local students from Edinburgh and two exchange students from Greece, sit down in the grass to hang

out and relax with their friends. The two Greek exchange students try to alleviate their feelings of homesickness by consuming and sharing the smell of the Greek beach in their hometown of Thessaloniki, using a disposable smellstick. This evokes strong and instant emotions of ecstasy and relaxation, which causes them to zone out. Furthermore, the speculative design fiction speculates about a social practice that might occur around smellsticks, with the disposable smellstick being passed around the group of students in a similar way that the data corpus and PACT-analysis revealed that cigarettes or joints are passed around while having an experience-in-place of socialising and relaxation in the park with a group of friends (Figure 5-13). One of the local students decides to partake and quickly zones out as well.



*Figure 5-13 – Middle Act: Disposable smellstick labelled "Beach/Greece" passed around by a Greek exchange student, to share the emotional experience-in-place of the beach in their hometown in Greece in person with compatriots and friends using smell, while socialising in the park (Stals et al., 2019).*

However, the other local student kindly refuses as she prefers to stay in the moment. She breaks away from the group to capture the smells of daffodils in spring nearby to relax and ground herself in the here and now (Figure 5-14).

**Figure 5-14 - Middle Act: Local student uses speculative smell technology in the form of an interactive nose piercing, to record the smell of daffodils in spring.**

This first scene in the middle act explores the theme of smells as representations for personal use and for sharing one's personal, emotional person-place relationship with others (Section 4.3.2). Smells can be spatially located and linked to the emotional experience-in-place of another place (i.e., the beach in Greece). This is used by the two Greek exchange students to self-regulate emotions of homesickness (Section 4.3.1) and create a shared emotional experience-in-place of belonging (Section 4.2.3-Belonging).

The passing around of the disposable smellstick in person depicts the trend in the Sharing-theme that there is a preference for sharing emotional person-place relationship data in person, with individually selected compatriots and friends (Section 4.3.3).

One of the local students however opts out as she prefers to ground herself in the moment by seeking out the smell of the daffodils in the park and record it with her interactive nose piercing. This represents the use of smells for an individual experience-in-place of relaxation (Section 4.2.3).

Middle Act – Scene 2: Local student uses recorded smell of daffodils in the park to enhance her individual experience-in-place of relaxation while walking the dog.

The second scene in the middle act takes place a few months later, when springtime has passed, and autumn has come. It shows the same local student who recorded the smell of the daffodils during springtime (Figure 5-15). She goes out at night by herself to walk the dog. Unfortunately it is raining, and she is not looking forward to going outside in the rain. She uses the recorded springtime smell of the daffodils to brighten her mood, augment her emotional experience-in-place of relaxation taking her dog for a walking through the park.



*Figure 5-15 - Local student selects recorded smell of the daffodils in spring for consumption using an interactive nose piercing. This enhances her emotional experience-in-place of relaxation while walking the dog in the park during a rainy autumn night.*

The second scene in the middle act explores the use of temporally-located smells for the individual, personal use. It enables the local female student to use the recorded smell of the daffodils in springtime, to self-regulate her emotional state and have an emotional experience-in-place of relaxation in the park in autumn (see section 4.5.5.3- Emotion Regulation).

**<u>Closing Act: Smell Addiction</u>**

In the closing act, the local female student is walking her dog is startled when she encounters a homeless smell addict in the park at night. It is the businessman who the tourist family asked for directions only a few months earlier. He is lying on the ground and taking a sniff of a disposable smellstick labelled "Christmas 1987", attempting to escape the harsh reality of life on the streets by reminiscing about happier times. On the ground next to the homeless smell addict, lies a newspaper with the headline:

"SMELLSTICK ADDICTION ON THE RISE, NATIONAL HEALTH SERVICE ISSUES WARNING!"

(See Figure 5-16 and Figure 5-17).



*Figure 5-16 - Closing Act: Dog walker encounters a homeless smellstick addict in Meadows park using a disposable smellstick labelled "Christmas 1987" for an emotional experience-in-place of reminiscing and escaping (Stals et al., 2019).*



*Figure 5-17 - Newspaper created as a prop for the speculative design fiction "Smellifciation", speculating about potential negative implications such as smellstick addiction.*

This end scene with the homeless smell addict addicted to the smell of Christmas 1987, speculates about how smell technology could be used in an emotional experience-in-place of Reminiscing or Escaping (see Section 4.2.3). It also speculates about potential undesirable implications of the speculative smellstick technology, by raising concerns regarding potential health issues such as addiction. This provocation is inspired by the strong and instant effect that participants describe that smells have on their emotional state (Section 4.3.2), in combination the intense emotional experiences-in-place of relaxation it contributes to in the Meadows park, described by participants using words like "nirvana-like experience" (P6) and "trancing" (P5) (Stals et al., 2019).

This speculative design fiction in the form of a short film aims to raise a discussion around what other smells might be connected to the experience of urban places, what the technology and interactions for capturing, consuming, and sharing emotional experience-in-place using smells might look like, and the potential implications of such technology on our relationship with place (Stals et al., 2019).

## 5.4   Speculative Design Fiction #2 – Emotion-based Place Access

The second speculative design fiction is a comic called "Emotion-based Place Access". It aims to communicate and explore the complexity of emotional person-place relationships with personally meaningful places in the urban environment, which is at odds with the current use of emotion maps in Urban Interaction Design as representations that oversimplify this complexity. The two main themes from the data corpus explored in this speculative design fiction are the Emotions-theme (Section 4.2.2) and the Emotion Regulation-theme (Section 4.3.1). Following Elsden et al.'s (2017) guidelines for developing a suite of speculative designs, this speculative design fiction will be developed around an event.

### 5.4.1   Linking Themes, Trends, and Findings to Speculative Design Fiction #2

The main finding in the Emotions-theme explored in this speculative design fictions is that there is no one-to-one relationship between emotion and a personally meaningful place. As outlined in more detail in Section 4.2.2, there are between 2 and 7 different types of positive and negative emotions reported as being related to each personally significant place in the city of residence per participant. The main finding in the Emotion Regulation-theme is potentiality for technology to support the active and

intentional use of personally meaningful places in their city of residence as a tool to self-regulate one's emotional state (Section 4.3.1). All participants visited and revisited personally significant places in the urban environment have a positive impact on their emotional state, enabling them to transition from a negative to a positive emotional state.

This informed and inspired the initial, broad speculation of a possible future scenario for the hybrid city in the near future, where certain places or events can only be entered if a person is in the one desired emotional state. In this dystopian scenario, a one-to-one relationship between emotion and place is enforced.

### 5.4.2  PACT-analysis

The results of the PACT-analysis to inform the design of the speculative emotion regulation technology are summarised in Table 5-3.

| People | People who seek relaxation, feel alone or are bored; Friends; Concertgoers; Performers; Celebrities; Regulars; Staff; |
|---|---|
| Activities | Night out; Pub crawl; Concert; Gather with friends; Going for drinks |
| Context | Pubs, Bars, Clubs, Concert venues; Social context of going out with friends |
| Technology | Based on current use of smartwatches and activity trackers for tracking and monitoring wellbeing. Wristbands are used to access clubs and concerts and are also kept as representations/mementos. |

*Table 5-3 - PACT-analysis for speculative emotion regulation technology*

As this speculative design fiction is designed around an event, the focus is on the interactions with- and implications of this speculative technology in the context of a socialising emotional experience-in-place, and for the self-regulation of emotions based on the emotions that places in the urban environment evoke. The socialising experience-in-place is the second most common emotional experience-in-place and is characterised by feelings of joy (Section 4.2.3).  Based on the PACT-analysis, this socialising emotional experience-in-place will revolve around a group of friends visiting a concert in their local club. It takes into account the different types of people that can

shape this emotional experience-in-place, like the friends one is going with, staff at the venue, celebrity performers at the concert, regular visitors, and other concert goers.

The perceptual bridge linking the familiar present to an unfamiliar future, is based on the current use of smartwatches and activity trackers. Six out of eight participants in the data corpus currently use these to track and monitor their physical wellbeing (Section 4.3.1). This trend is projected into a possible future scenario speculating about similar wearable technology that does not only track physical activity and wellbeing, but can also tracks and monitors emotional states and emotional wellbeing.

The aim is to communicate and reflect on the complexity of emotional person-place relationships and the potential interactions with- and implications of technology for the self-regulation of emotional states in the hybrid city of the near future on the relationship between person, place, and technology in the urban environment.

### 5.4.3  Provocation
The SCAMPER-technique and Tactics for Ambiguity are used to further design the critical design provocation. Besides the main provocation that there is only one desirable, enforced emotional state, the SCAMPER-technique of Reversing is applied. The desired emotional state will therefore not be the most common positive emotion of joy connected to 51% of all personally meaningful places, but a negative emotional state characterised by melancholy (i.e., pensive sadness). Sadness is the most common negative emotion connected to 18% of all personally meaningful places in the city of residence, and is located opposite to joy on the Plutchik Emotion Wheel.

Ambiguity of Information is used as a provocation tactic by magnifying changes in emotional states and the possible consequences from a personal and public perspective. The speculative technology is designed to be overly precise, indicating even the smallest and temporary changes in emotions. At the same time, this private emotional data is over-interpreted, with any change in the emotional state resulting in immediate, public consequences. This engages the audience into making sense of the emotion bracelet and emotion-based access policy in the context and environments in which it operates, and what the potential implications might be.

This results in a more detailed possible future scenario exploring the carefully formulated speculative "What if…"-question: ***"What if, in a city of the near future, you will only be allowed to enter a place or event if you are in the right emotional state?"*** It speculates about what using places as a tool to self-regulate emotional states might look like in a hybrid city of the near future. It asks critical questions about the current oversimplification of the complex (emotional) relationship between person, place, and technology, and the potential implications for emotional person-place relationships in the urban environment.

### 5.4.4   Storyboard and Diegetic Prototypes

To help bring the story to life and speculate about the implications and social practices that may be constructed around and through this speculative emotion regulation technology in the hybrid city of the near future, a storyboard and diegetic prototypes of an "emotion bracelet" and an "emotion compass" are designed as artefacts for the comic.



*Figure 5-18 - Emotion bracelet indicating if a person is in the desired emotional state to access a place or event, used as a diegetic prototype in the speculative design fiction comic "Emotion-based Place Acess".*

Following the already established perceptual link between smartwatches and activity trackers, the speculative technology used for emotion regulation takes the form of a wearable emotion bracelet. It also allows entry into a concert, reflecting the current use of wristbands to this end (Figure 5-18).

To emphasise that this potentially private data now also has a more public use, the emotion bracelet clearly changes colour depending on the person's emotional state. The colours correspond with the colours on the Plutchik Emotion Wheel, with purple indicating melancholy, yellow indicating joy, and green indicating fear.

The second diegetic prototype in this speculative design fiction is the "emotion compass" (Figure 5-19).



*Figure 5-19 - Emotion compass pointing to places in the urban environment that evoke feelings of melancholy, used as a diegetic prototype in the speculative design fiction comic "Emotion-based Place Access".*

The design of the emotion compass is based on a combination of a normal compass and the Plutchik Emotion Wheel. It can be used as a tool in the emotional experience-in-place of Exploring and Discovering, and points to places that can evoke the desired emotion of melancholy. This is based on the trend in the Consuming-theme, that there is a desire to visit places in the urban environment that evoke desirable emotions and emotional experiences-in-place (Section 4.3.4).  Prior to the creation of the full comic, a storyboard is created to design the key scenes (see Figure 5-20 below).

*Figure 5-20 - Storyboard for Speculative Design Fiction #2 - comic Emotion-based Place Access.*

### 5.4.5 Comic "Emotion-based Place Access"

In this section, the comic "Emotion-based Place Access" created by the researcher using Pixton Plus comic creation software (Pixton Comics Inc., 2019), will be presented. First the speculation in the form of the "What if"-question is presented to the audience on a slide (Figure 5-21).
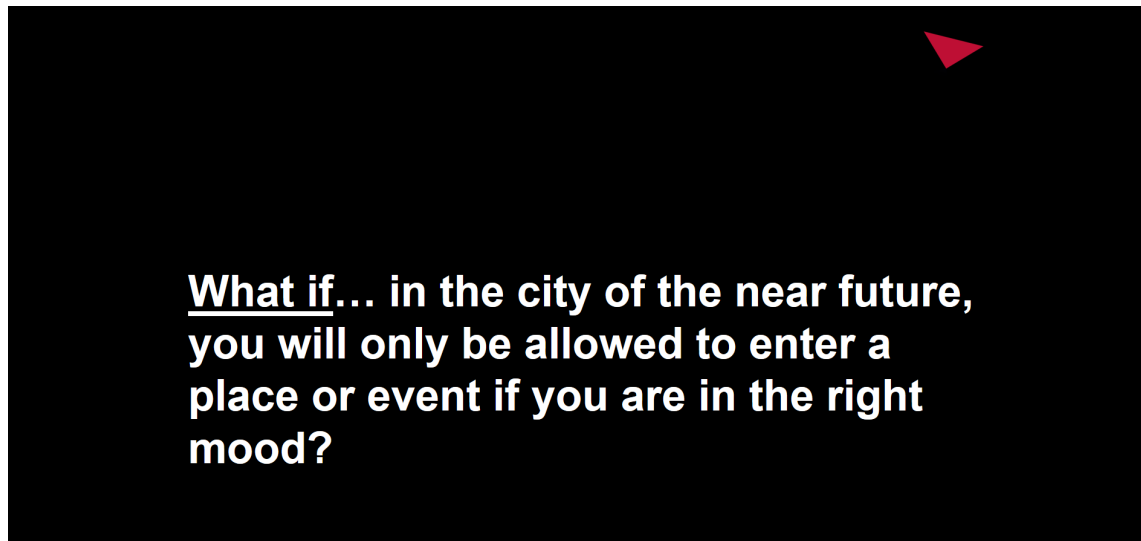


*Figure 5-21 - Speculation in the form of a What if-question for comic Emotion-based Place Access.*

This is followed by a slide setting the scene to contextualise the opening act, followed by the showcasing of the film or comic (Figure 5-22).
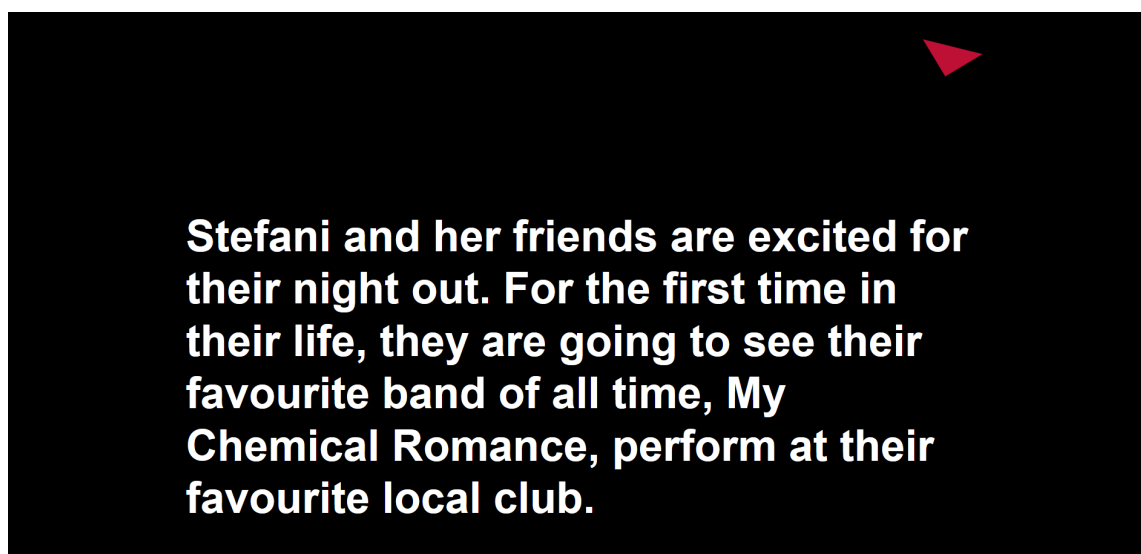


*Figure 5-22 - Setting the scene for the opening act of the comic Emotion-based Place Access.*

Below, the comic is presented using the 3-act story structure. For each of the scenes in the three acts, the link to the relevant, themes, trends, findings and quotes in the data corpus will be provided.

It is advised to read the full four-page comic first, which can be found in Appendix F.

**Opening Act: A Group of Emo friends go to their local club to see their all-time favourite band, My Chemical Romance, live in concert for the first time.**

The opening act shows Stefani and her group of emo friends arriving at their local club. It is the club where they regularly go out over the weekend, but tonight is a special night. For the first time in their life, they are going to see their favourite band of all time, My Chemical Romance, perform live on stage. Before they can enter, the doorman checks each of their emotion bracelets to check if they are in the desired emotional state. The emo band my Chemical Romance has requested that every member of the audience will be in the desired melancholical state to ensure that the gig will be a success. After the group of friends is allowed in by the security guard, they manage to find a place to stand right in front of the stage, from where they can clearly see the band and enjoy the concert.



*Figure 5-23 - Opening Act: Establishing the perceptual bridge.*

This setup-scene establishes the perceptual bridge (Figure 5-23). It links the familiar use of smartwatches and activity trackers to monitor wellbeing and wristbands to access concerts and clubs, to the unfamiliar future technology of emotion bracelets used to track and monitor a person's emotional state. This speculative technology makes it possible to enforce the emotion-based access policy. Being aware that other people and interpersonal relationships can shape and emotional experience-in-place (Section 4.3.3), the band My Chemical Romance demands that all concert goers are in the desired emotional state of melancholy.   A live concert of their favourite band is chosen based on the personal story of participant P4's Tom Waits concert (i.e., Magical experience-in-place).

**Middle Act: Stefani is removed from the club for not being in the desired emotional state, prompting a search with her friends for a place in the city that can help evoke the desired emotions, so they can all go back to the concert again.**

The middle act consists of three scenes, containing both a confrontation in the first scene of the middle act, and a journey in the second scene of the middle act (Flint, 2016).

Middle Act – Scene 1: Stefani is removed from the concert for not being in the desired melancholic emotional state

While the concert is well underway, Stefani notices that her emotion bracelet is detecting that her emotional state is changing and that she is becoming happy. She tries to control her feelings and hide her emotion bracelet, but unfortunately the lead singer of the band notices that her emotion bracelet has changed colour. He stops the performance and alerts security, who remove Stefani from the premises (Figure 5-24). Her friends quickly follow her to see if she is ok and to offer help.

*Figure 5-24- Middle Act scene 1: The singer of My Chemical Romance spots that Stefani is not in the desired melancholic state anymore and orders security to remove her from the concert.*

This illustrates main finding in the Emotions-theme, that there is no one-to-one relationship between emotion and personally meaningful place (see Emotions-theme, Section 4.2.2).

Middle Act – Scene 2: A visit to the cemetery fails to put Stefani back in the desired emotional state

The second scene in the middle act shows the group of emo friends using the speculative emotion compass to find a place in the city at night that would be able to put Stefani in a melancholic emotional state again so they can all go back to the concert. The emotion compass leads them to a cemetery, but this place does not evoke the desired emotions in Stefani. This upsets her friends, who consider going back to the concert without her (Figure 5-25). Afraid of being rejected by her friends now that she is not a melancholic emo anymore, Stefani manages to persuade them to try a different place first.

*Figure 5-25 - Middle Act-Scene 2: A visit to the cemetery fails to evoke the desired emotional state in Stefani, leaving her afraid that her friends will reject and abandon her.*

The attempt to use the cemetery to evoke feelings of sadness is a depiction of the Emotion Regulation-theme, where places are used as a tool for the self-regulation of emotions. It also reflects the trend in the Consuming-theme that people want to have the same desirable emotional experience-in-place. Therefor they have an interest in visiting a place they think will evoke the same emotional experience based on social and physical characteristics of the place-dimension (see section 4.3.4). The fear of being rejected by her friends, depicts the trend in the Place-theme that participants perceive a lack of a sense of community in Edinburgh (see Section 4.2.1).

Middle Act – Scene 3: A visit to her old flat brings Stefani back into the desired emotional state

In the third scene, Stefani leads the group to her former flat. She asks her friends to wait for her outside, while she goes inside by herself in an attempt to change her emotional state (Figure 5-26). To the surprise of her friends, she returns a bit later with her emotion bracelet indicating that she is feeling melancholic again.

*Figure 5-26 - Middle Act-Scene 3: Stefani goes into her old flat which successfully changes her emotional state back to melancholic.*

That the cemetery does not manage to evoke the desired emotion but her former flat does, depicts the finding that personally meaningful places are also used for self-regulation of emotions, and can evoke stronger emotions based on this personal attachment to place (section 4.3.1). The troublesome relationship with the previous flat is inspired by the personal story of P8, who underwent a personal traumatic event while living there. The fact that Stefani had not told her friends about her personal, emotional relationship with her previous flat, depicts the finding in the Negative Experiences-in-Place trend, that people tend to hide a negative person-place relationship from others, even from people close to them (Section 4.2.3 – Negative Experiences-in-Place). It also illustrates the trend in the Sharing-theme that people do not share emotional person-place relationship data that is considered to be private (see section 4.3.3 – Motivations for Not Sharing). The personal significance of her former flat, which as a building looks similar to all the other flats in the street, is a depiction of the finding in the Types of Places-trends (see section 4.2.1 – Types of

Places) that 78% of personally meaningful places can be classified as mundane, everyday places.

## Closing Act: Nobody is allowed back in

On the way back to the club, Stefani decides to tell her friends what happened, and shares the personal emotional relationship she has with her old flat with her emo friends. She explains that she found one of her flatmates dead in the flat as the result of a suicide. Now whenever she feels happy, she goes back to the flat to make herself feel melancholic again. Stefani sharing this personal story results in a bonding experience-in-place among the group of friends. What they do not notice though, is that as a result all their emotion bracelets have changed colour. None of them are in the desired emotional state anymore and are not allowed to enter the concert venue again (Figure 5-27).



*Figure 5-27 - Closing Act: Stefani and her friends bond over her sharing of her emotional person-place relationship with her old flat with them, which changes their emotional state, and results in nobody being allow to re-enter the concert venue.*

Stefani sharing her private emotional person-place relationship with her close emo friends is a depiction of the trend in the Sharing-theme, that emotional person-place

relationships are only shared with a specific person or a small social circle (see Section 4.3.3). It also depicts another trend that a motivation for sharing emotional person-place relationships is to create understanding and emotional support (see Section 4.3.3). The interest of her emo friends in Stefani's relationship with her former flat, depicts several trends in the Consuming-theme (Section 4.3.4). It shows an interest in the emotional person-place relationships of a person someone is close. It also shows the interest and curiosity in extreme emotional person-place relationships within the city of residence, in particular where the affective component of the relationship contains feelings of sadness, love, or anger. It also fulfils a desire to relate, sympathise, or empathise with another person's extremely positive or negative emotional experience-in-place. This results in a bonding experience-in-place characterised by strong feelings of joy and ecstasy (Section 4.2.3).

The full four-page comic "Emotion-based Place Access", can be found in Appendix F.

## 5.5   Speculative Design Fiction #3 – Personal Virtual Monuments

The third speculative design fiction is a Black Mirror-style short film called "Personal Virtual Monuments".  The main themes explored in this speculative design fiction are the Negative Experiences-in-place (see section 4.2.3-Negative Experiences-In-Place), and the Consuming-theme Section 4.3.4). There is a specific focus on the trends in the Consuming-theme that there is an interest in extreme positive and negative emotional person-place relationships in the city of residence, and the tension between the interest in and willingness to share this negative emotional person-place relationship data. Following the guidelines by Elsden et al. (2017) for developing a suite of speculative design fictions, this speculative design fiction will be developed around a speculative technological service.

### 5.5.1   Linking Themes, Trends and Findings to Speculative Design Fiction #3

The focus of this third speculative design fiction is on negative emotional person-place relationships in the city of residence. It explores the negative emotional experiences-in-place, with more than half of the participants reporting having had such and experience-in-place in 13% of the total number of selected personally significant places in their city of residence (see Section 4.2.3). This resulted in the development of a negative emotional bond for half of the participants with 9% of the personally

meaningful places in the city of residence, which often develops from the unexpected breakdown or loss of a close interpersonal relationship. This results in a desire to personalise and highlight the personal meaning of those places by erecting different types of permanent or temporal monuments, such as historical monuments, memorials, and personal shrines as representations (Section 4.3.2). The place itself is the location of a personal or shared experience-in-place, which is often a mundane public or semi-public place (Section 4.2.1). As outlined in more detail in the Consuming-theme (Section 4.3.4), negative experiences-in-place and the resulting negative emotional person-place relationships are often experienced alone and not shared as they are considered to be private (see Section 4.3.3). But at the same time these are the emotional person-place relationships that generate the most interest (see Section 4.3.4).

This inspired the initial, broad speculation of a possible future scenario where a technological service exists that allows people to erect virtual monuments at places in a hybrid city of the near future, that are only visible for a specific person or group of people.

### 5.5.2 PACT-analysis

Table 5-4 below gives an overview of the outcome of the PACT-analysis to inform the design of this speculative virtual monument service.

| People | Lost loved ones; Romantic partner; Family; Friend; Strangers (bystanders, shoppers); Desire to honour or commemorate special person. |
|---|---|
| Activities | Lay flowers; Erect monument; Avoid places with negative emotional person-place relationship; Revisit on special occasions; Monuments trigger interest & exploration |
| Context | Mundane semi-public places; No other social context, individual private use |
| Technology | Based on current use of, and behaviour and rituals around shrines and monuments; Virtual Monument; Augmented Reality Glasses; Smartphone app |

*Table 5-4 – PACT-analysis for speculative service for creating personal virtual monuments*

The design of the speculative technological service is informed by the current use, interactions, behaviours, rituals and activities around representations in the form of physical, personal monuments for lost loved ones summarised under Activities in the table above (see also Section 4.3.2). This will provide the perceptual bridge between current practices and interactions surrounding physical monuments in the familiar present, and the possible future scenario of unfamiliar virtual monuments. A key aspect of the personal virtual monuments service will be to protect a person's privacy by making the monument virtual. It will only be visible for a specific person or a select group of people selected by the creator of the monument. Speculative Emotion-Augmented Reality (EAR) glasses or the Emotion-Augmented Reality (EAR) smartphone app can be used to be able to see the virtual monument. This is based current the current technology use of participants in the urban environment, who wear and use protective technology in public, such as sunglasses and privacy screens on their smartphones (see Section 4.3).

### 5.5.3 Provocation

The SCAMPER-technique and Tactics for Ambiguity are used to design the critical design provocation. Ambiguity of Relationship is used as a tactic for provocation (Gaver et al., 2003). The initial plan was to tell the story from the perspective of a widow who created and visits the personal virtual monument for her deceased husband. However, using the Ambiguity of Relationship-tactic, the story will be told from the perspective of the two app developers who developed the personal virtual monuments service and encounter the widow using their service in the street. By offering unaccustomed roles and points of views, this will encourage the viewers to adopt potentially unfamiliar perspectives which help enable critical reflection (Gaver et al., 2003). To this end, the short film will be filmed in such a way that it looks like it was filmed by one of the developers using the camera on their smartphone.

Ambiguity of Relationship is also used as a tactic for provocation to draw attention to the personal virtual monuments in the urban environment without explaining what they are for. This will be left to the interpretation of the viewers to encourage reflection on what the personal significance of these places might be to other residents (Gaver et al., 2003).

This has resulted in a more detailed possible future scenario exploring the carefully formulated speculative "What if…"-question: ***"What if, in a city of the near future, a service will exist that allows you to create and place your own personal virtual monuments anywhere you like in the city?"*** It speculates about the possible use, interactions, and implications of a speculative Emotion-Augmented Reality service, which can be used to create and place personal virtual monuments for extreme positive and negative emotional person-place relationships wherever they want in the hybrid city of the near future. These virtual monuments are only visible for a specific person, or a small group of people selected by the creator of the personal virtual monument.

### 5.5.4   Storyboard and Diegetic Prototypes

Diegetic prototypes and storyboards are used to help to bring the story to life and speculate about the applications, implications and social practices that may occur around and through the speculative personal virtual monuments service in a hybrid city of the near future.

<u>Personal Virtual Monuments</u>

For the design of the main diegetic prototype, that is the personal virtual monument that the widow has erected for her husband, the SCAMPER design technique of "Combine" is used. It is designed to be a combination of a classic Greek pillar and a personal shrine (Figure 5-28). This is a reference to the many historical monuments in the Edinburgh which are designed in a similar style, and the perception of Edinburgh being a historical city (Section 4.2.1). In combination with the mundane location of the personal virtual monument on the pavement next to a shop, this is intended to create ambiguity of information regarding the personal meaning of both the place and the personal virtual monument. It creates space for interpretation and encouraging viewers to come up with their own interpretations.
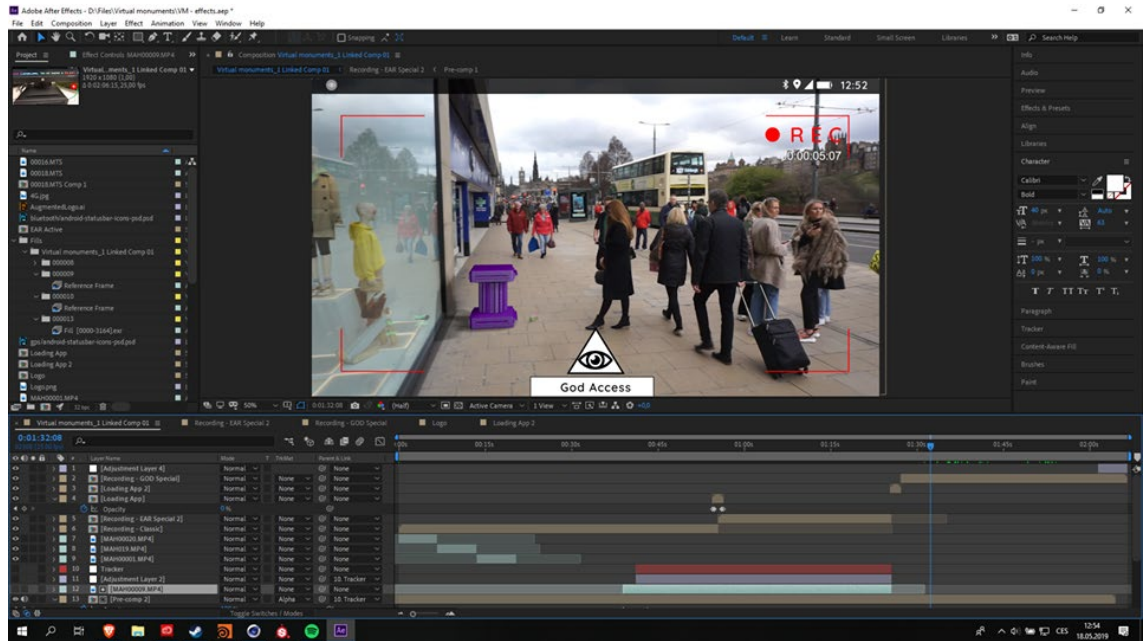
*Figure 5-28 – Final design of the purple personal virtual monument, created as a diegetic prototype using the Cinema4D software package.*

The SCAMPER design technique of "Modify" is applied to modify the size and colour of the personal virtual monument. To signify that this is a personal virtual monument, the size of the monument is relatively small compared to the other historical and cultural monuments located on the busy shopping street. The colour purple is chosen because this is the colour that corresponds with sadness and grief on the Plutchik Emotion Wheel and it provokes the audience to speculate about what these speculative personal virtual monuments might look like. Similarly, the two other types of personal virtual monuments in the short film (i.e., a heart and crosses) will be different in shape, size, number, and colour, to provoke further speculation to this end.

Emotion-Augment Reality service (EAR)

In order to be able to create and see these personal virtual monuments and provide an individual, personalised augmented emotional experience-in-place, two additional diegetic prototypes are designed. These are special Emotion-Augmented Reality glasses (EAR-glasses) and an Emotion-Augmented Reality smartphone app (EAR-app).

The logo of the Emotion-Augmented Reality start-up company is based on the all-seeing eye of God also known as the Eye of Providence (Figure 5-29).
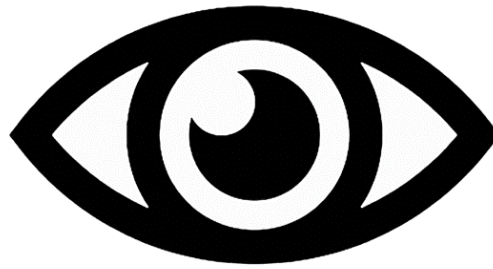
# Emotion-Augmented Reality

*Figure 5-29 - Logo of the startup company that created the speculative Emotion-Augmented Reality service (EAR).*

This logo is used in the short film to help the audience establish the link between the developers of the Emotion-Augmented Reality start-up company, and their EAR-glasses and EAR-app that make it possible to create and see these personal virtual monuments (Figure 5-30 and Figure 5-31).



*Figure 5-30 - EAR glasses with the EAR logo on the side, used as a diegetic prototype of the speculative Emotion-Augmented Reality service.*
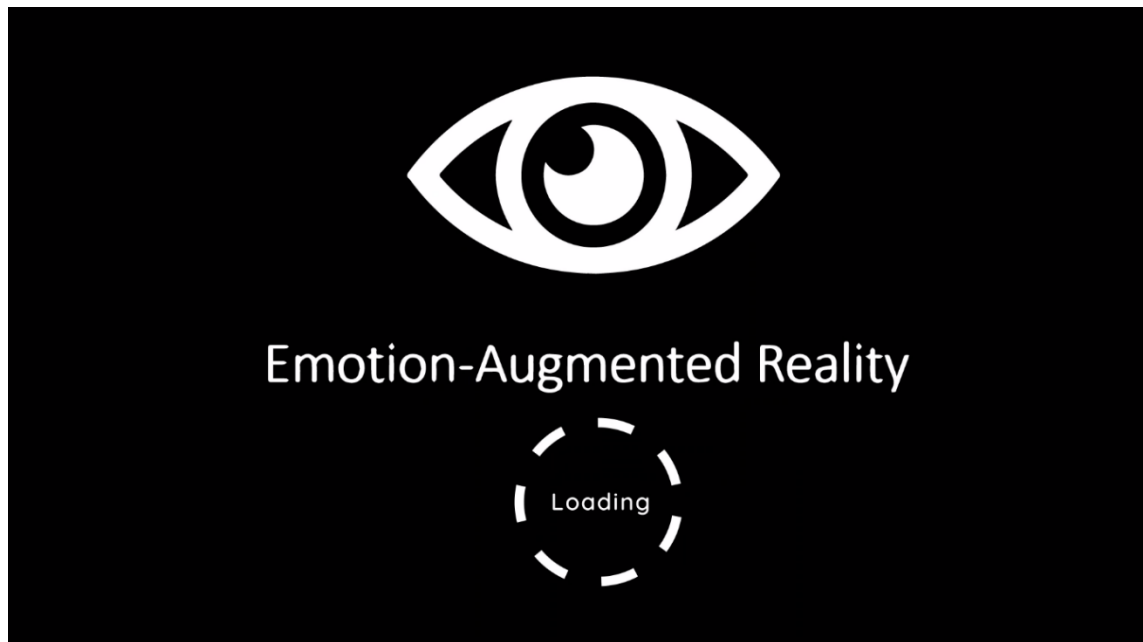
*Figure 5-31 - EAR-app loading screen with EAR logo, used as a diegetic prototype.*

As analysed by Flint (2016), the use of a company logo to this end is film technique used to establish the place of origin and of- and link between technological devices and services and should implicitly be designed this into the narrative (Flint, 2016).

Prior to the creation of the short film, a storyboard is created to design the key scenes.
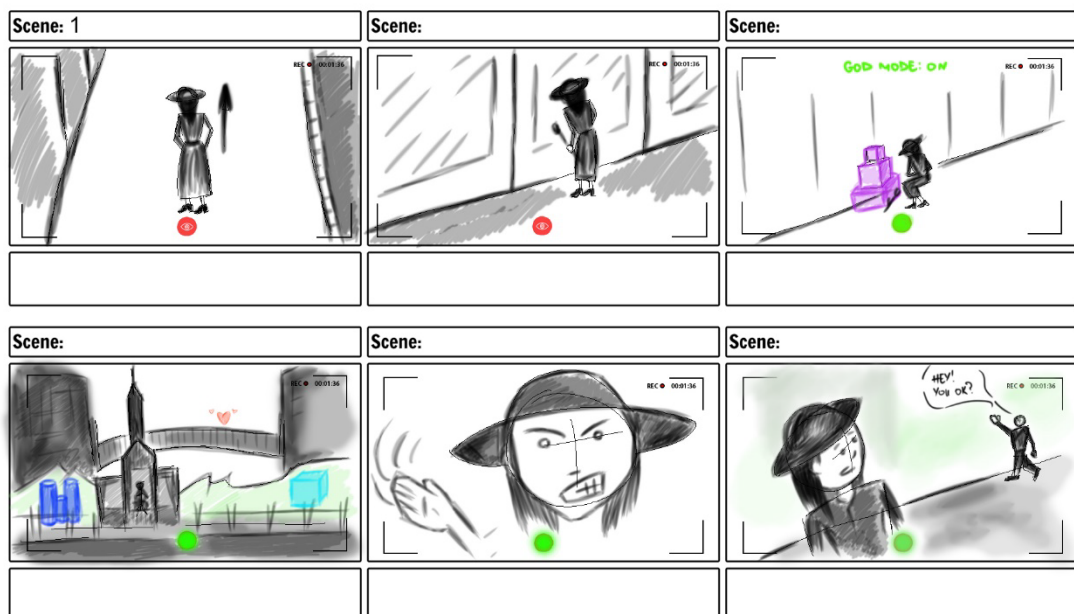


*Figure 5-32 - Storyboard for Speculative Design Fiction #3 - short film "Personal Virtual Monuments".*

### 5.5.5   Short film "Personal Virtual Monuments"

In this section, the short film Personal Virtual Monuments will be presented. First the speculation in the form of the "What if"-question is presented to the audience on a slide (Figure 5-33).



**What if…in a city of the near future, a service will exist that allows you to create and place your own personal virtual monuments anywhere you like?**
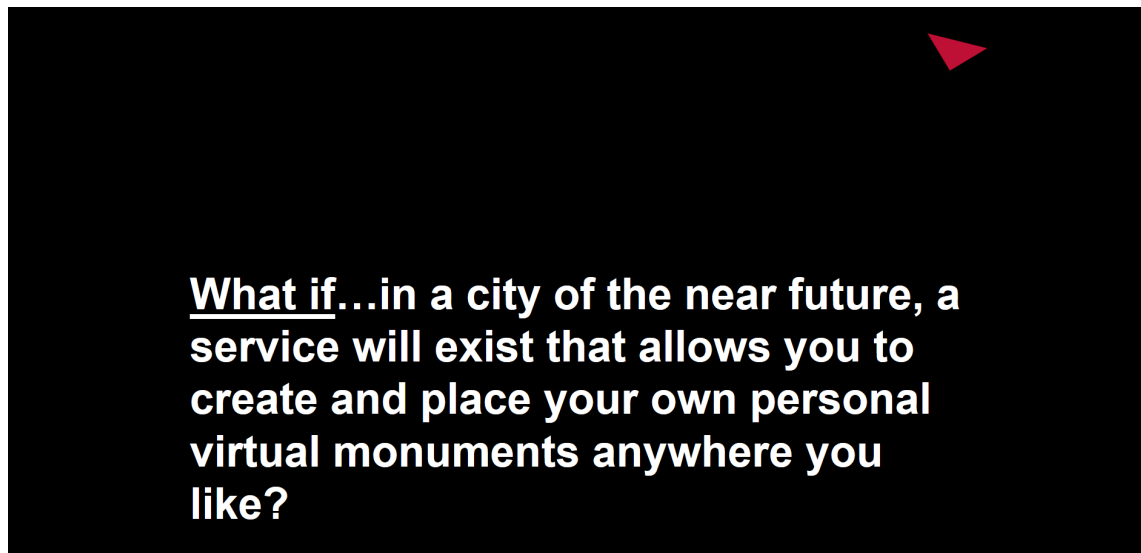
*Figure 5-33 - Speculation in the form of a What if-question for short film Personal Virtual Monuments.*

This is followed by a slide setting the scene to contextualise the opening act, followed by the showcasing of the film or comic (Figure 5-34).



**Peter and David are two app developers who work at the same office. They are excited because their start-up has just launched a new service which allows people to create and place their own personal virtual monuments anywhere they like, using an app on their smartphone or special glasses.**
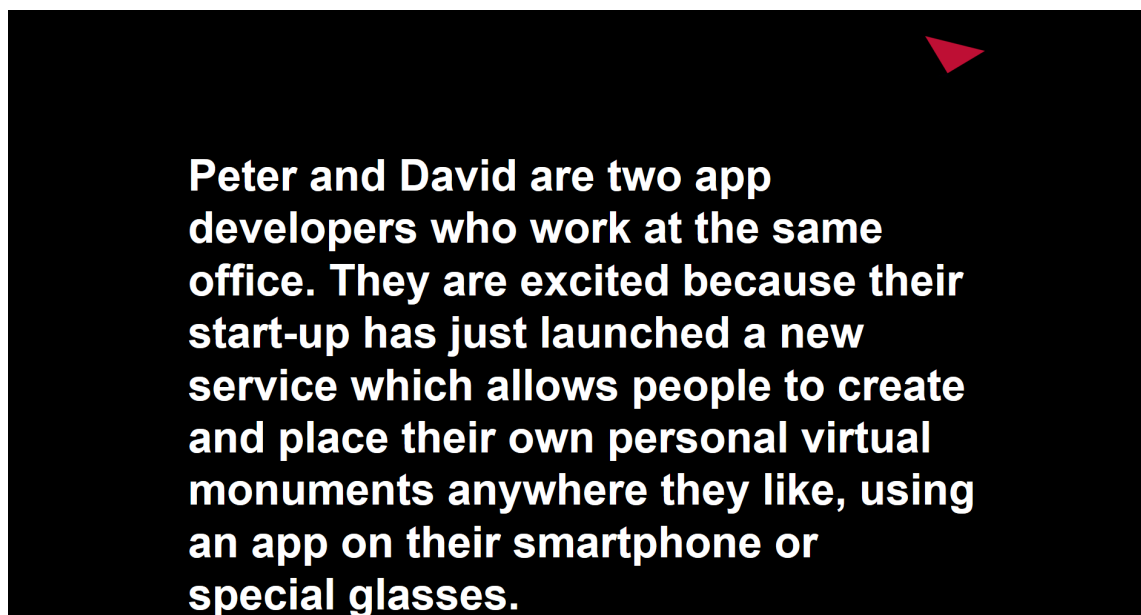
*Figure 5-34 - Setting the scene for th opening act of the short film Personal Virtual Monuments.*

Below, the short film will be presented based on the 3-act story structure. It is advised to watch the short film first, before continuing reading. To watch the full three-minute short film "Personal Virtual Monuments", please follow this hyperlink:

[https://youtu.be/9fLt8sJiCig](https://youtu.be/9fLt8sJiCig)


**Opening Act: Two app developers of the personal virtual monument service spot a woman dressed in back wearing their Emotion-Augmented Reality glasses behaving conspicuous in the street.**

The opening act shows two young app developers David and Peter, who recently started their own start-up company Emotion-Augmented Reality (EAR). It provides a service that enables people to create and place personal virtual monuments wherever they like in the city. During his smoke break outside the office, Peter spots a woman dressed in black acting conspicuously in the street. She is wearing one of their company's Emotion-Augmented Reality glasses. He rushes back into the office to get is colleague David, who is excited to learn that somebody might be using their service. He starts video recording with his smartphone while they rush back outside, hoping to capture the first person using their service on camera. They spot the woman who is fully dressed in black and carrying a red rose in her hand, walking down the street. Curious to see if and how she is using their personal virtual monuments service, they decide to follow her (Figure 5-35).
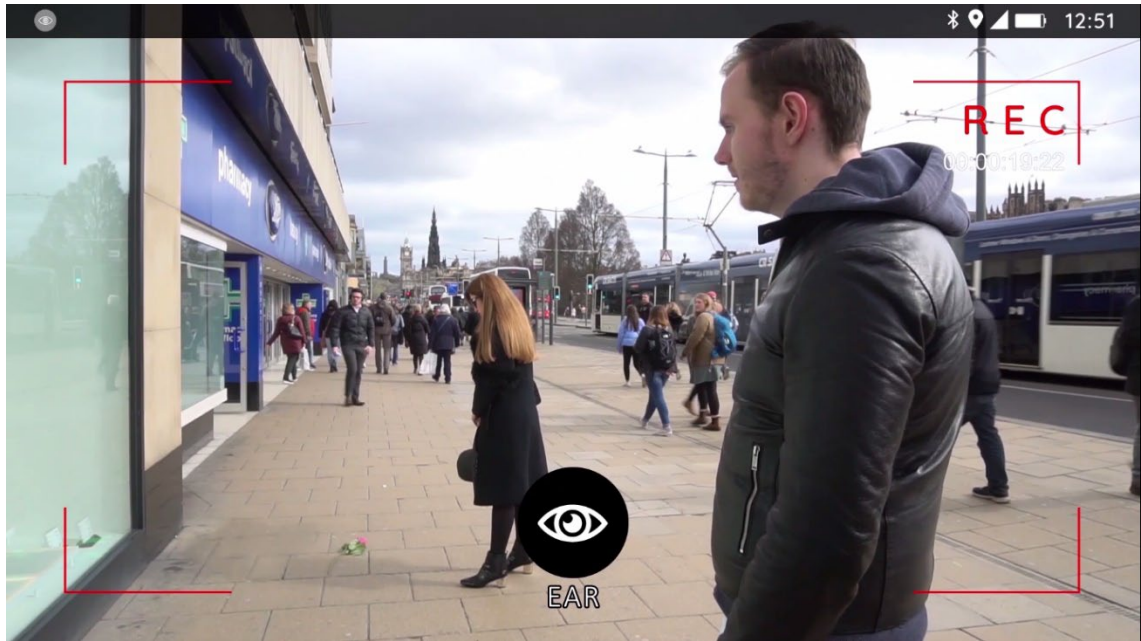
*Figure 5-35 - Opening Act: Developers of the Emotion-Augmented Reality service spot, follow an record a woman dressed in black and carrying a rose who appears to be using their service in the street.*

The main purpose of this opening act is to set up the story, focusing the attention on the new speculative Emotion-Augmented Reality service that has recently been developed, and is now being used by people in public in the street. The woman is looking sad, dressed fully in black and carrying a rose, giving the impressions that she is on her way to a funeral. This illustrates that she is having a negative experience-in-place (Section 4.2.3) characterised by grief and sadness. It represents the finding in the Emotions-theme that sadness is the most common negative emotion in emotional person-place relationships with personally significant places in the city of residence (see Section 4.2.2).

**Middle Act: Developers activate GOD Access in the EAR-app, to be able to see the woman's hidden personal virtual monument and invade her privacy**

After some hesitation, the woman stops at a seemingly random spot in the street, and takes a moment of silence for herself, apparently looking at something on the pavement. The two developers who are spying on her from a distance, are curious to see what is there and suspect it might be the location of a personal virtual monument.

They start up the Emotion-Augmented Reality-app on their smartphone to be able to also see it, but there is nothing there. When the woman lays down the rose on the street, they are sure though that there must be something there. They suspect that she has hidden her personal virtual monument using the privacy settings so only she can see it. After some debate, the developers decide to enable the GOD Access mode of the app. This invades the woman's privacy, as it allows them to also see private, personal virtual monuments that have been hidden by the users using the privacy settings. The GOD Access reveals a purple personal virtual monument located on the pavement next to the entrance of a shop (Figure 5-36).



*Figure 5-36 - Middle Act: Developers activate God Access in the EAR-app, revealing the woman's personal virtual monument in the street.*

In this middle act the perceptual bridge is established by the rituals, behaviours, and interactions exhibited by the woman in black around the personal virtual monument. Her hesitance to go to the exact location and the laying of flowers suggest that there is a negative person-place relationship that developed from the negative experience-in-place of losing a loved one. It implies that the weird-looking purple personal virtual monument might be some short of personal shrine or memorial. However, the fact that she dressed up to go to the location today to lay flowers, indicates that this is a special occasion. It reflects the ritual of revisiting personally meaningful places on special occasions and the desire to highlight the personal place meaning by

personalising the place using a personal shrine (see Section 4.2.3 - Negative Experiences-in-Place). That the woman made the personal virtual monument only visible for herself, with at the same time the two developers being very interested in exploring her negative person-place relationship, reflects the trend in the Consuming-theme that there is a tension between willingness to share and interest in consuming negative emotional person-place relationship data (see Section 4.3.4 – Tension Between Willingness to Share and Interest In Consuming Negative Emotional Person-Place Relationship Data). The woman's unwillingness to make this monument publicly visible reflects the trend in the Sharing-theme that a motivation for not sharing is that the emotional person-place relationship is considered personal or private (see Section 4.3.3 – Motivations for Not Sharing). The script is based on the personal story of participant P1's negative emotional person-place relationship with a specific dock in a harbour where the body of his deceased girlfriend was discovered.

From the perspective of the two developers however, they are having a completely different emotional experience-in-place at the same location. David and Peter are two colleagues sharing an achievement experience-in-place outside their office after they realise that the woman is indeed using their technological EAR-service (Section 4.2.3 – Achievement). Their attempts to hide that they are spying on the woman to discover her personal, emotional relationship with the place, and the discussion whether to activate the GOD Access, illustrates their awareness of the potential sensitive personal and private nature of place-based emotion data (Section 4.3.4). However, their willingness to still activate the GOD Access illustrates the trend in the Consuming-theme, that there is an interest in extreme negative emotional person-place relationship data in the city of residence, in particular if the affective component contains sadness or anger (Section 4.3.4).

## Closing Act: GOD Access reveals many other hidden personal virtual monuments in the cityscape

The two developers wonder what the purple monument is and what it is for. As the woman walks away, they quickly look away to avoid detection. When doing so, they discover there are hidden personal virtual monuments everywhere in the city, including a pink heart hovering over a bridge and a two green crosses on the pavement

across the street (Figure 5-37). However, the woman in black now realises she has been spied on, and angrily slaps David who has been recording everything with his smartphone. This causes him to drop the phone, which stops the recording of the video and signals the end of the short film.
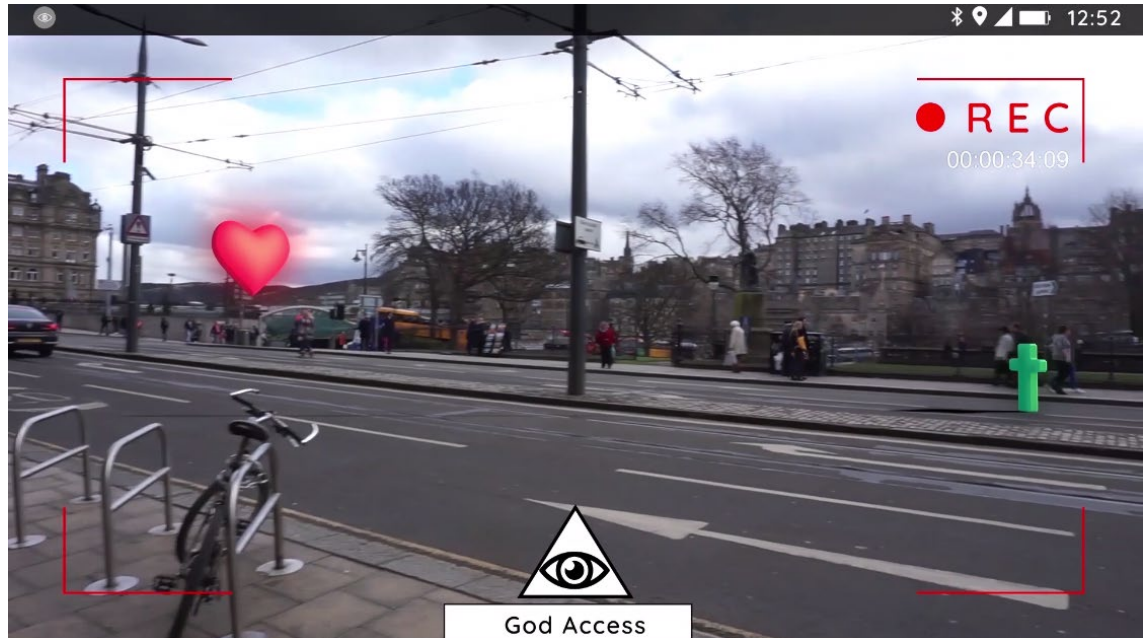


*Figure 5-37 - Closing Act: God Access reveals many other hidden personal virtual monuments located at mundane places spread across the city.*

The location of purple monument on the pavement next to the entrance of a shop, as well as the discovery of many hidden personal virtual monuments in the cityscape, illustrates the trend in the Places-theme that 78% of personally significant places are perceived by other to be mundane, everyday, (semi-)public places (Section 4.2.1). The personal virtual monument in the shape of a heart hovering over a bridge indicates a "spot for lovers" (P6, P8) and the green crosses indicating a popular "suicide spot" (P5, P7). These personal virtual monuments are informed by the interest in extreme emotional person-place relationships in the city of residence, in particular if they are characterised by emotions of sadness, love, or anger (SectionConsuming 4.3.4– Interest in extreme positive and negative emotional person-place relationships in the city of residence).

## 5.6   Concluding Remarks

In this chapter, the develop stage in the second diamond of the double diamond model for this research has been addressed. In this development stage, the focus was on diverging and exploring the design space. PACT-analysis, the SCAMPER-technique, and Tactics for Ambiguity were used as design techniques to create a suite of three speculative design fictions for a speculative design approach. This suite of speculative design fictions explores and speculates about a wide variety of future possibilities grounded in- and informed by the trends and themes in the data corpus outlined in sections 4.2 and 4.3. The first speculative design fiction takes the form of a short film named "Smellification". It articulates and communicates the main findings in the Representations-theme (see section 4.3.2) that there is a desire to represent emotional person-place relationships with non-visual representations, using the sensory experience of smell. It furthermore explores the Place-theme and the Sharing-theme regarding the sharing of emotional person-place relationships. It speculates about a possible future scenario of the hybrid city, where personal memories and personally meaningful experiences-in-place are recorded, consumed, and shared using speculative smellstick technology.

The second speculative design fiction takes the form of a comic named "Emotion-based Place Access". It articulates and communicates the main findings in the Emotion-theme that there is no one-to-one relationships between emotion and place (see Section 4.2.2), and in the Emotion Regulation-theme that residents use personally significant places in their city as a tool to self-regulate their emotional state (see Section 4.3.1). It speculates about a possible future scenario of the hybrid city, where a person is only allowed to enter a place or event if they are in the desired emotional state.

The third speculative design fiction takes the form of a short film named "Personal Virtual Monuments". It articulates and communicates the main finding that emotional person-place relationships and the experiences-in-place and related emotions from which they develop can also be negative (see Section 4.2.3), and the main finding from the Consuming-theme that for the city of residence there is an interest in extreme positive and negative emotional person-place relationships (see Section 4.3.4).

However, there is a tension between interest in and willingness to share negative emotional person-place relationships in the city of residence. It speculates about a possible future scenario of the hybrid city where a speculative technological service exists that allows people to create and place their own personal virtual monuments anywhere they like in the city.

# Chapter 6:  Focus Groups

In this chapter, the final stage of the double diamond model will be addressed (Figure 6-1). In this converging stage known as the deliver stage, the suite of speculative design fictions created in the previous chapter, will act as conversation pieces in a series of three focus groups with citizens of Edinburgh.
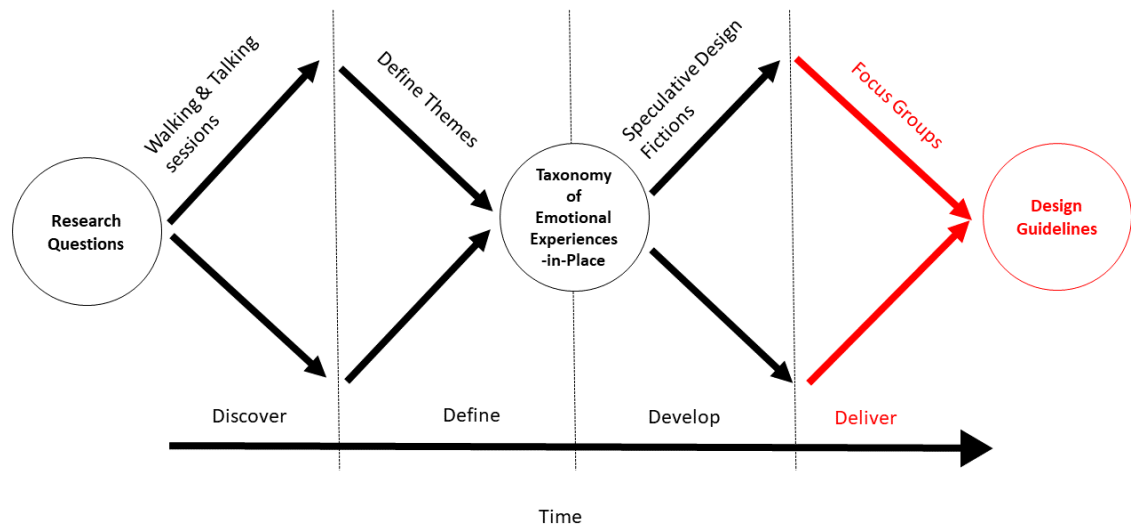


*Figure 6-1 - Double Diamond model - Delivery phase with Focus Groups*

These provocative conversation pieces will be used as a catalyst for discussion with current residents of Edinburgh. By speculating about possible future scenarios, these speculative design fictions also enable critical thought, reflection, and discussion on current practices and interactions in the context of emotional-person place relationships in the urban environment. This will contribute to a better understanding of the relationship between person, place, and technology in the urban environment, and inform a set of design guidelines for urban interaction designers aiming to design technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future to augment the urban lived experience (i.e., Research Question 4) (see section 6.3).

The rationale for using focus groups, is that these are often used for validation and refinement purposes of face-to-face interview data gathered in a grounded-theory approach (Creswell & Poth, 2018; Flick, 2014; Goodman et al., 2012). It is thus complementary to the one-on-one Walking & Talking sessions with the participant and

the researcher. ***Focus groups*** are structured, moderated group discussions (sometimes also referred to as "group interviews") that explore people's meanings, desires, motivations, priorities, values, memories, and personal, first-hand experiences of a complex phenomenon (Goodman et al., 2012). It is a tool to uncover what people think about a given topic, and especially how people think about it and why. It is an effective use of speculative design fictions, as focus groups take advantage of group dynamics and dialogue between people to create a better understanding, determine a range rather than generalise across a population, and provide insights about people's attitudes and perceptions about their own needs and values (Creswell & Poth, 2018; Flick, 2014; Goodman et al., 2012).

## 6.1 Operationalization of methods

Goodman et al.'s (2012) guidelines for conducting focus groups are followed. A series of three focus groups with 5-6 participants will be conducted. This ensures that the speculative design fictions can be presented in different orders to minimise order bias, and that every participant will have the opportunity to express their opinion during the focus group. The duration of each focus group will not exceed the recommended duration of two hours (Goodman et al., 2012).

Participant recruitment

The inclusion criteria for participant recruitment are that participants are current residents of Edinburgh and have been for at least two years, are at least 18 years of age, and have a good command of the English language. Before starting the recruitment of participants, ethical approval for the study is obtained. Appropriate ethical approval forms, participant information sheets and consent forms (including a privacy notice) are developed in keeping with Edinburgh Napier University guidelines (see Appendix G, H, I). Participants were recruited by distributing physical and digital recruitment leaflets across the university campuses and using the researcher's professional Twitter account. Each participant was rewarded with a £5 Amazon gift voucher regardless of their level of participation.

The Sensorium User Experience Lab at Edinburgh Napier University was chosen as the location to conduct the focus group. It is designed as a living room with a couch, table

and comfortable chairs around a screen on which the speculative design fictions can be shown (Figure 6-2).



*Figure 6-2 - Sensorium User Experience Lab.*

Drinks and snacks are also provided to help participants feel welcome and comfortable (Goodman et al., 2012) Two GoPro cameras and one omnidirectional microphone were unobtrusively placed in the room to recording video and audio.

<u>Discussion Guide, Procedures, and Pilot Study</u>

In a focus group, the participants are the experts but the moderator (in this case the researcher) is in control (Goodman et al., 2012). A discussion guide was created as a script for the moderator to follow, providing a consistent framework and timed schedule for each of the group discussions (see Appendix J). Following guidelines by Goodman et al. (2012), the discussion guide was divided into three sections: the introduction or warm-up phase, the main discussion (i.e., of each of the three speculative design fictions), and the conclusion or wrap-up phase. During the main discussion, for each speculative design fictions the speculation in the form of the "What if"-question was presented first. This was followed by a slide setting the scene to contextualise the opening act, and then the showcasing of the film or comic. Prior to the group discussion, each participant was asked to first indicate individually which emotions (if any) the short film or comic evoked using the Plutchik Emotion Wheel, and to write down one thing they liked and one thing they did not like about the speculative future scenario. These were subsequently discussed with the group.

Prior to conducting the focus groups, the suite of speculative design fictions was showcased at several conferences. These showings acted as pilot studies to test the suite of speculative design fictions, (parts of) the discussion guide, and to resolve any practical issues (e.g., need to include subtitles for the short films).

<u>Data Analysis</u>

Thematic analysis (Goodman et al., 2012) was used to analyse the data from the focus groups. In thematic analysis, the focus is on identifying themes (i.e., patterns of meaning) in qualitative data. These patterns are identified through a process of data familiarisation, data coding to track and categorise responses, theme development, and revision or reviewing of the themes (Braun & Clarke, 2006; Clarke & Braun, 2019; Goodman et al., 2012; Mortensen, 2020).

Analysis of the focus groups began with the researcher watching the video recordings of the focus groups and taking notes to gain an overview. Subsequently, the recordings of the focus groups are transcribed by the researcher using FTW transcription software (Tyger Valley Systems, 2017). The coding of the transcripts was done by the researcher using qualitative data analysis software NVivo (QRInternational, 2017).These codes were grouped, categorised and organised into initial identifiable trends and themes. Analysis was first done per focus group, then per speculative design fiction across different focus groups. Finally, overarching themes across different focus groups and speculative design fictions were identified.

In the next section, the themes and trends that emerged from analysis of the focus groups will be discussed.

## 6.2   Results

The three focus groups with in total 16 participants (i.e., one focus group with six participants, and two focus groups with five participants each) who are all residents of Edinburgh, were conducted over a three-week period in July and August 2019 in Edinburgh, United Kingdom.

Participant demographics

An overview of the demographics of the 16 participants in the focus groups can be found in Table 6-1 below. Participant responses have been anonymised, but the participant IDs are a combination of the number of the focus group and the participant's number within that focus group (e.g. P1.2 refers to the participant in focus group 1 with participant number 2). Of these sixteen participants, eight are male, seven are female and one participant identifies as non-binary. The participants are spread over different age ranges, with the youngest participant being 24 years old and the oldest participant being 57 years old, with an average age of 35.1 years old. Six participants are in their twenties, five are in their thirties, four are in their forties, and one participant is in their fifties. Nine of the participants are British with one participant having a dual nationality. Seven participants are foreigners (four are from other countries in the European Union, one is from South America, one from North

America, and one is from Africa). Their length of residence in Edinburgh varies from 2 years to 31 years, with an average length of residence of 12.7 years.

| FG | Participant (FG.ID) | Sex | Age | Area of residence | Length of residence |
|---|---|---|---|---|---|
| 1 | P1.1 | M | 44 | Leith | 4 years |
| 1 | P1.2 | M | 34 | Morningside | 2 years |
| 1 | P1.3 | F | 25 | Polwarth | 8 years |
| 1 | P1.4 | M | 24 | Morningside | 24 years |
| 1 | P1.5 | F | 49 | Bellevue | 31 years |
| 1 | P1.6 | M | 49 | Polwarth | 5 years |
| 2 | P2.1 | F | 24 | Meadowbank | 13 years |
| 2 | P2.2 | M | 26 | Slateford | 3 years |
| 2 | P2.3 | F | 32 | Slateford | 9 years |
| 2 | P2.4 | F | 45 | Morningside | 25 years |
| 2 | P2.5 | Non-binary | 29 | Leith | 21 years |
| 3 | P3.1 | M | 26 | Marchmont | 3 years |
| 3 | P3.2 | M | 32 | Sighthill | 2 years |
| 3 | P3.3 | F | 31 | Oxgangs | 31 years |
| 3 | P3.4 | M | 34 | Restalrig | 4 years |
| 3 | P3.5 | F | 57 | Fairmilehead | 18 years |

*Table 6-1 – Demographics of participant in focus groups*

### 6.2.1   Responses to Speculative Design Fiction #1 "Smellficiation"

The short film "Smellification" speculates about a possible future scenario of a hybrid city of the near future, where there will be technology that allows experiences and memories to be recorded as smells. The short film depicts different types of people using speculative smellstick technology in the context of different types of emotional experiences-in-place to augment the urban lived experience (see section 5.3).

**Smells as Representations of Different Types of Emotional Experiences-in-Place**

The different smells related to personally meaningful places in the short film acted as a catalyst for participants to discuss smells related to their own personally meaningful places. Across all three focus groups, participants could easily and immediately come up with other smells that are typical of their current city of residence, Edinburgh, that

are specific to other personally meaningful places such as their own country of origin, or that evoke specific personal memories and emotions of different times and people in their life.

<u>Smells for an emotional experience-in-place of belonging.</u>

In the speculative design fiction, the smell of gunpowder in the shopping street after the firing of the canon, led to a discussion of other smells that participants link to Edinburgh as a city. Participants across all three focus groups identified the smell of the local brewery and the smell of the local biscuits factory as typical smells of Edinburgh. These smells evoke and augment an emotional experience-in-place of belonging:

> *P2.2: Yeah, the brewery!*
>
> *P2.3: Yeah, very typical, but I haven't associated with like good or bad. Just reminds you like, every time I go back to [home country] for a week or a couple of weeks. I come back here, and I feel that smells right. It was like, here I am. Back home.*
>
> *P2.2: Yeah, it is for me too. Now it feels like I mean, I've been here for three years. So this is home now for me. So when I come back, it's like yeah, here I am again. Yeah, every time I go back here, I have this obsession with that smell.*
>
> **Focus Group #2 on the smells coming from the local brewery signifying home**

Other participants immediately recognise these Edinburgh-smells and the emotional experience-in-place of belonging they evoke. It indicates that smells could indeed be used to communicate and share this emotional experience-in-place with other residents.

Across the different focus groups, participants also discuss other smells that represent a personally meaningful place, such as participant's home country. These smells also evoke an emotional experience-in-place of belonging. These include the smell of wet English grass, the smell of a Greek beach, the smell of grass linked to a place in Jordan frequently visited by a woman and her family while living there, and the smell of a Mediterranean summer night:

*P3.5: I remember when I was living in Los Angeles, I was invited to come over to a friend's house. I had already been living there for several years. And in LA, there is no grass anywhere because it is so dry. But they were living in this nice house in one of the suburbs, and they had some grass, like a lawn in front of the house. And when I arrived, the sprinkler system was on to water the grass. And I got of the car and immediately got that smell of wet grass…It immediately reminded me of summers in [home country]! I hadn't smelled that smell in years! It was so nice!*

**Focus Group #3 on the smell of wet grass evoking an emotional experience-in-place of belonging while living abroad.**

Smells for emotional experience-in-place of reminiscing

Other types of smells discussed by participants are smells linked to a specific moment in time, highlighting the temporal nature of some urban smells (Quercia, Aiello, Mclean, et al., 2015). These smells can be linked to a season or one's childhood, triggering personal memories and an emotional experience-in-place of reminiscing. Some participants in focus group 3 for example recall how the smell of gingerbread coming from the local biscuits factory reminds them of Christmas time.

Other smells are reminiscent of one's childhood and bring back fond childhood memories and highlight the temporal factor of smell. Three participants across different focus groups (P1.6, P2.1, P2.5) mention the smell of hot tarmac in the summer in this respect, like the participant below (P2.1) who reminded it of her childhood in her foreign home country, evoking a sense of feeling safe and belonging:

*P2.5: The smell of hot wet tarmac that always stands out to me when it's a hot day. And it's been raining.*

*P2.1: I love that smell! It just brings back fond memories of my childhood. It makes me feel happy. It's just…I don't know what I really associated with. It's just what was it just simpler days I suppose when, your child and you don't have all those adult worries. It's just one of those smells associated with being a child.*

**Focus Group #2 on the smell of hot tarmac reminiscent of their childhood**

<u>Smells of other people for an emotional experience-in-place of bonding</u>

During the focus group discussions, participants also mentioned smells related to other people, enabling an emotional experience-in-place of bonding by feeling close to a loved one who is not physically nearby. For example their grandmother (P1.5, P2.1), mother (P2.1), or romantic partner (P1.4):

> P2.1: *"I would use it [capturing smells] for places, but also for persons. I remember when I was a child, I used to…whenever my mom would come back from work, she would take of her scarf, and I would smell it. Because it had her smell in it. And like my granny, all her clothes, I really love to smell them. So those are other smells that came to my mind."*
>
> **Focus Group #2 on the smells related to other people**

That smells can evoke strong memories and emotions was illustrated by the participant's reaction while telling this personal story. Simply talking about the smell already made her feel as if she can actually smell it, which evoked tears of joy.

This validated and refined the use of smells as a representation for different types of emotional experience-in-place, in particular for Reminiscing, Belonging, and Bonding. It can have a direct impact on the emotional state and informed the design guideline of designing for emotional experiences-in-place.

**<u>Design Implications and Social Implications of speculative smell technology</u>**

In the short film "Smellification", different types of people were depicted using different devices of the speculative smell technology in the hybrid city of the near future. This acted as a catalyst to discuss potential interactions with the speculative smell technology, how it can be used for different purposes, and to speculate what the design implications and the social implications of this speculative smell technology might be.

<u>Personal use of smell from personally meaningful places for self-regulation of emotions</u>

Across the three focus groups, participants identified most with the character of the local female student with the interactive nose piercing, who preferred the smell of the

daffodils in the park over the smell of the beach in Greece from the disposable smellstick. Participants speculated that they would also use speculative smell technology to capture smells for self-regulation of emotions, by recording pleasant urban smells, and consume those smells to enhance their emotional state when needed.

> *P2.5: For me it has to be the girl, just kind of capture a moment where you're there with the kind of the tap on it and then recalling that to help you through other things or to benefit from those emotions.*

> *P2.1: For me the same with the girl, let's just use it for the daffodil. Maybe she gets a bit sad and winter, slipping out to recall the smells of spring helps her through the month until spring comes again. So just like a natural antidepressant in a way.*

> **Focus Group #2 on using smells to self-regulate emotions.**

The use of smells from places that are personally significant to help self-regulate emotions is recognised by participants, with several participants who live or used to live close to the sea commenting on the positive effect the smell of the sea has on their emotional state (P1,1, P2.3, P3.2, P3.5).

Participants' mental models of the speculative smell technology support this, with several participants comparing the use of the speculative smell technology, and in particular the disposable smell sticks holding only one specific smell, to the use of a comfort blanket used to help babies and young children feel comfortable and secure (P2.1, P3.3, P3.5):

> *P3.5: I'm just thinking about is that way, that when you're somewhere new and it's nice to have something that connects you with where you feel secure. Smelling it takes you back to that place.*

> *P3.3: Like your comfort blanket.*

> *P3.5: Yeah, exactly!*

> **Focus Group #3 mental model of smell technology is comfort blanket.**

Initially the use of speculative smellstick technology seemed like something out of a science fiction movie. However, as the group discussion progressed, participants realised that it is related to current practices and interactions, and that they are already actively and intentionally use smells to self-regulate their emotions:

> *P3.5 I actually make my own essential oils from the roses in my garden. I always carry a small bottle with me and use it at the airport to calm me down. Because airports are places that make me really anxious. So I am actually already using essential oils for that.*

> **Focus group #3 realising they already use smells to self-regulate emotions in places that trigger anxiety.**

Design Implications: Interactive nose piercing is preferred for recording and consuming smells for self-regulation of emotions, interactive smellstick device is preferred for personal reminiscing.

Replacing all smartphones and visual representations of emotional person-place relationships in the speculative design fiction with speculative smellstick technology that uses smells as a representation, provoked participants to think about how smells might be captured, consumed and shared using technology in the future, and reflect on the current use of technology to this end. Across all focus groups there was a clear preference for the interactive nose piercing for capturing and consuming smells for self-regulation of emotions. Participants liked that it is an unobtrusive device, which unlike the disposable smellsticks, is not reminiscent of drug use. It is also intuitive to operate, by simply tapping it to start recording or consuming smells. This was compared to the use of a smartphone to take selfies during memorable experiences, which is considered to be disruptive and breaks the flow of the experience:

> *P2.5: Yeah, and if it's like, you're in a memorable situation, like capturing a selfie or wherever seems really uncomfortable. At the best of times it is just like breaking from the mood of a situation to be in like, here's my smell capture doesn't seem natural. But the like "nose touch" one, those more subtle and more integrated. It seemed better, I thought.*

> ### Focus Group #2 on their preference for the interactive nose piercing for recording and consuming smells, as it is subtle and intuitive to use.

An additional benefit of the interactive nose piercing (or "nose implant" as Focus Group 1 referred to it) is that you have the smells readily available and always carry them with you, which is considered to be particularly important when it is used for self-regulation of emotions or when the smell is reminiscent of a special person in their life:

> *P2.1: Especially like my grandmother's smell. If I could take that smell with me, I would feel safe everywhere. So if you create that device, let me know!*

> ### Focus Group #2 on the importance of having smells for emotion regulation readily available.

If smells are used in that context, a design implication would be that a wearable device is preferred. However, when it comes to the use of smells for reminiscing about an experience-in-place, the interactive smellsticks used by the tourist family are preferred by some participants. Like the interactive nose piercing, they have the capability to record and reproduce multiple smells, but participants also perceive the device to be a safe container in which smells can be safely stored and preserved for later use:

> *P1.3: "I think the first one would be the one they held up, because then when I come back from a holiday, I put in a box of all my photos. And then it's not… I mean, when I want to relive that moment like I do it my photos. It's there to remember, it's not on tap. Funny, I keep saying that hahaha. But I guess I like keeping that nostalgia, but maybe that's just my personality versus other people's personalities. [..] Like I say like, you know, I've got my box of photos. So that's not something I go into every day. But it's like one like, I don't know, I can't put a time on it? It's something I would associate with how I approach photos is what I'm trying to say. So I don't know. Just something that I'm happy to stumble across, have a flick through and then have the smells to go with the photos maybe?"*

> ### Focus Group #1 on preferring the speculative interactive smellstick device used by tourists for reminiscing.

This participant compares the use of and interaction with smells from personally significant places and experiences-in-place to safekeeping physical photos in a memory box and suggests a similar interaction with smells for personal reminiscing. The smells for reminiscing do not need to be readily available and are preferably only occasionally be encountered, similar to a person only occasionally going through a photo album or memory box from time to time.

A design implication for this speculative smell technology, based on smells from personally meaningful places being used and interacted with in different ways, is that smells for self-regulation of emotions should be portable and available at all times. Smells for personal reminiscing however should only occasionally be used or encountered to be most effective. Participants anticipate that repeated use of smells for reminiscing might weaken its effectiveness to recall those personal memories and emotions related to personally significant places:

> *P2.3: I mean the thing about smell is the unexpected. That you don't expect this smell and then you get the scent and you feel "Ahhh!" If you keep having it, it will be like I don't know, it might lose its power. The memories would fade that are associated with it.*

> **Focus Group #2 expressing concern that smells would lose their power to augment an emotional experience-in-place of reminiscing if they are used too much.**

Design Implication: Smell is for personal use, and of limited efficacy for sharing

From the group discussions, it became apparent that participants view the use of smells from personally significant places for self-regulation of emotions and reminiscing as something that is mainly for personal use. This is also evidenced by the participants' mental models of this speculative technology, comparing it to using a comfort blanket or the use of headphones to create a personalised experience bubble in a public place, like the woman in the short film while walking her dog.

In particular the use of the disposable smellstick containing the smell of the Greek beach in the short film, evoked discussion in each of the focus groups around the social practice of sharing smells of personally meaningful places with other people. Some

participants did not see the point of sharing smells from personally significant places with others, claiming it would not provide the same emotional experience across different people, or have the same effect for people who do not have a personal link with that place:

> *P1.6: And the idea of sharing doesn't really appeal to me.*
>
> *P1.1: Yeah, I know, I thought that was weird too.*
>
> *P1.3: Yeah, me too*
>
> *P1.6: Smell is really subjective and yeah, you know, I don't only mean sticking it up your nose from a hygiene point of view. Different smells, unlock different associations from different people. So it's really subjective. So one thing wouldn't have the same effect for someone else.*
>
> **Focus group #1 discussing the sharing of emotional person-place relationships using smells.**

Some participants compare the sharing of smells as a representation of emotional person-place relationships to the sharing of holiday photos or sharing of foreign food in person. Other participants felt that smell as a sense is too sensitive and too invasive in comparison:

> *P1.6: I can see how you might compare it to tasting food from a different country and I might even try that, but I don't want to smell it. I don't care how nice you say it is, I do NOT want to smell it! Because it might be a nice smell to you, but it might not smell nice to me!*
>
> **Focus group #1 on smell being perceived by some participants as too personal, sensitive, and invasive for sharing representations of emotional person-place relationships.**

A smell perceived as pleasant by some, might be perceived as unpleasant by others due to personal or cultural preferences and differences. Participants across the three focus groups agree that smells are not suitable for sharing emotional person-place relationships, and that it would affect people differently depending on a person's personal associations with the smell or place:

> *P2.4: I don't see the benefit of...for me smelling a beach in Greece I haven't been to. That would be of no benefit at all for me.*

> **Focus group 2 discussing the different effect sharing smells from personally significant places might have on different people.**

The effects of the smell are thus anticipated to be different depending on the emotional person-place relationship it is associated with. Some participants compare it to sharing a cigarette or sharing alcohol. It affects everyone, but it does affect everyone differently.

Repeated Interactions and Negative Side Effects

The closing act of the short film shows the homeless smell addict trying to escape the harsh reality of life on the streets by using a disposable smellstick to relive Christmas 1987. This successfully provoked participants in the focus groups to also consider potentially negative implications capturing, sharing, and consuming emotional person-place relationships, in particular in regard to repeated interactions with personally meaningful places and smells as representations.

*Addiction to Nostalgia*

Because of the strong and instant effect of smell on memory and emotions, the danger of getting addicted to personally significant memories of emotional experiences-in-place and disconnecting from place in an experience-in-place of escaping rather than using smells to ground oneself in the present, seems realistic to participants:

> *P1.1: I think I think nostalgia is extremely addictive. A lot of people tend to fall into that trap. You see that in music, for example, people who listen to the same track over 100 years they keep listening to, and it gives them the same feeling.*

> *P1.6: Yeah, I agree, we're living in the past too much as well. Specifically, the girl taking her dog out and stuff. She didn't want to live in the present, by using this implant so that she didn't have to have an experience of the "now", which is horrible.*

> **Focus group 1 discussing the danger of "addiction to nostalgia"**

It also led to a discussion of how people currently revisit personally significant places hoping in vain to get exactly the same, intense emotional experience-in-place from which their initial bond with the place has developed:

> *P1.3: It's like, when we try and go to the same place on holiday again, it'll never be exactly the same as the first time. It's almost a disappointment in nearly every instance.*

> **Focus Group #1 discussing the danger of revisiting personally significant places hoping to have the same, intense, initial, emotional experience-in-place**

This addiction to nostalgia and perceived danger of getting stuck in the past was raised across all three focus groups. There was a fear that this misuse of smells from personally significant places or experiences-in-place could specifically impact people's mental health, as it could make it difficult to overcome or let go of past emotional experiences-in-place, or hinder the engagement in new, positive experiences-in-place. This informs a design implication, that when designing for repeated interactions with personally meaningful places or representations thereof, potentially negative side effects regarding mental wellbeing should be considered.

<u>Unauthentic smells can be misused to influence consumer behaviour</u>

It also led to a discussion in which concerns are raised regarding the authenticity of the smells to represent personally meaningful places or emotional experiences-in-place in the first place. In the various focus groups were several participants who have been to the specific beach in Thessaloniki in Greece depicted by one of the disposable smellsticks in the short film. They reported that in their personal experience, the smell of the beach in Thessaloniki is actually not pleasant at all:

> *P3.2: To be honest with you, that beach in Greece smelled horrible! I swear to God! When I was at the beach in Thessaloniki, it smells like one trillion of ships have leaked liquids there. It's very bad smell. [..] It's like, industrial liquids. I don't know what it is exactly. It smells like poison.*

> **Focus group 3 discussing the authenticity of the smell of the beach in the Greek city of Thessaloniki as depicted in the short film.**

This raised awareness and resulted in reflection regarding current and potential future misuse of place-related smells, in order to manipulate consumer behaviours, by for example producing and promoting pleasant smells of places in cities and countries to attract tourists to come and visit.

### 6.2.2 Responses to Speculative Design Fiction #2 "Emotion-based Place Access"

The comic "Emotion-based Place Access" speculates about a possible future scenario where people are only allowed to enter a place or event in the hybrid city of the near future, if they are in the desired melancholic emotional state. The dystopian scenario in the comic depicts a group of emo friends during a night out who visit a cemetery and former flat of Stefani to get her back into the desired emotional state after having been removed from a concert (see section 5.4).

**Place-based self-regulation of emotions**

Provoked by the narrative in the comic where emo character Stefani first goes to the cemetery with her friends and then to her former flat which is personally significant to her, enabling her to evoke the desired feeling of melancholy, participants could also easily recall so-called "happy places" that evoke positive emotions in them personally, like their favourite pub, a bench in the park, or a pond. These happy places are personally significant to participants, and they use them for the self-regulation of emotions. This validated and refined the finding that people use their emotional bond with personally meaningful places in the city of residence as a tool to self-regulate emotions (section 4.3.1). The discussions in the focus groups revealed that places that have developed a personal meaning from a shared experience-in-place of socialising and bonding, in particular pubs and bars, can also be used for self-regulation of emotions:

> *P2.2: I have a couple pubs I started playing with other musicians when I arrived in Edinburgh. That's how I just "destress" myself. I've been playing for so long in these places that I basically know all the bar staff. I know all the musicians and all the punters. So it's like, I'm really extended family. And then just go there and socialize with people and I know they really like the same stuff.*

### Focus Group #2 on participating in jam sessions in pubs with other musicians, bar staff, and punters for emotion regulation.

It refines the finding that using a personally meaningful place for the self-regulation of emotions is typically an individual emotional experience-in-place. People also use personally meaningful places where they can have a shared socialising experience-in-place with people that a person has a close social relationship with or has a shared interest with to regulate their emotional state. This finding is supported by quantitative studies of place attachment which found that going to a personally meaningful place alone or with a close friends or family does not improve the emotional experience of the place or the restorative effect of the place, but does change the place preference from a natural place to a third place (e.g. pub or bar) (Staats & Hartig, 2004; Staats, Jahncke, Herzog, & Hartig, 2016).

### Complexity of emotional person-place relationships in the urban environment

The oversimplified portrayal of emotional person-place relationships with personally significant places also provoked discussion. Participants across all three focus groups argued that assuming a one-to-one relationship between person and place was unrealistic for several reasons. Firstly, they argued that it is impossible to sustain one and the same emotion and at the same intensity throughout an event. Secondly, places can also evoke different feelings in different people, indicating that even if the feelings are evoked by the place dimension as depicted in the comic, this does not necessarily mean the emotional response is generalizable across different people. For example, some participants have a negative emotional experience-in-place in a cemetery characterised by strong negative emotions, while for others it is a pleasant aesthetic experience-in-place which evokes positive emotions:

> *P2.2: Basically, you cannot simply just attach places with feelings because every person has different emotions to different places for a different number of reasons. And it's a really personal thing.*

> *P2.4: There was very much a presumption that taking everyone to the cemetery, you would all have the same feeling. You know, personally, I quite like cemeteries. I live near one. I like to walk through them. I like to read the*

*gravestones. I don't find it a place that makes me miserable. It can for other people but there's never presume that people's emotions are going to be like the same thing. I think, I love cemeteries. Love them!*

*P2.2: Maybe one cemetery makes you sad, because people you love are buried there. But other one makes you happy. Because to do that*

*P2.4: There is so much history and yeah, and some of them are just beautiful and calm.*

*P2.1: And especially the old gravestones. Yeah, they are beautiful. And then you take one wrong turn and you're in a bit that's dedicated to young children. Yeah, completely different emotions.*

***Focus group #2 discussing the oversimplification of having a generalizable one-to-one relationship between emotion and place, using cemeteries as an example.***

Thirdly, emotional person-place relationships with personally meaningful places are not stable, but even for one single person can evolve over time due to having multiple emotional experiences-in-place, resulting in a mixture of emotions in the affective component of the emotional person-place relationship:

*P3.3: Again, it's my local [pub]. And but somebody in my local died right there in the middle of the pub, they had a heart attack. So when you're sitting there, and you know exactly where they were sitting. You sort of like you can't help but have that... moment. So I, anyway. So my pub is like, really good thing. That is also it has like, sadness to it as well.*

***Focus group #3 discussing the complex, evolving emotional person-place relationship of a participant with her local pub***

It successfully communicates, validates, and refines the main finding in the Emotions-theme that there is no one-to-one relationship between emotion and place. It informs the design guideline to design for emotional experiences-in-place rather than for place or emotions and to design for continued interaction.

<u>**Design Implications**</u>

The group discussions focussed on the private nature of emotional person-place relationship data, and the perceived lack of control over the speculative technology, gathered speculative emotion data, and the sharing and use of that data with third parties. Participants across the three focus groups struggle to imagine places or events that might adopt such an "emotion-based access policy". The emotion bracelet however is considered to be a useful tool to monitor their own mental health and wellbeing over a longer period of time. It can monitor progress and alert the wearer to take action to improve their emotional and mental wellbeing (P2.1, P2.2, P2.5):

> *P2.2: If it was like, let's say a smartwatch or something and you have an app on there saying you've been feeling sad 70% of the time this week. Then it can make you think, oh, maybe I should do something to change that, you know, that will be helpful.*
>
> ***Focus Group #2 discussing alternative use of speculative emotion bracelet for monitoring emotional or mental wellbeing***

This is in line with the trend in the data corpus from the Walking & Talking sessions indicating the current use of technology in the urban environment to track activity and monitor wellbeing (see section 4.3). The use of the speculative emotion bracelet technology to this end is also reflected in the mental models used by participants to understand and talk about this speculative technology, comparing the emotion bracelets to mood rings (i.e., pieces of jewellery popular among teenage girls, which claim to change colour based on the wearer's mood) and the current use of activity trackers and smartwatches to monitor wellbeing.

Design implication: Design for emotional experience-in-place rather than emotions

With participants in the focus groups now being aware of the complexity of emotional person-place relationships, this led to a discussion regarding the perceived accuracy of the speculative emotion bracelets. Participants perceived the emotion bracelets to be unrealistically precise in determining place-based emotions, which paradoxically had resulted in simplified emotion-based access policies. Participants commented on the difficulty of grounding the emotion as well as the sensitivity in picking up even short

switches between emotions. Therefore, in order to be useful, a design implication is that the speculative emotion bracelets should reflect a prolonged emotional state related to the place or their mental wellbeing, rather than reflecting brief, real-time changes in experienced emotions:

> *P3.1: I can feel I can go to a theatre that is melancholic, but there can be a moment of humour and I can feel in a sense happy. So why should I go away? I mean, the overall spectrum of my feelings should be melancholic and not that a momentarily change would get me kicked out. That would be nice.*
>
> **Focus group #3 on how less sensitive measurement and displaying of emotions could lead to a better representation of the overall emotional experience at the theatre.**

The reflection of the overall emotional experience-in-place, rather than individual emotions and short changes in emotions, is deemed more useful both in monitoring mental wellbeing as well as producing a better "emotion-based access policy" in the fictional world scenario portrayed in the speculative design fiction. It is also expected to lead to a more realistic and useful mapping of the different emotions related to urban places in general. It further informs the design guideline of designing for emotional experience-in-place rather than individual emotions.

<u>Design implications: Emotion data is non-trivial and private</u>

The perceptual bridge between smartwatches and activity trackers and the speculative emotion bracelets, enabled reflection on the current practice of using quantified-self data for monitoring one's personal physical health. This raised discussions in the various focus groups regarding privacy and the potentially personal and private nature of emotion data. All participants in the focus groups consider the place-based emotion data to be private, which is in line with findings in the Sharing-theme (see section 4.3.3 - Motivations for Not Sharing) and the Consuming-theme (see section 4.3.4) from the Walking & Talking sessions. In comparison however, participants in the focus groups consider quantified-self data currently tracked by activity trackers and smartwatches,

such as heart rate, GPS location, number of steps, and number of calories, to be personal but trivial:

> *P3.1: I think, that seeing how many steps you do, how many calories you lost and stuff like that is very trivial. Very different and insignificant information compared to what your emotional state is. I think in a way, your emotional state can be used to inform your decisions in a much better way that the other data cannot.*

> **Focus Group #3 discussing and comparing the private and personal nature of speculative emotion data with current quantified-self data.**

They acknowledge that current quantified-self data is specific to them as an individual. However, they do consider it to be less insightful and therefore less relevant and useful for themselves and others in comparison to place-based emotion data.


Design for privacy and personal control

Comparing these different types of quantified-self data also reveals the value of being in control of the technology and the personal, private data it collects, in particular when it comes to sharing this data with others. Provoked by the current design of the speculative emotion bracelets, participants advocate for a design of the emotion bracelet that does not publicly broadcast their emotional state for everyone to see.

> *P2.4: You can't see that I haven't walked 10,000 steps today, while an emotion bracelet will tell you…everything. Just keep it hidden. It is nobody's business*

> *P2.3 But with activity trackers, you can connect with your friends and see how much activities they are doing.*

> *P2.4: That's a choice, you can make that choice to do that. Or you can choose to keep it to yourself, you don't have to share, nobody needs to know.*

Following this discussion, a redesign of the emotion bracelet based on a normal smartwatch is suggested by the focus group, where the emotional state can discretely be displayed on the screen. In that way it can be used for personal use and is only visible or shared the people if the user decides to share this data with others. Putting

the user in control of sharing the emotion data would also make the speculative emotion bracelet device suitable for use in places where more (emotional) discretion is required, such as the workplace and other professional settings and environments (P1.3, P3.2, P3.5). This informs the design guideline to design for privacy and personal control

All focus groups agree that this speculative design fiction depicts a dystopian future scenario, comparing it to the famous George Orwell novel "1984" (P3.5) and an episode of the popular Netflix series Black Mirror (P1.1). Participants are provoked by the top-down enforcement of having to use this speculative emotion bracelet technology and having to share the emotion data to be able to enter a place. This raises concerns regarding privacy and control:

> *P1.5: But you get them you get the emotion rings you know? You get the jewellery that's supposed to show your emotions, but it's showing your temperature really.*

> *P1.6: Yeah, but you can take them off. But I wouldn't want a totalitarian "everyone has to wear one" kind of scenario hehehe.*

> *P1.4: It could work in certain scenarios, and I might use it for like, personal use to track my own wellbeing. But not if it was like, government mandated.*

> *P1.1: Yeah, I wouldn't wear one, even if it was mandatory.*

> **Focus Group #1 discussing being against emotion technology and related data-sharing being imposed in a top-down fashion.**

Interestingly, participants across the three focus groups spontaneously come up with strategies to cheat, disrupt, influence, and circumvent the speculative emotion technology monitoring their emotional state, and the emotion access policy. Focus group 3 thinks of influencing the emotion bracelets to depict the desired emotion in the same way they tried to get the mood rings to reflect the correct or desirable emotional state in the past, by sticking their arm with the emotion bracelet in the fridge or freezer (P3.3, P3.5).

In focus group 2, participants discussed a different option in an attempt to take back control, by secretly exchanging emotion bracelets with other people or by trying to influence what the emotion bracelet displays by going dancing on the dancefloor, thus influencing behaviour. The first focus group considers more drastic measures, contemplating the use of drugs to bring their body and mind into the desired emotional state and cheat the system in that way:

> *P1.6: You could use the drugs on yourself to cheat the system. Get high or drunk or whatever so that it shows that you are in the right emotional state.*

> ***Focus Group #1 discussing the use of drugs and alcohol to trick the technology***

These examples illustrate the extent that people consider going to, to get control over the technology and the place- or event-based emotion data, further informing the design guideline to design for privacy and personal control over both the speculative technology and the data being gathered and shared.

.
Design implication: Sharing can undermine social conventions

If the emotion data is shared with other people, participants envision this to potentially have serious social implications and impact on existing social relationships. Participants across the three focus groups felt that the public display of the wearer's place- or event-based emotional state or the sharing of the place-based emotion data would undermine existing social conventions and social etiquette. Several participants compared the emotion bracelet to a lie detector, making it impossible to lie or hide one's personal feelings. This could result in harming their personal reputation or hurting the other person's feelings in a social situation. Participants feared that his would result in increased social pressure of having to keep up appearances, leading to people becoming and behaving less sincere:

> *P3.2: It would lead to extremely high fake societies because you cannot be in a flat emotional state all the time. It is impossible. [..]*

> *P3.3: I thought it was a bit morbid that her friends only became happy when they realised that she was being unhappy again. They were putting a lot of pressure on her, like, you have to be unhappy, you have to be unhappy!*

> *P3.5: Yeah, while there was no issue with her being happy. I think they are nasty people. Yeah, she needs a new group of friends!*

> **Focus group #3 on how sharing emotion data can create judgment and social pressure to keep up appearances**

The same holds for sharing this type of data afterwards on social media like Strava as is currently being done with physical data gathered by activity trackers and smart watches:

> *P1.4: It's not just like that the emotion bracelet is visible for everyone. Say that was not the case, that you can't see from the device what I am feeling. Now for example, say that I tell you that I am enjoying this workshop. And then at the end of the day I go home and share my data online like we do with our heart beats after running in the park. And then for whatever reason you go to my profile and check how I was actually feeling in this room during the workshop, and you see that although I said I was enjoying it, it shows that I was actually really bored. That's not the case, but it could be the case you know. But I wanted to be polite and say that I enjoyed it. But then you would know now that I hadn't been honest with you. So that makes me look bad while I was just trying to be polite, and you would like, maybe be hurt or be angry with me.*

> **Focus Group #1 on the social implications of sharing place-based emotion-data**

Participants thus anticipate the undermining of social conventions and social etiquette, and the negative implications on social relationships if place- or event-based emotion data is shared in the same way as other quantified-self data, or is interpreted incorrectly.

Design Implication: Effects of continued interaction on emotional wellbeing and emotional person-place relationships

What the examples above illustrate as well, is that speculative emotion technology can also drive and influence behaviour in a similar way that current quantified-self technologies and the data they collect already do. Participants comment on the fact that although the technology in the speculative design fiction only appears to monitor

a person's emotional state, it also has the ability to negatively influence and drive people's behaviour. They comment on how the technology encourages the potentially dangerous behaviour of Stefani returning to the flat where her flatmate killed herself, and the potential negative consequences that might have for her mental health and wellbeing in the long run, by reinforcing negative place-based coping mechanisms.

> *P2.5: But what I didn't like was I guess policing people's "correct" mood to appreciate something. And from what she said, it led her to seek out harmful situations to her emotions because she said that she goes back there whenever she needs to feel melancholy. So it's not just that she did that one time but it's something she digs up regularly it seems.*

> *P2.2: Yeah, I realized at some point she, her bracelet goes green. And I assumed that was like she been concerned with her friends or something like that. So she's been put in a really tough situation that pushes her to getting into a place that actually brings back really, really bad feelings. And that's apparently what this "mood police" wants, right?*

> *P2.4: It wasn't appreciating that we all deal with emotions differently. She did have to go to quiet dark place to turn that bracelet.*

> **Focus Group #2 discussing how quantified-self emotion data could encourage or reinforce positive and negative coping mechanisms**

Other participants also commented on how emotion-based place access hinders potentially successful coping mechanisms in the short run. Such a policy would actually make it more difficult to use urban places as a tool for the self-regulation of emotions, because it would not allow people who are already in a negative emotional state, to access and use the place to enable a transition to a positive emotional state.

Participants also discuss potential long-term implications of place-based emotion data might be for people's emotional relationships with places in general. They speculate this could lead to the creation of generalised emotion profiles for urban places that could prime the (emotional) experience of places in a positive or negative way:

> *P2.5: But you could use emotion data about place as a precautionary advice, perhaps, to avoid a certain street or certain area or something. Especially if you*

*could kind of group it into different demographics as well. Like, if is this particular area has been bad for people of a certain ethnicity or sexuality, for them to keep themselves safe.*

*P2.2: I not sure that will be a good thing in the long run either. Because you could argue, let's say for example Google Maps is telling you this is a really bad neighbourhood, maybe you should avoid it and a walk around it. So you prove that over like 10 years, that neighbourhood is not going to get any good is going get a really bad name. This just keeps like segregation and like, good and bad places just getting worse. So I would be very cautious to attach a label saying "science says this is a bad place".*

### Focus Group #2 on the potential long-term implications of place-based emotion data

The fear is that negative place-based emotion data could destroy the reputation of urban places and neighbourhoods. This could lead to avoidance behaviour and limit the opportunity for people to have a positive experience-in-place in an urban place with a bad reputation, resulting in a self-fulfilling prophecy.

Participants also anticipate undesirable consequences of priming by positive place-based emotion data, in particular for places that a person has a strong, positive, emotional person-place relationship with. They fear that this would set unreasonably high expectations for (re)visiting this personally significant place or for attempts to relive the experience-in-place, inevitably leading to disappointment. This is illustrated by a participant who had two very different holiday experiences, when he decided to revisit the same holiday location for a second time after a very successful first holiday:

*P1.6: In the past few years I have been to Hawaii twice for a holiday. The first time I went was amazing. The second time had the added fun of earthquakes and volcanoes. So you had this fear factor… It was basically a disaster zone. So that completely changed my viewpoint of the same places that I had been to a year before. So the year before, it was amazing! The second year was: "When am I going to get off this rock? Am I going to die?!"*

> *P1.1: The expectations are too high as well. So for example, I remember people really going on about how great Amsterdam is. It was so hyped up. And it's not as good as they say it is, it's rubbish. But people gave me that expectation and I was horribly disappointed.*

> **Focus Group #1 on how positive place-based emotion data primes expectations, and can lead to a disappointing emotional experience of place**

An implication for design is that place that have become personally meaningful from a Magical Moment experience-in-place, are not well suited to be used as a tool for self-regulation of emotions. It also cautions against using design or innovative technology to try and recreate such an intensely positive, one-off, experience-in-place, because it is unlikely to live up to expectations. Using places and experiences-in-place that a person has developed a personal attachment to based on multiple, repeated experiences-in-place are therefore more likely to be effective. Even if, or perhaps because the emotional experience-in-place is less intense and more sustained over time, and does not require getting all the circumstances exactly right:

> *P1.3: So I had a really great experience with that one person, one person that is not in my life anymore. I want to protect that bubble. So I wouldn't go back there, especially not with someone else. Because it's about the specific circumstances that are difficult to recreate.*

> **Focus Group #1 on preferring to preserve the memory of a positive personally meaningful experience-in-place by intentionally avoiding revisiting the place.**

So although participants express a desire to relive a Magical Moments experience-in-place, they are aware of this trap and some intentionally avoid revisiting those personally significant places in order to protect the magic of that specific memory.

### 6.2.3 Responses to Speculative Design Fiction #3 "Personal Virtual Monuments"

The speculative design fiction in the form of the short film "Personal Virtual Monuments" speculates about a possible future scenario of the hybrid city, where a technological service exists that allows people to create and place their own personal virtual monuments anywhere they like in the urban environment. The short film shows

the two developers Peter and David who have invented the Emotion-Augmented Reality service that enables people to create these personal virtual monuments, following and spying on a woman dressed in black in the street who is using their service.

**Personal Virtual Monuments as Representations for Different Types of Emotional Experience-in-Place**

In the short film "Personal Virtual Monuments", a variety of personal virtual monuments are depicted in the form of a large red heart, two small green crosses, and the more abstract purple pillar. These representations of different types of emotional experience-in-place successfully provoked participants to think about the kind of emotional person-place relationships or emotional experience-in-place they themselves would like to erect a personal virtual monument for in their city of residence. Using the speculative personal virtual monuments service to be able to personalise a personally meaningful place in this way, resonated with the participants of all three focus groups:

> *P1.3: I really like the concept to have something, in the city, for me, that captures what I want it to be, what it means to me. So even if the place changes, I still have that thing. It really feels like a personal thing.*
>
> *P1.2: Yes, I also liked that you could virtually build your memories. You can personalise your own experience and use public space to do private activities.*
>
> ***Focus Group #1 on using the speculative technological service to personalise personally meaningful places in their city of residence.***

Participants compare the practice of personalising a place with personal virtual monuments, to the use of graffiti (P1.1), the etching of their names or initials with a heart in concrete or trees (P1.4) or leaving love locks on a bridge (P3.1). These mental models indicate that participants consider personal virtual monuments to be representations of and for a personalised emotional experience-in-place. They discuss several types of emotional experience-in-place that the speculative service could support.

Negative Experience-in-Place

Participants could easily infer that the purple virtual monument was some sort of shrine, memorial, or tombstone for a loved one who lost their life at that location. Some participants compare it to memorial benches being placed and dedicated in memory of a loved one who has passed away:

> *P1.5: It reminds me of those benches with a plaque on it. You know, for people who have passed away. And then they put a bench for them, like in a place where they enjoyed the view or something you know? So you can now also sit down on that bench and enjoy that view. I really like those benches!*

> ***Focus Group #1 comparing the personal virtual monument to a memorial bench***

Participants in two different focus groups indicate that they would like to use the speculative service themselves to this end, to erect a personal virtual monument for a family member who has passed away recently. Participants from Mediterranean countries indicate that erecting shrines for people who have passed away in traffic accidents is already common practice in their home country (P1.1 and P3.2), and describe the tradition that their families regularly return to those shrines to lay flowers.

> *P1.1: One thing it reminded me of which is really weird, in [home country], due to chaotic driving very, dangerous driving, a lot of people were killed in traffic accidents. What you get is a lot of people put up these... being a Catholic country, they put up these shrines for people who died. So they'd go there, and they light candles, and they lay down flowers there. But so many people were dying. And so many of the shows are coming up all over the place that they had to stop people from doing because it was becoming a bit too excessive.*

> ***Focus Group #1 on personal shrines for people who died in traffic accidents in Mediterranean countries.***

Several participants commented that similar shrines also exist in Edinburgh (P3.5, P1.3), indicating places where people have committed suicide or died in a traffic accident. It validates and refines the findings from the analysis of the Walking & Talking sessions, that there is a desire to personalise personally meaningful places where the emotional person-place relationship has developed from a negative

experience-in-place, in particular for grieving and commemorating following the death of a loved one. This also validates and refines the importance of negative emotional experiences-in-place and the resulting negative emotional person-place relationships in the urban environment.

Romance Experience-in-Place

Participants across all three focus groups indicate that they would also like to use the speculative personal virtual monument as representations for different types of positive emotional experience-in-place, namely Romance, Achievement, and Exploring & Discovering. The big red heart hovering over the bridge provoked participants to consider different types of a romantic experience-in-place in that participants would like to commemorate in this way:

> *P1.4: If I get engaged, I will totally use it for that. That would be so cool! I would propose to my girlfriend in front of Edinburgh Castle, and yes, I have already thought about that hahaha. So I would put a big virtual engagement ring in front of the castle, like on the spot where I proposed. Because it would be the happiest day of my life and I would want to scream it from the rooftops for everyone to know!*

> ***Focus Group #1 on creating their own personal virtual monuments for a Romance experience-in-place***

Romantic experiences-in-place that participants across the three focus groups would like to commemorate using personal virtual monuments, are the place where they first met, shared their first kiss, had their first date, and got engaged.

Achievement Experience-in-Place

Although not depicted in the short film itself, participants in the focus groups also expressed a desire to use the speculative personal virtual monuments as representations for the emotional experience-in-place of personal Achievement. Several participants mention wanting to highlight personal sport achievements, such as winning a race (P3.1), amateur mountaineers wanting to place a virtual monument on the summit of each Munro-type mountain they have reached (P3.3, P3.5)). Some PhD students express wanting to leave a personal virtual monument at their university

campus to commemorate their personal academic achievement of getting a PhD there (P2.2, P3.4, P3.5):

> *P3.4: You can have the privacy settings, so you can keep it only for yourself. For example, it could be something that you achieved, for example, I achieve a PhD here, so I feel really, really happy about it. So I would like to put something here to celebrate that. [..] I would put a flag of [foreign home country] outside of the university campus, like I did it! I did it! I achieved a PhD. And part of my country is here, part of my efforts is here. So I would put a virtual flag out there.*

> **Focus Group #3 on using personal virtual monuments to represent personally significant places that develop meaning through an emotional experience-in-place of personal Achievement.**

In these instances, the personal virtual monument takes on the form of a place-based personal award that may be made publicly visible. Some participants would like to keep these virtual monuments hidden for personal use, while others would prefer to make them publicly visible to show off their achievements or to have a shared celebration with others.

Exploring & Discovering Experience-in-Place

The fourth type of emotional experience-in-place that participants see themselves use the speculative personal virtual monuments service for, is that of Exploring & Discovering. Participants like the idea to be able to take on the role of content creator and design new urban experiences themselves for more playful interaction within the urban environment. Participants make comparisons with existing technological services, such as mixed-reality applications in museums (P1.6), and the popular location-based augmented reality games Pokémon Go and Harry Potter: Wizards Unite.

> *P1.4: Like yet the Pokémon Go stuff is a bit different because you don't really have individualised experiences. Generally, the space is still the same for everyone. It is the same points of interest and the same bonuses and things you get from certain places. But if you make it that you can create those things*

> *yourself, you can create a very different, really individualised experience. And it is almost like a doing this thing where you're writing on concrete.*

> **Focus Groups #1 on added value of creating your own personalised content for an individualised urban experience.**

The added value in comparison to those technological services is that the users of the service are not passive consumers. They can actively use the technology to create their own content for playful personalised urban experiences at places and locations of their own choosing, to personalise, explore, discover, and interact with their city of residence in novel ways.

From the discussion in the focus groups it has emerged that personal virtual monuments can be used as representations to create, augment, and highlight different types of personalised emotional experiences-in-place in urban places that have become meaningful through a negative emotional experiences-in-place, Romance, Achievement, and Exploring & Discovering. This validated and refined the findings from the Walking & Talking sessions that monuments are mainly used as representations for a negative emotional experience-in-place, and informs the design guideline for designing for emotional experiences-in-place.

## Design implications of personal virtual monuments & social implication

Several design implications emerged from the discussion in the focus groups. Those group discussions informed design requirements as well as potential social implications and negative implications of using this speculative service in the urban environment.

<u>Design Implication: Designs of basic personal virtual monuments is underwhelming and should be customised and personalised.</u>

The different designs of the speculative personal virtual monuments depicted in the speculative design fiction, provoked participants to think about possible designs for their own personal virtual monuments. Across the three focus groups, participants

agreed that the designs of the personal virtual monuments in short film are basic and underwhelming.  Several participants mention that the word "monument" does not align with the simplistic designs in the short film, which look like "basic 3D printed models" (P1.4):

> *P3.5: I was expecting like a statue or, you know, like something really grand.*

> *P3.3: Yeah, me too. I think I was thrown by the word "monument".*

> *P3.2: I was expecting something magnificent as well.*

> ***Focus Groups #3 underwhelmed by the simplistic design of the personal virtual monuments***

Participants indicate that their own designs for personal virtual monuments would be larger in size and have more grandeur than the rather simplistic shapes currently being used. They feel current designs do justice to or sufficiently reflect the personal importance that a personally meaningful place holds for them. This informs the design guideline, that users should be able to customise the size, shapes, and colour of the personal virtual monuments.

Some participants though prefer the standard shapes because they clearly signify what the personal virtual monument is for. The cartoonish style of the personal virtual monuments makes it inviting for participants to use it to create their own personal virtual monument (P3.3, P3.5). However, even the participants who prefer the standardised shapes express a desire to be able to personalise or customise the designs to some degree, to make the virtual monument more personal:

> *P2.5: I think I'd imagine them being used more symbolically. So rather than just like, here's the standard kind of monument that is used for this thing, it'd be more like some of this more representative of the memory or the person. Maybe something that would represent them there rather than just generic dead person thing. Or a generic love thing. Yes, I'd like an umbrella for the love thing being something that happened in the rain or something.*

> *P2.1: I think it should be something more personal. Because it could be anything right? So instead of having a cross, you could have a drawing that one of your kids made for its father as a monument.*

> **Focus Group #2 discussing standard designs for personal virtual monuments that can be personalised to fit a specific person.**

Because of the high personal meaning of both the place and the experience-in-place, participants would like the design of the personal virtual monument to reflect this. This would be highly specific to the deceased person in question, like an aspect reflecting what kind of person the deceased was, or something that would reflect their own relationship with the deceased person. This informed the design implication that it should be possible to personalise personal virtual monuments.

Design Implication: Personal virtual monuments should be easy to create from building blocks, or creation should be supported by professional digital artists.

As participants realise that the design of a personal virtual monument could literally be anything they like, it reveals a need for support in creating these personal virtual monuments. After criticising the current designs, participants struggled to come up with what kind of design they felt would be more appropriate or that they would prefer. From the discussions it emerges that there are two reasons for this. Firstly, participants lack the design skills themselves to be able to create the grand, sophisticated designs for the personal virtual monument. One focus group opted for a selection of standard virtual building blocks to be included in the speculative service, that would allow users to put them together to create their own, personalised, unique personal virtual monuments, in a similar style as the augmented reality version of the popular game Minecraft (Minecraft.net, 2019):

> *P1.4: But then I guess everyone's got the same set of things. That's not personalised the same way. But there is a new, there's a new augmented reality Minecraft game coming out, which allows you to just… you build things, and you can superimpose them in places. So when you are done, someone else can go and see your castle that you build at that place, you know.*

> *P1.1: Well this is it. You see, you brought up a good point there.*

### Focus Group #1: on the use of standard building blocks to enable users to create their own personal virtual monuments.

Two focus groups envision that the speculative emotion-augmented reality service will result in the rise of new professions and a whole new industry to support people in the creation of their personal virtual monuments. Participants envision new jobs revolving around new digital crafts, such as digital artists or digital sculptors, who would be commissioned by users to create and design high-quality personal virtual monuments for them:

> *P3.2: My first impression when I saw this, is that it is really close to gaming. Because in online computer games, you can craft something in the game. And you can see it, and other players can see it. And what they do currently, is they sell and exchange currency or in-game objects. And it could be the same for virtual monuments. You can integrate it into this service as well. That there is a marketplace where people can go to see virtual monuments and buy and sell monuments that they have designed.*

> *Researcher: Would that just be for buying and selling?*

> *P3.2: No, it would also be to support the design process. So people who are really good at designing monuments can be asked to design one for you. I can see a whole industry and economy emerging around this.*

### Focus Group #3 envisioning an industry and economy of digital artists emerging to design, buy, and sell personal virtual monuments for others.

This further informs the design guideline for supporting the creation, customisation, and personalisation of representations of emotional person-place relationships.

Design Implication: Importance of Location

The placement of the speculative personal virtual monuments in the short film also provoke discussion around a different aspect of the design, namely the importance of the location where the personal virtual monument will be placed. Some participants did not see the point of having a personal virtual monument at the location of an emotional experience-in-place, and argue that having a physical personal monument in

a public place is disruptive to the flow of people or traffic, is a source of littering, and is egocentric as it only has meaning for a small group of people and not for the local community in general:

> *P1.1: Then, you know, are you taking up pavement spaces, taking up this, madness! Again, all these things, these shrines in [home country], they tend to turn into... that somebody doesn't go and clean them every night and they become litter. And when you've had a very windy day, and the candles have all been blowing all over the place, and flowers all over the place, and it's a mess, and nobody's going to clean them up.*

> **Focus Group #1 reflecting on the current practice of erecting personal physical monuments in the form of shrines being disruptive and a source of litter.**

This prompted a reaction from the other participants in the focus group who disagree and feel that a public place is a shared place, and other people should therefore be allowed to place a virtual monument in a public place if they wish to do so. It democratises place and allowing different meanings of place to be expressed at the location of an emotional experience-in-place. This could be especially important for smaller communities within a larger community from a specific socio-demographic background, such as the LGBTQ community or minorities of a certain religion (P2.5).

Especially in the context of a personal virtual monument for a loved one who has passed away the importance of the location is highlighted. Participants argue that a personal virtual monument should be erected at a meaningful place. The main locations considered are the place where the person died, a place that is personally meaningful to the deceased, or the place where the deceased has been put to rest. Interestingly, the two participants who had recently both lost their fathers who had been cremated, express that they miss a place they can go to remember and feel close to the deceased. They feel that being able to freely erect a personal virtual monument in the urban environment, would address this need:

> *P1.3: Yeah so like, when my father died, he wanted to be cremated. So I have a little urn with his ashes on a shelf in my bedroom, which I turned into a little shrine for him. But before he died, he lived in a care home for a long time. And*

*my family lives quite far away. So whenever I would go to visit my family, I would also go to the care home to see my dad. But now that he is dead, I can't go anywhere to go see him, because he is not in the care home anymore. And because his ashes weren't scattered anywhere, I can't go to that place either. I really wish I also had a place I could go to. So if I could like, make a virtual monument and put it at the care home where he lived, because that was his home those last few years, then I could still go there.*

***Focus Group #1 on how a personal virtual monument could address the need of having a place to go to for grieving, commemorating, or feeling close to a loved one who has passed away.***

The participant in the quote above misses a place to go to because the ashes of her father have not been scattered anywhere, disrupting her personal ritual of going to a place to be with her dad when visiting her family. This was not the case for other participant, whose ashes have been scattered at a designated place, but she also expresses feeling the lack of having a specific location to go to:

*P3.5: Both my parents' ashes are in the same place. [..] I would like to mark the spot where the ashes were scattered. But you are not allowed to, it is part of the rules that there can't be any marker or headstone or anything like that there. Because now whenever I go back, you are always wondering where it was exactly. It would give my brother and me something more tangible to connect with."*

***Focus Group #3 on the importance of knowing the exact location where the ashes of a loved one who has passed away are scattered.***

Another important aspect that a personal virtual monument would offer, is a focal point to direct one's emotions to for emotion regulation. This also extends to people who are not able to visit the graves of loved ones regularly or at all, for example because they live abroad or because the exact location of the body is not known (e.g. soldier killed in battle). In those cases, a personal virtual monument in the form of an exact copy of the gravestone would provide an accessible, personal focal point for their grief and conducting rituals like laying flowers and burning candles.

<u>Design Implication: Repeated Interactions</u>

Participants are divided if lack of physicality is a positive aspect of the design or a limitation. Some participants who are against the current practice of erecting personal physical shrines in public places see it as an improvement, as this means that the personal virtual monument will not be visible for everyone. This will result in less obstruction to traffic and take up less space on the pavement. In addition, unlike real gravestones and shrines, virtual monuments do not need regular maintenance, and there will be no signs of wear and tear. On the other hand, participants anticipate that they would miss being able to touch these personal virtual monuments. Physically being able to touch a gravestone gives the person a sense of comfort and physical closeness to the loved one who has passed away:

> *P3.1: I still prefer the physical one. If you touch it, or if you walk past it, but especially if you touch it. Because every time we add something we want to touch it, we want to experiment. We want we want to stay very close to that. So you can feel the energy. So yeah, I would still prefer the real monument.*
>
> ***Focus Group #3 on the importance of the physicality of monuments and being able to touch them and feel physical close to them.***

Virtual monuments on the other hand would be safe from vandalism, as some participants recalled incidents in a cemetery where gravestones were vandalised and were knocked over or had swastikas painted on them with graffiti (P1.5, P2.2, P3.5).

There is concern though that personal monuments that are virtual could result in the disappearance of rituals and traditions that currently occur around gravestones and personal shrines. If virtual gravestones and shrines do not need to be maintained, this might disrupt current rituals, practices, and interactions as it takes away the practical need to revisit the grave, shrine, or personally significant place.

> *P2.4: You don't have to look after it like you would a real shrine or headstones. You know, look after the grave. It's all virtual.*
>
> *P2.5: But I guess also you don't have that ritual thing, showing up to rain and tending to it as well, that is maybe cathartic to people with real graves and real shrines and things.*

### Focus Group #2 on how the ritual of looking after physical graves is cathartic to people

More importantly, participants wonder what the effect might be on the grieving process and a person's emotional state, if the cathartic process of looking after the monument would not be necessary anymore if the monument will be virtual. In terms of design implications, this means that including a mechanism that encourages regular, continued interaction with the personal virtual monument over time to support this ritual or tradition would be beneficiary to people's emotional wellbeing. In particular in the context of a personal virtual monument in the form of a gravestone, personal shrine, or personal memorial.

This also illustrates that once a personal virtual monument is created, this does not mean that interaction with the monument is finished. Participants envision that these personal virtual monuments should not remain static. They express a desire to change and adjust the design of the personal virtual monument over time, to reflect evolving social- and emotional person-place relationships.

> *I can virtually go to that place [where the virtual monument for his nephew winning his first race is located] and sketch him something. Or write a message on that virtual object to congratulate him whenever he wins a race. Or he can use it to keep track of how many races he has won. So every time he wins a race he can physically go there and add a mark to the virtual monument. And when he does, I will get alerted and I can leave in a message on the monument which he can see, maybe the next time he is there.*

### Focus Group #3 on continued interaction with personal virtual monument.

They would like to keep a track record of people's interactions with the personal virtual monument. It highlights the temporal factor in emotional person-place relationships and the desire for a design requirement enabling and encouraging continued interaction with personal virtual monuments over time.

Design Implication: Shared Use and Shared Emotional Experience-in-Place

The speculative design fiction depicts the lady in black having erected a personal virtual monument for individual use. Participants across all focus groups reported though that this speculative service has more potential for shared use in the four types of experience-in-place identified:

> *P1.4: To me, it's like a way of creating a shared experience.*

> *P1.1: That's a good point there. You want relatives to go there and to commemorate too.*

**Focus Group #1 on using personal virtual monument for a shared emotional experience-in-place**

Although certain negative experiences-in-place are preferably kept private, participants express that the negative experience-in-place of grieving, remembering, or honouring a lost loved one is typically an experience shared with others. It is only shared with a very small and close circle of social relationships, such as close family and friends:

> *P3.5: My brother and I, we shared the moments there…. So I wouldn't just share it with anybody, but I would share the monument with my brother. And his children, and my daughters because it now has some meaning for them as well. They will associate memories with being with my dad with that area, and, you know, playing on the beach, all that kind of stuff.*

**Focus Group #3 on shared experience-in-place and shared use of personal virtual monument for lost loved one with close family members**

One participant who recently lost her father even argues that this not an entirely negative experience-in-place either, and opposes to only understanding it or describing it as a negative experience-in-place:

> *P3.5: Well, you keep saying it is a negative experience. And of course it is, I mean my father had died and we were scattering his ashes. But also, being able to bring him to the place where my mother was, as promised, was also quite a proud moment. It was a good moment that my brother and I were able to do*

*that. And I'm happy that we were able to do that. And that I could share that moment with him.*

### Focus Group #3 opposing to labelling negative experience-in-place as all negative.

This refines the understanding of negative emotional person-place relationships, showing that this type of negative experience-in-place can also be a shared experience-in-place.

Several participants also discuss how they would use it to personalise personally significant places where the emotional person-place relationship has developed from a shared bonding experience-in-place with their children (P2.1, P2.4, P2.5, P1.2, P1.3, P3.5):

*P2.1: There is a playground there which is right across from where I live. And my son and I have had lots of moments there. [..] When my son started going on his bicycle, learning to run all those, you know, big milestones in childhood. It has played a big part and but his developments and our relationships and it holds a lot of memories. So yeah, I would put a monument there. Make a monument there with him.*

### Focus Group #2 on making a virtual monument together to signify the bonding experience-in-place a mother had with her son in the park.

The desired shared usage of personal virtual monument service becomes even more evident when discussing it in the context of the emotional experience-in-place of Achievement and Exploring & Discovering. In this context, participants talk about creating a virtual monument for someone else, in terms of a gift for a specific person. This includes creating virtual objects in the urban environment to create urban games for their children, or creating a personal virtual monument placed at their university campus for each student obtaining a degree to celebrate their personal achievement. For example, the Italian participant in the quote below who's family lives in Italy, indicates how he would like to create a personal virtual monument as a gift for his nephew's personal achievements on the race track:

*P3.1: As a user, I would not want to have to be at the specific place to be able to use it. I am thinking about the fact that I am far from my family. So for mourning or celebrating for years to come, being able to visualise things that they can visualise, to some degree has a future.*

*Researcher: So you see it as something that you would like to share with your family back home?*

*P3.1: And vice versa. I feel that I miss out on a lot! I have a fairly big family. I have got four nephews, two nieces, growing up all the time, I see them every time I go home. But I am never there for their birthdays or stuff like that. Or for when they have won things or did something commemorative. So I have this nephew who does racing, and he is quite good at it. So he lives at the seaside in his hometown. So I am thinking I could use this to celebrate the fact that he has won the race there. I could "be there" far more and participate far more than I can do through sending a heart on WhatsApp.*

*P3.2: You could give gifts as well through this. Like the virtual monument when he wins the race, that could be your virtual gift to him for winning the race. You know, instead of sending some physical thing.*

*P3.1: That is actually a really nice idea! Although I was thinking more of, maybe at the place where he won his first race. Put a monument or something there to celebrate and commemorate that.*

***Focus Group #3 on gifting a personal virtual monument as a gift for an achievement experience-in-place.***

Design Implication: Privacy & Control

From the discussions in the focus groups, it becomes apparent that personal monuments, whether they are physical or virtual, push the boundaries between (semi) public and private space. As they are positioned right on those boundaries, sometimes literally, it provokes discussion not only regarding the boundaries between the physical and the virtual world, but also between (semi-)public place and private place This has implications regarding privacy and control. In (semi-)public places the person or people interacting with the personal monument have no control over the place. One

participant comments on how the council in Edinburgh removes physical personal shrines from the urban environment, leaving relatives of the deceased without a place to grieve:

> *P3.5: We just see it now, they are too common, we see them too frequently and they're messing up places and some people are setting up their little own memorials, but they're not being allowed to keep them there since they are on council land, and they get cleared away. So that people who have something to grieve or remember, are now kind of left in limbo.*

> **Focus Group #3 on the council removing personal shrines from their land, leaving people who have something to grieve or remember in limbo**

Where the participant in the quote above feels personal virtual shrines could be the solution as there is no or less littering, other participants disagree. They feel that even if the monument is virtual, people would still feel the need to do their rituals and revisit those places to lay flowers or burn candles, and will do so, thus still blocking the pavement and causing disruption. Some participants argue that the candles or flowers could be virtual and could be added remotely without having to even visit the location of the personal virtual monument itself, but most participants prefer to visit the location and bring real flowers, highlighting the importance of location. If also the flowers would be virtual, this would look very strange and draw unwanted attention (P3.3), while others argue the ritual of laying real or virtual flowers already draws unwanted attention anyway:

> *P1.1: In fact there was a man who kept looking back all the time... and trying to figure out what was going on.*

> *P1.4: Yeah*

> *P1.1: He wasn't part of the film. But he was like, why did she put a flower there? What's there? This is something I can't see.... You know, there's that whole behaviour, which creates interest. But at the same time, if you had loads of people going there and throwing flowers in the same place, then, you know, are you taking up pavement spaces, you are picking up this, or laying down that. It's madness!*

### *Focus Group #1 on how behaviours and rituals around personal virtual monuments in public places attract unwanted attention and disruption.*

Participants notice that in the video, bystanders walk over the location of the personal virtual monument and stop to see what the lady in black is doing. This potential lack of control over the place if the personal virtual monument is placed in a semi-public place also raises privacy issues for participants regarding if and how other people's privacy should be respected when visiting a personal virtual monument. Some feel that having a physical monument at the location has the advantage of acting as a cue for bystanders to what is going on. They expect this will automatically result in the appropriate reaction of being respectful and not intruding what is clearly a private, emotional experience-in-place. This is also why some participants prefer the standardised designs for the personal virtual monuments in the short film, because it clearly communicates to bystanders the personal meaning of the place and the monument. Others feel that from the ritual and behaviour of the lady in black it is already apparent what this personal meaning is and that once this technological service has become more common, people would recognise thus much easier and be respectful of the situation.

Others commented that in the film, they value that privacy inherently built into the design of the personal virtual monuments. There is no plaque or inscription visible and there is nothing linking her to the personal virtual monument. This is important to participants, as there are concerns regarding the impact virtual monuments might have on their personal reputation:

> *P1.5: Who would be able to see my monuments? And would they know it is mine? Because I wouldn't want to be known as the woman who leaves hearts everywhere in the city.*

> ### *Focus Group #1 on worrying about the potential impact of personal virtual monuments on their personal reputation*

If the person who places the personal virtual monument can be identified, this also reveals an additional social implication. Participants across all three focus groups

anticipate having to justify the creation of a personal virtual monument to other people.

> *P2.5: But also, if other people can see it, I think you'd probably have a sense of need to justify what you're marking with your monument.*

> *P1.4: Or if you are walking somewhere with your girlfriend, and she suddenly sees that there is a big hear that you put there, like before you met her or something. And then she goes "Who is that for? Why did you put that there?"*

> **Focus Group #1 and #2 on feeling the need to justify their personal virtual monuments to others.**

Alternatively, as participants envision that people mostly will be making their own design for personal virtual monuments. As this will result in highly personalised designs (e.g. a child's drawing for his deceased father), this would make it difficult or impossible to infer who or what the personal virtual monument is for. This would make privacy less of a concern as the personal meaning of the place is hidden by design. Its meaning would only be clear to people for who it is of personal significance to begin with.

The two developers following the lady in black and filming her from a distance while having a private moment in a public place, appeared to outrage the participants more than the use of the GOD mode to uncover her personal virtual monument, and successfully evoked feelings of sympathy for the lady in black:

> *P3.2: Yeah, I felt bad for her. That she was being filmed in what was clearly a private moment. I had to laugh when she slapped them though.*

> *P3.1: Yeah, that was funny. But they definitely had it coming!*

> **#Focus Group #3 sympathising with the lady in black in the short film**

Participants laughed and cheered when she slapped the two developers in the end, which they felt was justified and added some humour to the short film. It also raised concerns regarding privacy among participants. They realised how easy it would be to use this type of data to potentially stalk people, and film them in a private moment in public without them ever knowing this was  happening.  In addition, if personal virtual

monuments are allowed to be placed anywhere, participants fear that this could lead to issues of virtual stalking and vandalism. Participants commented on how someone could leave unwanted romantic personal virtual monuments outside someone's house or along one of their daily commutes. Also virtual vandalism could potentially be a negative implication, with several participants commenting how it might lead to penis-shaped "skyscrapers" being erected all over the city. This informs the design requirement that personal virtual monuments should not standard be publicly visible for everyone to see, but that users should actively agree to opt-in, describing the personal virtual monuments as "opt-in landmarks":

> *P1.3 But that's what I like about THIS! Because I feel like...it's not like graffiti in a sense that you could hypothetically have loads of people putting different things in one spot. But if you have it on your private mode, it's for you. So it's not like graffiti, which ruins what's there for everyone. And then the next person comes along and spray over it like "No, it's mine now." So it would just be for you. But then as I say, that's my interpretation of it.*

> *P1.4: Exactly. And you'd have to choose to download the app in order in order to see it. So it's almost like "opt-in landmarks".*

> **Focus Group #1 preferring to have to opt-in to be able to see a virtual monument**

This desire to have control over the place and the visibility of the personal virtual monument to other people, informs the design implication for privacy and control.

In this section 6.2 the responses to the suite of speculative design fictions and themes that emerged from a series of three focus groups with residents of Edinburgh have been discussed. These inform a set of design guidelines for urban interaction designers, aiming to design technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future to augment the urban lived experience. The resulting set of design guidelines will be discussed in the next section.

## 6.3   Design Guidelines

The themes that emerged from the analysis of the series of three focus groups with residents of Edinburgh, in which the speculative design fictions were used as provocative conversation pieces, contributed to the formulation of a set of design guidelines for urban interaction designers. These design guidelines for emotional experience-in-place serve as a framework for understanding the context of, identifying potential for, and informing the design of technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future (i.e., Research Question 4).

### 6.3.1   Design for Emotional Experience-in-Place in the urban environment

This thesis applies a novel, holistic, bottom-up, human-centred approach in the field of Urban Interaction Design to create a better understanding of the relationship between person, place, and technology in general, by creating a better understanding of emotional person-place relationships in the urban environment (Section 4.2) and identifying opportunities and motivations for technological devices and services to capture, represent, consume, and share emotional person-place relationships (Section 4.3). It investigates the full range of positive and negative experiences-in-place and emotions from which emotional person-place relationships with all types of personally meaningful places in the urban environment develop. This resulted in a taxonomy of sixteen types of emotional experience-in-place that people have within their city of residence, which can provide guidance for the design of technological devices and services to augment this urban lived experience (Section 4.2). The rationale for designing for emotional experiences-in-place, is that residents develop emotional person-place relationships with a wide variety of different types of places in the urban environment (see Section 4.2.1). In addition, there is no one-to-one relationship between emotion and place, but there are between two and seven emotions related to each personally meaningful place (see Section 4.2.2). This is because there can be multiple emotions related to one emotional experience-in-place (and one type of emotion can be related to multiple different types of emotional experience-in-place), a person can have multiple different types of emotional experiences-in-place in the same personally meaningful place, and the emotional person-place relationship can evolve over time. Furthermore, the underlying emotional experiences-in-place and

opportunities and motivations for capturing, representing, consuming, and sharing emotional person-place relationships are expected to remain more stable over time. Specific types of technological devices and services on the other hand tend to change rapidly due to technological advances and developments (see section 4.3). With this in mind, the speculative technologies for the speculative design fictions have been designed for specific types of emotional experiences-in-place in the urban environment (see Sections 5.3, 5.4, and 5.5). The subsequent discussion of the suite of speculative design fictions with residents of Edinburgh validated and refined this. It identified potentiality for each of the speculative technologies to augment additional emotional experiences-in-place in the urban environment (see Sections 6.2.1-6.2.3). For example, from the focus groups it became apparent that the speculative Emotion-Augment Reality service for creating personal virtual monuments for the Negative emotional experience-in-place of losing a loved one, could potentially also augment the emotional experiences-in-place of Romance, Exploring and Discovering, and Achievement in the urban environment. It also articulated the desired interactions with the speculative technology in the context of a specific emotional experience-in-place, informing potential design implications, social implications, and negative implications. These findings inform the design guideline of designing for emotional experience-in-place in the urban environment.

### 6.3.2   Support the Creation, Customisation, and Personalisation of Representations of Emotional Person-Place Relationships

There is a desire to represent emotional person-place relationships, or aspects thereof, using different types of representations and sensory experiences (Section 4.3.2). Current technological devices and services mainly support the capturing and sharing of visual representations like photos and videos. However, there is a wide range of different types of preferred physical and digital representations for emotional person-place relationships and emotional experience-in-place, and this data can take many different forms. These representations can provide different sensory experiences to represent and reflect the important sensorial properties of a personally meaningful places (i.e., vision, smell, audio, touch, and taste). Different types of representations can be more or less suitable for different types of emotional experience-in-place. It is therefore important that the type of representation and sensory experience fit the

emotional experience-in-place. For example, from the discussion of the speculative design fictions in the focus groups, it can be concluded that smell is suitable representation for an emotional experience-in-place of belonging, bonding, reminiscing and relaxation (see Section 6.2.1). Personal monuments on the other hand are more suitable representations for a negative emotional experience-in-place, as well as romance, exploring & discovering, and achievement (see section 6.2.3).

From the discussion in the focus groups, it emerged that being able to create their own personal representation of an emotional person-place relationship is considered important. Participants commented on wanting to capture and create their own smells (e.g. capture the smell of roses in their own garden (P3.5)) and wanting to create their own personal virtual monuments (e.g. child's drawing (P2.1)). This is supported by the findings that participants want to customise the shape, size, and colour of their personal virtual monuments or be provided with building blocks to create their own. If they lack the time or skills to do this themselves, they would like to be able to enlist the help of digital artists to create the personal virtual monument for them. What is important though, is that the resulting representation is personalised and reflects the personal significance of, connection to, and meaning of the place (see section 6.2.3). These findings inform the design guideline of supporting the creation, customisation, and personalisation of representations of emotional person-place relationships, independent of the specific type of technological device or service.

### 6.3.3  Design for Personal and Shared Use

Places in the urban environment can become personally meaningful through individual emotional experiences-in-place and shared emotional experiences-in-place. Residents actively and intentionally use their personally meaningful places to regulate their emotional state. This mainly individual use of personally meaningful places in the city of residence is observed for several different types of emotional experience-in-place, namely reminiscing, belonging, relaxation, negative experiences, and inspiration and motivation (see section 4.3.1). It advocates that when designing technological devices and services to augment those types of emotional experience-in-place or for the self-regulation of emotions, the focus should be on designing a private, personalised bubble for personal use. Discussion in the focus groups validate and refine this finding,

indicating that personal meaningful places where people have a shared emotional experience-in-place, namely socialising, bonding, and the negative experience-in-place of grieving and commemorating a lost loved one, are also used for the self-regulation of emotions (see Section 6.2.2).

However, even for places that are meaningful on a personal level, several motivations for sharing related emotional person-place relationship data on a small scale with a specific person or small group of people have been identified. Enabling others to have the same, potentially shared, positive emotional experience-in-place, to create, maintain or strengthen social ties (which is particularly important when friends, family and romantic partners do not live in the same city), and to generate understanding, sympathy, empathy, and emotional support (see section 4.3.3). This sharing is preferably done at the location, in person or mediated by technology. Also participants express having an interest in another person's emotional person-place relationships. This is based on the closeness of the social relationship, shared personal and professional interests, the desire to experience a positive emotional experiences-in-place, and an interest in extreme emotional person-place relationships in the city of residence where the affective component consists of intense positive or negative emotions, namely sadness, love and anger (see Section 4.3.4). These findings indicate that there is potential for the shared use of emotional person-place relationship data.

However, the potentiality for shared use is interrelated with the type of emotional person-place relationship and the type of representation. This was further explored in the speculative design fictions and the discussions in the focus groups. Discussion of the first speculative design fiction "Smellification" revealed that the efficacy of using smells as representations for a shared emotional experience-in-place of reminiscing and belonging is limited. It is only suitable for sharing with people who share the emotional person-place relationship (e.g. compatriots). It will have less of an effect on the emotional state of people that do not have the same emotional person-place relationship. For them the sense of smell is considered to be too sensitive, too intrusive, and too personal for sharing. Discussion of the third speculative design fiction "Personal Virtual Monuments" however indicated that the negative emotional experience-in-place of grieving and commemorating the loss of a loved one is a shared

experience-in-place, and that personal virtual monuments are suitable representations for shared use. Participants expressed a desire to use the personal virtual monuments to create a shared emotional experience-in-place (e.g. for grieving and commemorating, romance, achievement, and exploring and discovering), co-create personal virtual monuments, and create personal virtual monuments as gifts for others. These findings inform the design guideline to consider designing for personal and shared use of emotional person-place relationships.

### 6.3.4   Design for Privacy and Control

From interactions with the speculative social map and emotion map containing personally meaningful places of other residents of Edinburgh during the Walking & Talking sessions, it became apparent that participants consider emotional person-place relationship data to be both engaging and private. This awareness of the private nature of this type of data was illustrated by participants describing their own interest in this data as "being nosy" (see Section 4.3.4). This was further supported by the reasons participants gave for not being willing to share their own emotional person-place relationships with other people, namely that type of data would be too personal (i.e., too personal to be of relevance or interest to other people than themselves) or too private (i.e., of interest to other people but not willing to share with others) (see section 4.3.3). This was explored further in the speculative design fictions "Emotion-based Place Access" and "Personal Virtual Monuments" and the subsequent discussions in the focus groups. Participants classified current quantified-self data collected by activity trackers and smartwatches to be personal but trivial, but in comparison classified the place-based emotion data collected by speculative emotion bracelets to be more informative and private (see section 6.2.2). Participants further speculate that the (public) sharing of this private emotional person-place relationship data could undermine social conventions and lead to undesirable behaviour like being stalked (see section 6.2.3). The preference for personalised designs of personal virtual monuments which would mean their meaning is by design only understood by those that the personal virtual monument is for, and not having them publicly linked to the creator, further informing the design guideline for privacy.

What follows from this, is also a desire to be in control of the technology leveraging the emotional person-place relationships, the place itself, and the private emotional person-place relationship data. This is evidenced by the focus groups rejecting the top-down enforced emotion-based access policies, the mandatory wearing of emotion bracelets, and the mandatory sharing of place-based emotion data in speculative design fiction #2 (see Section 6.2.2). This was further illustrated by the sometimes drastic measures participants speculated they would be willing to take to disrupt and "cheat" the technology (e.g., misuse alcohol and drugs to alter the emotional state the bracelets show). Participants suggested to further take back control by redesigning the emotion bracelet so that the data is not publicly broadcasted or visible. They prefer that it is kept private and can be more privately shared if the user wishes to do so (see Section 6.2.2). These findings inform the guideline to design for privacy and control in the context of technology that aims to leverage emotional person-place relationships in the urban environment.

### 6.3.5 Design for Continued Interaction

Emotional experience-in-place is not only located spatially, but also temporally. Place attachment is expressed by revisiting personally meaningful places over time (Scannell & Gifford, 2010, 2014). In addition, not every emotional experience-in-place can be experienced at the location at every point in time. Temporal factors that play a role in this are the time of day, weather conditions, seasons, and special events (see Section 4.2). Emotional person-place relationships also do not remain static, nor does their perceived importance, but they evolve over time.

From the discussion in the focus groups emerged a desire for continued interaction with personally meaningful places and the representations of emotional person-place relationships in all three speculative future scenarios. Speculations from participants revolved around what the implications of those continued interactions mediated by technology might be for emotional wellbeing and emotional person-place relationships in the hybrid city of the near future. In response to the speculative design fiction "Smellification", participants expressed a desire for repeated use of smells to augment emotional experiences-in-place of reminiscing and relaxation, but also expressed concern that this may lead to an addiction to nostalgia or an inappropriate use of

smells to influence consumer behaviour (see Section 6.2.1). In response to the speculative design fiction "Emotion-based Place Access", participants validated the repeated interaction with personally meaningful places for the place-based self-regulation of emotions, and using emotion-based place data to reflect on their emotional wellbeing over time. At the same time, they warned it may contribute or encourage to unhealthy coping mechanisms or the creation of emotion profiles for urban places. For places with a negative emotion profile this could potentially lead to priming and place avoidance resulting in a self-fulfilling prophecy. For places with a positive emotion profile, the priming could lead to unrealistic high expectations which could result in a disappointing emotional experience-in-place. The same holds for personally meaningful places that developed meaning through a magical moments experience-in-place. Therefore, the design of technological devices and services to augment emotional experience-in-place within the city of residence, should focus on designing for repeated emotional experiences-in-place and continued interaction with representations of emotional person-place relationships, and take into account their influence on shaping the emotional experience-in-place of the urban environment (see Section 6.2.2).

From the responses to the speculative design fiction "Personal Virtual Monuments", it emerged that interaction with the personal virtual monument does not end after finishing its initial creation and placement. There was a concern that the lack of maintenance required for virtual monuments in comparison to physical monuments could disrupt current rituals and traditions. Revisiting gravestones and shrines and maintaining them is cathartic and contributes to the grieving process and emotional wellbeing. There is also a desire to keep track of other people's interactions with a personal virtual monument, and to adjust the design of the personal virtual monument to reflect evolving emotional person-place relationship over time (Section 6.2.3). However, current emotions maps as representations of emotional person-place relationships typically offer a snapshot in time, while technological devices and services using emotional person-place relationship data are present-focused (Elsden, O'Kane, et al., 2017; Rooksby et al., 2014; Stals et al., 2018). These findings highlight the importance of and inform the design guideline of designing for continued

interaction with personally meaningful places and emotional person-place relationship data over time.

## 6.4   Concluding Remarks

In this chapter, the final stage of the second diamond of the double diamond model for this research has been addressed (Figure 6-3). In this converging stage known as the delivery stage, the suite of speculative design fictions has been discussed in a series of three focus groups with citizens who are residents of Edinburgh. This suite of speculative design fictions successfully provoked emotional responses, thought, and reflection from participants. It enabled these non-experts to engage in a discussion with the researcher, speculating about possible future scenarios and reflecting on current practices and interactions regarding their emotional person-place relationships with personally meaningful places in their city of residence, and the role of technology in this urban lived experience.
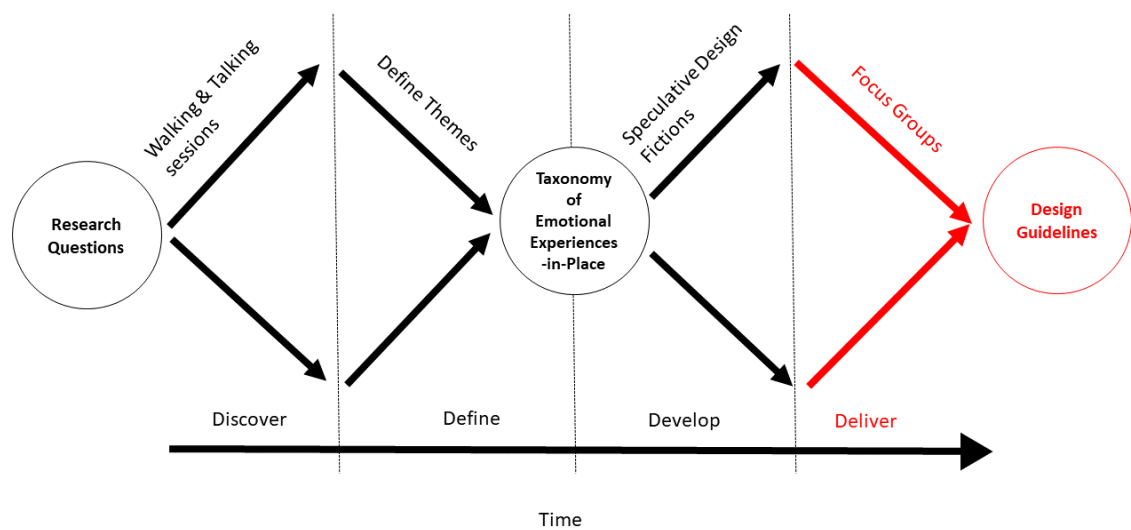


*Figure 6-3 – Double Diamond Model – Second Diamond*

 A thematic analysis of the focus group discussions has validated and refined trends and themes identified in the data corpus presented in Chapter 4 and created a better understanding of the relationship between person, place and technology in the urban environment. This informed a set of design guidelines for urban interactions designers, informing the design of new technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future.  These design guidelines are Design for emotional experience-in-place in the urban

environment; Support the creation, customisation, and personalisation of representations of emotional person-place relationships; Design for personal and shared use; Design for privacy and control; and Design for continued interaction.

In the next chapter, the Discussion chapter, the main findings of this research and the implications will be discussed and positioned within existing literature.

# Chapter 7:  Discussion

In order to create a better understanding of the relationship between person, place, and technology in the urban environment, this thesis has investigated the overall research question ***how people's personal, emotional relationships with personally meaningful places in the urban environment, and in particular their personally meaningful experiences-in-place and emotions connected to these personally significant places in the city of residence, can inform the design of technological devices and services for the hybrid city of the near future.*** In order to answer this research question, the following sub-questions have been formulated:

1.  How are people's personal emotional place meanings (i.e., personally meaningful experiences and emotions) connected to their own personally significant places in the urban environment?

2.  How can these personal emotional meanings of place be represented and communicated?

3.  How can people's personal, emotional relationships with personally meaningful places in the urban environment potentially inform the design of future technological devices & services for the hybrid city of the (near) future?

In this chapter, the main findings that answer these research questions will be summarised and positioned within existing literature, and the implications and strengths and limitations of this research will be discussed.

## 7.1    Discussing the Answers to the Research Questions

With the vision of ubiquitous computing (Weiser, 1991; Weiser & Brown, 1997) becoming increasingly realized, a wide range of information and communication technologies have been deployed in the urban environment. This new technological layer being added to the existing infrastructure of the urban environment creates a hybrid city in which the physical world and the digital word come together (Smyth, Helgason, & Brynskov, 2013; Smyth et al., 2015). It opens up new opportunities to investigate, capture, track, measure, quantify, share and augment experiences in the urban environment. In the field of Urban Interaction Design, which takes a human-

centred design approach to smart cities, there is an increased focus on emotion to create a better understanding of the relationship between person, place and technology in the urban environment, and to inform the design of new technological devices and services to augment the urban lived experience in the hybrid city of the near future.

This research takes a three-stage multimethod approach consisting of a sedentary semi-structured interview with an evaluative map technique, a walking interview, and a speculative design approach using an evaluative map technique. Walking & Talking sessions with eight participants have been conducted in their city of residence, Edinburgh (United Kingdom), resulting in an investigation of 45 emotional person-place relationships in the urban environment. A grounded theory approach to data analysis created a deeper understanding of the emotional person-place relationships citizens of Edinburgh currently have with personally significant places in the urban environment. In the sections below, the main findings are presented in bold and underlined text.

### 7.1.1 Research Question #1: How are people's personal emotional place meanings (i.e., personally meaningful experiences-in-place and emotions) connected to their own personally significant places in the urban environment?

The first research question explored and investigated the different (types of) places that participants consider to be personally meaningful, and the emotions and experiences-in-place from which these emotional person-place relationships have developed. This resulted in a taxonomy of sixteen types of emotional experiences-in-place. The main findings, presented below in bold and underlined text, are presented and discussed.

**<u>Within their city of residence, people develop emotional person-place relationships with a wide variety of different types of mostly mundane, (semi-)public places.</u>**

Within the city of residence, participants report having emotional person-place relationships with a variety of different places and types of places in Edinburgh (see section 4.2.1). These places vary in geographical scale, from historical specific steps in a close being the smallest, to large geographical places such as entire neighbourhoods

and an airport. These personally significant places are **typically mundane** (78%), **public or semi-public places** (95%).

Fourteen types of places that participants consider to be personally significant are identified (see section 4.2.1). **Parks (13%) and pubs and bars (13%) are the most common types** of personally significant places selected by participants. This reflects findings from other studies that found that green spaces such as parks and other outdoor nature places are the type of places that people develop an emotional person-place relationship with (Korpela & Ylén, 2007; Moulay et al., 2018; Scannell & Gifford, 2014, 2017). The wide variety in both geographical scale and types of personally significant places is also reflected in other studies of place attachment across different types of place (Gustafson, 2001a; Manzo, 2005; Scannell & Gifford, 2010, 2017). Looking at the personally meaningful places in Edinburgh, results indicate that **71% of all personally significant places do not fall in the category of the home, workplace, or neighbourhood**, which are traditionally the most common types of places studied in place attachment studies in the social sciences. This is in line with findings by Gustafson (2001a) and Manzo (2005) and Scannell and Gifford (2017) that most personally significant places are not organised around these three types of place. There are two noticeable differences though with findings in the literature. Results indicate that only 5% of personally significant places in Edinburgh are current or previous homes, while Scannell and Gifford (2017) found that current or previous homes are the most common type of personally significant places, accounting for 21.9% of all personally significant places. In their study, outdoor places including parks rank second at 16.7%, which in this thesis is the most common type of personally significant place accounting for 13% of all personally meaningful places. A potential explanation is that in this thesis the focus is on multiple personally significant places within the participant's current city of residence, while in the study by Scannell and Gifford (2017) participants were asked to choose one place that had been personally significant at any point during their life. This means that participants in this study could not choose a previous home unless it is also located in Edinburgh. This may have resulted in previous homes being mentioned less. This also points to another potential limitation of the study. Besides limiting the number of personally significant places, limiting the geographical area in which they need to be located, could also result in

certain types of personally significant places being underrepresented or overrepresented.

Similarly, bars and pubs rank second as type of place in this study at 13% of all personally significant places, while in the study by Scannell and Gifford (2017) this type of place only accounts for 3.1% of all place types. A possible explanation is that if a participant can only choose one personally significant place, this forces each participant to compare and make a choice between all of their (types of) personally significant places, deciding which one is more important to them. This means that certain types of personally significant places are potentially underrepresented or overrepresented. However, this difference could also be caused by cultural differences. The United Kingdom in which Edinburgh is located is famous for its pub culture (Keenan, 2017; Kocsis, 2003; Sandiford & Divers, 2011; Spencer-Oatey & Xiong, 2006). Scannell and Gifford's (2017) study was conducted in Sweden with Swedish nationals, which does not have a similar pub culture and has strict laws on alcohol consumption and high alcohol prices. This may have resulted in a lower representation of this particular type of place.

However, despite these differences in occurrence between the different types of personally significant places, when adding up the occurrence of (current and previous) homes, neighbourhoods, and workplaces these still only account for 29% of all personally significant places. This means that most personally significant places (71%) are not organised around those three types of places. This is in line with the results in the literature, with Scannell and Gifford (2017) finding this is the case for 70.8% of personally meaningful places, as well as the studies by Manzo (2005) (71%) and Gustafson (2001). This **supports the holistic approach taken** in this thesis to investigate emotional person-place relationships across all types of personally significant places in the urban environment. Rather than focusing on a specific place or specific type of place, it creates a more complete and deeper understanding of the different emotional person-place relationships people currently have with different (types of) places in their city of residence.

**<u>Wide range of both positive and negative emotions related to personally significant places within the city of residence.</u>**

Both in social studies of place attachment as well as in the field of Urban Interaction Design there has been an increased focus on emotions in recent years to create a better understanding of the relationship between person and place, and to inform how technology could augment this urban lived experience (de Lange, 2013; Matassa & Simeoni, 2014; Nold, 2018; Stals et al., 2014; Zeile et al., 2016). Results regarding the affective component of the emotional person-place relationships indicated that most **emotions** related to personally significant places are **positive (59%), 30% are negative, and 11% are neutral**.  Joy is by far the most common positive emotion and is connected to 51% of all the personally significant places, with all participants experiencing joy in at least one of their personally significant places. For the other positive emotions and their occurrence see Section 4.2.2.

Negative emotions are also related to personally meaningful places, accounting for 30% of the total number of emotions. All participants indicated having a negative emotion related to at least one of their personally significant places. 53% of all personally meaningful places having at least one negative emotion associated with it. Sadness is the most common negative emotion, which is associated with 18% of the places. These results indicate that although place attachment is often defined as a positive affective bond with place, negative emotions towards personally meaningful places in the city of residence are quite common. This elaborates on and is supported by findings by Manzo (2005, 2014), who found that 72% of participants experienced negative emotions towards their personally significant places in varying intensities. However, Manzo (2005,2014) did not identify any specific emotions beyond positive or negative valence. To see which other negative emotions are associated with personally meaningful places and their occurrence, see Section 4.2.2.

Eleven percent of the total number of emotions related to personally meaningful places can be classified as neutral (see Section 4.2.2). The most common emotion that falls into the neutral category is nostalgia. Nostalgia is related to 27% of the total number of personally significant places, with six out of eight participants reporting feeling nostalgic in at least one of their personally meaningful places. Such a wide range of emotions related to personally meaningful places, ranging from intensely positive (e.g. ecstasy and love) to intensely negative (e.g. sadness, anger,

homesickness, and fear) and everything in between, was also found Manzo (2005) and Scannell and Gifford (2017). This thesis however **goes beyond valance and refines** the wide range of different types of positive, negative, and ambivalent emotions related to personally meaningful places, and their relative occurrence within the city of residence (see Figure 4-9).

Although the affective component of the emotional person-place relationship can contain positive, negative, or positive and negative emotions, most attachments to places in the city of residence are considered positive by participants (89%), with 9% being classified as negative attachments to personally meaningful places and 2% being classified as neutral or ambivalent. These findings do indicate though that personally meaningful **places can also develop meaning from negative emotions and negative experiences-in-place** other than those related to personal safety, which can result in negative emotional person-place relationships.

**No one-to-one relationship between emotion and place**

Results indicate that for each participant, there are **between 2-7 different emotions** attached to each personally significant place. This means that there is no one-to-one relationship between emotion and place (Stals et al., 2017a). This finding is supported by De Lange (2013) who argues that data visualisations in the form of emotion maps currently oversimplify the complexity of emotional person-place relationships, and that current emotional visualisation systems in affective computing incorrectly assume a person feels only one emotion at the time (Cooney, Pashami, Sant'Anna, Fan, & Nowaczyk, 2018). This poses a problem, as emotion maps are currently the most commonly used tool and representation by urban interaction designers to create a better understanding of emotional person-place relationships in the urban environment. This makes the emotion map of limited use as a tool and representation for investigating, exploring , communicating, and sharing people's emotional experiences-in-place connected to urban places (Stals et al., 2018).

It also raises challenges for the design of interactive systems regarding the collection, visualisation, use, and sharing of geo-located emotion data using emotion maps as an interface. Typically, these emotion maps are visualisations of the arousal levels (e.g. heart rate) of a participant at a certain location (Al-Husain et al., 2013; Kanjo et al.,

2015; Nold, 2004, 2009). These are easy to visualise because they are based on a single, linear metric (e.g. heart beats-per-minute). However, they only indicate an elevated arousal level at certain locations, not the actual emotions experienced at a place (e.g. they are not indicative of valence), which is a well-known problem in affective computing (Leahu & Sengers, 2014; Picard, 2000; Picard, 2009). Emotion maps that do attempt to depict a person's emotions connected to a place based on simplified emotion categories using crowdsourced data (Quercia, Schifanella, et al., 2014; Resch et al., 2016), quantitative measurements (Al-Barrak & Kanjo, 2013; Al-barrak et al., 2017) or qualitative measurements (Matassa & Rapp, 2015; Mody et al., 2009), appear to incorrectly assume that there is only one emotion connected to a person's experience of their personally significant place. They typically allow only one emotion to be linked to a place on the map, using different colours for each type of emotion. This is regardless of the fact if it is the emotion map of an individual (e.g. Matassa and Rapp, 2015), or an aggregated emotion map combining the data of multiple people (e.g. Al-Barrak et al., 2017). The wide range and occurrence of the different types of emotions identified in this research can inform broader, more accurate, and more informative emotion categories than the ones currently used. Resch et al. (2016) for example limited the classification of urban emotions based on crowdsourced location-based Twitter data to None, Anger, Fear, Happiness and Sadness due to limitations in the technology used for sentiment analysis, with happiness notably being the only positive emotion category used in their emotion model (Resch et al. 2016). Matassa and Rapp (2015) used eight emotion categories for their concept of the smartphone app UMap, namely, Happy, Sunny, Blissful, Sad, Alone, Calm, Impatient, and Wishful. However, no rationale for this particular classification was provided (Matassa & Rapp, 2015).

More importantly however, given the finding that there are between two and seven different emotions related to each personally significant place per person, this means current emotions maps give an inaccurate representation of emotional person-place relationships in the urban environment. These visualisations appear to incorrectly assume and imply that there is only one emotion connected to a person's emotional experience of place or oversimplify the complexity of the emotional experience-in-place due to technological limitations and for visualisation purposes. This poses a

problem if urban interaction designers want to use these emotion maps to create a better understanding of the relationship between person, place and technology, or use these emotion maps to share and communicate people's emotional bond with personally significant places in the city to other people. There is a need for a better way to represent, communicate and share the complex emotional relationship between person, place, and technology in the urban environment.

In addition, these findings **support the holistic approach** taken in this thesis to investigate the full range of (positive and negative) experience-in-place and emotions from which emotional person-place relationships across all different types of personally meaningful places in the urban environment develop. There are several reasons why there are between two and seven different emotions related to each personally meaningful place. There can be multiple emotions related to one emotional experience-in-place, one type of emotion can be related to multiple different types of emotional experience-in-place, a person can have multiple different types of emotional experiences-in-place in the same personally meaningful place, and an emotional person-place relationship can evolve over time. To create a better understanding of how these different emotions are related to personally meaningful places, the combination of experiences-in-place and emotions from which these emotional person-place relationships develop, has been investigated further. This resulted in a taxonomy of sixteen types of emotional experience-in-place.

**<u>Taxonomy of sixteen types of emotional experience-in-place from which emotional person-place relationships develop.</u>**

After identifying the places and types of places that participants develop an emotional attachment to on an individual level, and the emotions related to these personally significant places, sixteen types of emotional experience-in-place from which emotional person-place relationships develop have been identified in the data corpus. These are, ranked by percentage of personally meaningful places to which they are related, Reminiscing (41%), Socialising (27%), Belonging (25%), Bonding (25%), Relaxation (18%), Romance (16%), Aesthetic pleasure (16%), Knowledge & Secrets (16%), Escaping (13%), Negative experiences (13%), Exploring & Discovering (11%),

Interest (11%), Achievement (9%), Inspiration & Motivation (9%), Imagination (7%), and Magical Moments (7%).
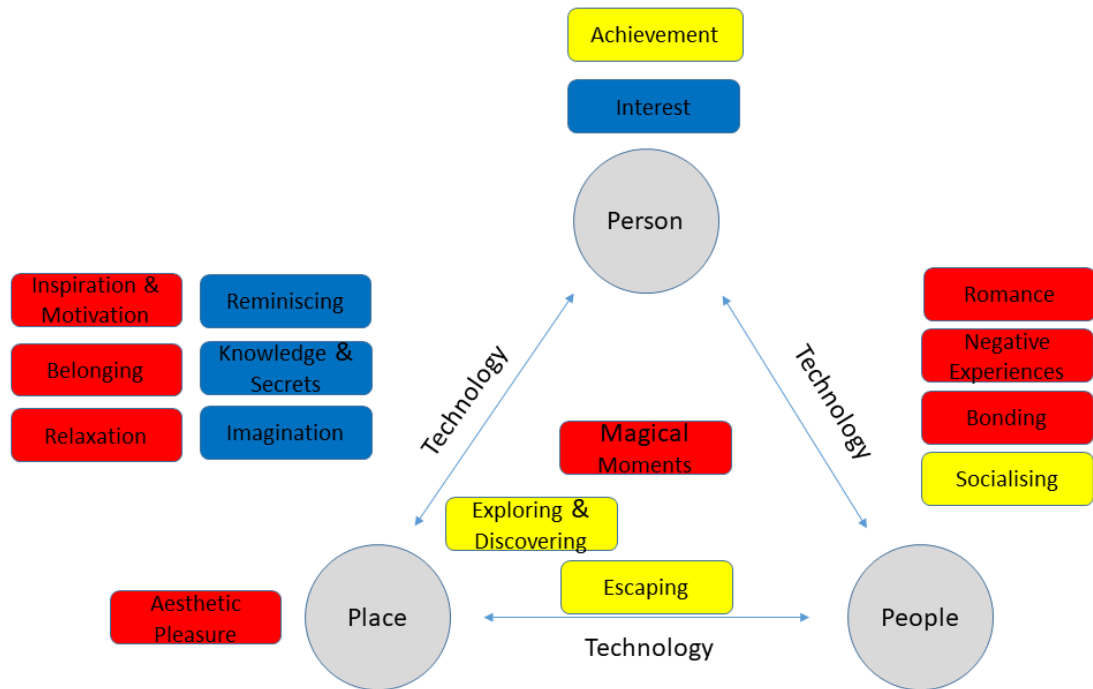


***Figure 7-1 – Sixteen types of Emotional Experience-in-Place mapped onto Gustafson's analytical framework of Place Attachment. Red indicates an emotional experience-in-place that is mainly affective in nature, blue is mainly conginitive in nature, and yellow is behavioral in nature.***

Figure 7-1 illustrates how the sixteen types of emotional experience-in-place may be mapped onto Gustafson's analytical framework of place attachment (Gustafson, 2001a). The different colours indicate if the underlying processes that contribute to a person developing an emotional relationship with a place and the nature of the interactions that occur in the place, are mainly affective, cognitive, or behavioural. This relates to the three psychological processes in the process dimension in the theoretical PPP-framework of place attachment. The red emotional experiences-in-place are mainly affective in nature, while blue indicates emotional experiences-in-place that are mainly cognitive, while yellow indicates emotional experiences-in-place that are mainly behavioural. For example, the emotional experience-in-place of Belonging, refers to the deepening of the bond between a person and a place, and is therefore positioned on the edge between Person and Place. The underlying process and the nature of the

interactions in a personally meaningful place that has developed personal meaning from the emotional experience-in-place of Belonging is mainly affective in nature, which is why it is coloured red. It should be noted though, as is also evident from the discussion of the different types of emotional experience-in-place in Section 4.2.3, that all three processes (i.e., cognitive, behavioural, and affective) contribute to the development of each emotional person-place relationship. As also noted by Gustafson (2001a), the way the different types of emotional experience-in-place are classified and positioned in relation to each other and the Person, Place, People dimensions of the framework of place attachment, is not set in stone. Its main use is that of an analytical tool to help organise and visualise how, in this case the sixteen types of emotional experience-in-place that emerged from the analysis of the data corpus collected from participants in Edinburgh, can be understood.

Having said that, the taxonomy of sixteen types of emotional experience-in-place validates and elaborates on existing frameworks of place attachment that take into account a range of place types throughout a participant's lifetime, rather than examining it in the context of one type of place (e.g. home, park, neighbourhood) as is generally done in social studies of place attachment. Specifically, it elaborates on the multidimensional Person-Place-Process framework (PPP-framework) of place attachment (Scannell & Gifford, 2010, 2017) and Manzo's general themes of experience-in-place (Manzo, 2005). It does so by providing a more detailed range of sixteen types of emotional experience-in-place and related emotions that individuals have in their city of residence and their commonalities, from which individual emotional person-place relationships develop. These sixteen types of emotional experience-in-place incorporate the four general types of experience-in-place identified by Manzo (2005), namely Privacy, Introspection and Self-reflection (i.e., Relaxation experience-in-place), Developmental and Transitional markers (i.e., Achievement), Bridges to the Past (i.e., Reminiscing) and Safety, Threat, and Belonging (i.e., Belonging). These sixteen types of emotional experience-in-place also validate and refine the thirteen experienced psychological benefits of place attachment of people throughout their lifetime (Scannell & Gifford, 2017), a refinement of the PPP-framework published by the original authors (Scannell & Gifford, 2010). Like the sixteen types of emotional experience-in-place, to date, it is the only other study that

has also determined the commonality of, in this case, the perceived psychological benefits of place attachment. These thirteen experienced psychological benefits, ranked by the percentage of personally significant places in relation to which these benefits are self-reported by participants, are access to Memories (69%), Belonging (54%), Relaxation (49%), experiencing Positive Emotions (38%), Activities (33%), Comfort-Security (31%), Personal Growth (22%), Entertainment (19%), Freedom-Control (19%), Nature (11%), Aesthetics (7%), and Privacy (7%). However, different types of experienced psychological benefits are not the same as different types of emotional experience-in-place. The two main differences are that the experienced psychological benefits are looked at through the lens of psychological processes resulting in categories reflecting behaviour (e.g. Activities), cognition (e.g. Memories) and affect (e.g. Positive Emotions). The types of emotional experience-in-place are looked at through the lens of the affective component of the person-place relationship. This resulted in types of experience-in-place being based on the emotions related to personally meaningful experiences of individuals in personally significant places. In addition, these sixteen types of emotional experience-in-place also consider negative emotions, negative experience-in-place and negative person-place relationships, while the thirteen types of experienced psychological benefits of place attachment presented by Scannell and Gifford (2017) only take into account positive emotions, experiences-in-place, and person-place relationships. Like Manzo (2005) they do not identify emotions beyond making a distinction between positive, ambivalent, and negative emotions (Scannell & Gifford, 2017).

However, there are some interesting commonalities and differences between the sixteen types of emotional experience-in-place identified in this thesis, and the thirteen types of experienced psychological benefits identified by Scannell and Gifford (2017). Firstly, the five most common types of emotional experience-in-place identified in this research, are reminiscing, socialising, belonging, bonding, and relaxation. Although this is perhaps not very surprising giving their prominence in place attachment research and literature (e.g. Gustafson, 2001a; Manzo, 2005; Scannell & Gifford, 2014), these results do validate their relative importance in emotional person-place relationships on an individual level within the current city of residence. Secondly, the sixteen types of emotional experience-in-place also identify less common types of

emotional experience-in-place and their commonalities, which have received less attention in literature on place attachment as well as in the field of Urban Interaction Design, namely romance (16%), aesthetic pleasure (16%), knowledge & secrets (16%), escaping (13%), negative experiences (13%), exploring & discovering (11%), interest (11%), achievement (9%), inspiration & motivation (9%), imagination (7%), and magical moments (7%). By making the range and different types of emotional experience-in-place and their relative occurrence explicit, it **provides a more fulsome and deeper understanding of the individual emotional experiences-in-place** that people have in their personally significant places **in their city of residence**.

In addition, these types of emotional experience-in-place can also **provide guidance for urban interaction designers** on which type of emotional experience-in-place in the urban environment to focus on when designing a technological device or service to augment the urban lived experience in the hybrid city of the near future. For example, in the field of urban interaction design, research has focused on applications that enable individuals to access their personal memories in context (i.e., supporting a Reminiscing experience-in-place) (Angus et al., 2008; Lane et al., 2005; Matassa, 2013), recommender systems for urban places for an experience-in-place of relaxation or aesthetic pleasure (Al-Barrak & Kanjo, 2013; Al-barrak et al., 2017; Neale et al., 2017; Quercia, O'Hare, et al., 2014; Tilley et al., 2017), or to increase feelings of safety (Blom et al., 2010; Satchell & Foth, 2010, 2011b; Zeile et al., 2016). However, other types of personal emotional experience-in-place in the urban environment, such as belonging and negative experiences-in-place other than those related to safety, have received less attention in Urban Interaction Design. This identifies potential for designing new technological devices and services to augment those types of emotional experience-in-place within the city of residence. Furthermore, because these types of emotional experience-in-place are not based on a specific type of technology, but on the underlying needs, desires, behaviours, rituals, and experiences of people's everyday lives in the urban environment, they are expected to remain more stable over time.

In this section, Research Question 1 has been answered, by identifying the different types of places that can become personally meaningful within the city of residence, and the range and different types of positive and negative emotions associated with

personally meaningful places. This resulted in a taxonomy of sixteen types of emotional experience-in-place and related emotions from which emotional person-place relationships in the urban environment develop.

### 7.1.2   Research Question #2: How can these personal emotional meanings of place be represented and communicated?

The taxonomy of emotional experiences-in-place identified opportunities and motivations for technological devices and services to capture, represent, consume, and share emotional person-place relationships.

**<u>Emotion Regulation</u>**

The **personally meaningful places** within the city of residence themselves are actively and intentionally used by residents **to self-regulate their emotional state.** This finding is supported by the literature on the restorative effect of nature settings, and is referred to in the literature as "environmental self-regulation" (Korpela, Ylén, Tyrväinen, & Silvennoinen, 2008). This can help individuals sustain levels of physical health and physical activity (e.g. Korpela & Ylén, 2007). The results expand on this, by identifying emotional experiences-in-place that leverage a person's individual relationship with places in the urban environment, and in the city of residence in particular, for the self-regulation of emotions. There are two main types of emotion regulation among participants in Edinburgh. Firstly, personally significant places are being used to **alleviate feelings of homesickness** by visiting a personally significant place to have an experience-in-place of belonging. Secondly, for **alleviating physical or psychological stress** by visiting a personally significant place to have an experience-in-place of relaxation. This indicates that there might be potential for innovative technological devices and services in the hybrid city of the near future that augment the experiences-in-place of belonging and relaxation. The latter result supports an emerging trend in studies in the field of place attachment and urban interaction design, which argues that regularly seeking out personally meaningful places from their everyday environment (rather than restorative nature places) could also improve and individual's mental and emotional wellbeing (Knez, 2014; Korpela & Ylén, 2007; Manzo, 2014; Matassa & Rapp, 2015; Quercia, Schifanella, et al., 2014; Ratcliffe & Korpela, 2016). This has resulted in the concept of "favourite place prescriptions" for

mental and emotional health benefits, as an analogy to exercise prescriptions for physical health benefits, where people are advised to reflect on their place experiences, preferences, and autobiographical memories (Korpela et al., 2008). In fact, the more intensely felt and relived the place experience or memory is, the larger the perceived restorative effect of the personally meaningful place is (Ratcliffe & Korpela, 2016).

The former finding is supported by social science of studies of place attachment among migrants, indicating that increased mobility among people and technological developments has led to a more active use of technology to stay connected to personally significant places in their home country (Gustafson, 2014; Masso et al., 2019; Scannell & Gifford, 2014; Trąbka, 2019). In this time of globalisation, urbanisation, population growth, technological and economic development and migration, place attachment is still considered important. But the type of place attachment is changing from traditional, passive place attachment, towards active place attachment in which people take a self-conscious and active role towards constructing and maintaining emotional relationships with places and (symbolic) representations of place. Increasingly technological devices and services such as mobile phones, cameras and social media are used to maintain these emotional person-place relationships and minimise the effects of displacement (Gustafson, 2014; Lewicka, 2011a, 2013; Masso et al., 2019; Ryan & Ogilvie, 2001). Therefore, there appears to be potential for more personalised technological devices and services that support the self-regulation of emotions based on a person's individual emotional person-place relationships with personally meaningful places in the urban environment and in the city of residence in particular.

**<u>Desire to represent emotional person-place relationships using different types of representations and sensory experiences, in particular smells.</u>**

Places offer multisensory experiences of environments, which play an important role in the perception of place and development of place attachment (Gehl, 2011; Lentini & Decortis, 2010; Lynch, 1960; Pallasma, 2007; Relph, 1976; Tuan, 1977). Lentini and Decortis (2010) identified sensorial experiences as one of the five dimensions of their framework for experiencing physical space (Harrison & Dourish, 1996; Lentini &

Decortis, 2010) which are discussed in more detail in Section 2.6.4. It highlights the perception and comprehension of sensorial qualities of the environment, such as colours, smells, and textures. This informed their argument for designing for technological devices that foster sensorial discovery of the environment to support different experiences of physical space.

An analysis of the different types of representations selected by participants in this research, shows a wide range of different types of preferred physical and digital representations of emotional person-place relationships or aspects thereof. These representations also provide different sensory experiences to represent and reflect the important sensorial properties of personally meaningful places (i.e., vision, smell, audio, touch, and taste).  However, several studies in the field of Urban Interaction Design noted that when it comes to interacting with urban data and smart city environments, there is a focus on interaction using the senses of vision and hearing (Antonaki, 2008; Matassa et al., 2015). Even Decortis and Lentini who argued for designing technology for sensorial discovery of the environment, focus only on the visual experience of the environment (Decortis & Lentini, 2008a, 2008b; Lentini & Decortis, 2010).  Smell, taste, and touch as sensory modalities have received less attention in Urban Interaction Design, but could be used to design novel experiences through the design of novel interactions in smart city environments, in particular to improve the exchange of emotions (Matassa et al., 2015).

The results of this research indicate that there is indeed potential for using those other sensory modalities to capture, share, and communicate a person's emotional person-place relationships with other people, with 78% of all representations chosen by participants not being in the form of visual representations such as pictures and videos. They take the form of other physical or digital objects that can be taken as mementos or that symbolise an aspect emotional person-place relationship. In particular, participants express a desire to represent their emotional person-place relationships with personally significant places using non-visual representations and other sensory experiences, namely smell (16%), taste (11%), audio (7%), and touch (1%). After visual representations, **smells are the second most popular representation** among participants, with six out of eight participants indicating a desire to represent at

least one of their emotional person-place relationships or aspects thereof, with 16 smells being identified in the data corpus. This finding indicates that there is potential to use smell, taste, sound, and touch related to personally significant places to capture, represent, and share emotional person-place relationships.

This finding is supported by studies of urban smells, indicating that smells can be used to characterise cities and urban places within cities, and that these urban smells have the power to evoke emotional responses (McLean, 2014; Quercia, Aiello, Mclean, et al., 2015). Similarly, studies of urban soundscapes have found that certain urban soundscapes can evoke an emotional response in people (Aiello et al., 2016; Rizopoulos et al., 2014). While these studies of urban smellscapes and urban soundscapes focused on aggregating and visualising these sounds and smells on maps of the city (e.g. Mclean, 2020), recent studies have shown that 3D printed food can be designed with specific tastes to enable personal reminiscing and self-regulation of emotions, and to communicate shared past personal emotional experiences between people (Gayler, Sas, & Kalnikaite, 2019, 2020). These studies support the results indicating that smells related to a personally significant emotional experience-in-place could be used in a similar way (Gayler, 2020).

The discussions in the focus groups refined this finding, noting that **not all types of representations are equally suitable for every type of emotional experience-in-place**. It followed that smells appear to be particularly suitable for individual use and the self-regulation of emotions, as they can enable or augment an experience-in-place of reminiscing (e.g. using smells associated with childhood), bonding (e.g. using smells associated with other people), relaxation (e.g. using nature smells) and an experience-in-place of belonging (e.g. using smells linked to a person's country of origin). This means that there could be potential for technological devices and services that enable the capturing, consuming, and sharing of **smells to augment the emotional experience-in-place of belonging, bonding, reminiscing, and relaxation** in the hybrid city of the near future. However, using smells to share or communicate emotional person-place relationships is expected to be of limited efficacy (see Section 5.3). The different types of digital and physical representations indicate the different forms this emotional person-place relationship data can take and provide insight into which

representations are most suitable for capturing and sharing each type of emotional experience-in-place (see Section 4.3.2).

## Emotional person-place relationship data is non-trivial, personal, and private

As emotional person-place relationships and data related to it is considered to be personal and private, participants indicate that they are not likely to share it publicly or broadcast this type of data on social media. They rather share it with only a carefully selected group of people. Typically this carefully selected group of people are persons that were part of the experience-in-place, close social relationships (in particular close friends, family, and romantic partners,) that understand and appreciate the personal significance, or people that have the same interests (e.g. compatriots or colleagues who share the same cultural or professional interests). This has been discussed in more detail in Section 4.3.3.

Because the place itself acts as a prompt for sharing, and because of the personal and private nature of emotional-person place relationships and related data, **sharing is preferably done in person and at the personally meaningful place** by having a shared experience-in-place (e.g. going to a restaurant to share a meal of traditional native food). Alternatively, if it is mediated through technology by sharing digital representations of the experience-in-place (e.g. sharing a selfie of having food in the traditional native restaurant). This is done as close to the time of the experience-in-place as possible. In other situations, the experience-in-place is more publicly shared by personalising the personally meaningful place by leaving a physical representation at the location. For example, by hanging a technical drawing in the shared office or placing a memorial bench at the personally meaningful place of a lost loved one.

## Motivations for sharing emotional person-place relationships

Participants indicate several motivations for sharing emotional person-place relationships with other people. The **most common reason for sharing** a person's emotional relationship with a personally meaningful place is **to enable others to have the same emotional experience-in-place**. Another reason is to promote the personally meaningful place itself or performers performing at the place, to encourage people with similar interest to visit or attend. On other occasions, the motivation for sharing

emotional person-place relationships is **to create, maintain, or strengthen social ties**. This can be to keep friends and family updated on what is happening in one's life, or to maintain or strengthen already existing social bonds and make people feel part of a group. Other studies have already concluded that the enjoyable exchange of social knowledge with friends and family is at the core of sharing one's personally significant relationship with personally meaningful places (Angus et al., 2008; Lane et al., 2005), but participants indicate that this is particularly important for them when their family and friends are not located in the same city or even the same country. A motivation for sharing emotional person-place relationships with strangers is to provide knowledge or background information to enhance the other person's experience of place (e.g. sharing historical, cultural, or personal knowledge during a walking tour), which is line with findings by Lane et al. (2008). Finally, the motivation for sharing emotional person-place relationships can be part of a person's emotion regulation to generate understanding, sympathy, empathy, or **emotional support** from others and if the other person can relate to it, potentially to bond over it. These motivations for sharing indicate that although emotional person-place relationship data is considered to be non-trivial, personal, and private, there is **potential for sharing this type of data with a specific person or a select group of people** that the sharer has close social relationships with (Stals et al., 2017b). This finding is supported by Leahu et al. (2008), who found that a main motivation for sharing a person's arousal map of the city with a group of friends was to improve social connectedness. It is also supported by Lane et al. (2008) on public authoring who found that younger participants' motivations for sharing their public authoring of a place is for their friends to be able to access it, while elderly participants' motivations for sharing to leave memories as traces of their presence in the city (Angus et al., 2008).

### 7.1.3  Research Question #3: What is the relevance of these emotional person-place relationships to other people?

As also pointed out by Schnädelbach et al. (2017), the relationship between this personal data, people, and the urban environment remains poorly understood despite being a growing aspect of our everyday lives. Sensors, mobile technologies, and wearable Quantified-Self technologies spread through the urban environment. There is a growing strand of research in the field of Personal Informatics and Quantified-Self

technology which seeks to go beyond the typical present-focused and self-focused use of this technology and personal data (Elsden, O'Kane, et al., 2017; Rooksby et al., 2014). It seeks to understand how this personal data, if shared, might be relevant or valuable to other people (Elsden & Kirk, 2015; Elsden, O'Kane, et al., 2017). This third research question investigated where people's interests and preferences lie in exploring and interacting with personal emotional person-place relationship data of other people. This is based on the analyses of participant interactions with personally meaningful places in the urban environment, and their responses to- and interactions with the social map and emotion map of Edinburgh containing other people's personally meaningful places.

**Interest in person-place relationship data of other people is based on closeness of the social relationship and shared personal or professional interest.**

Results indicated that emotional person-place relationship data of a person one has a close social relationship with or shares a personal or professional interest with, are of particular interest to other people. In case of the former, this is because people would like to get the know the other person better and see **potential to bond** over the other person's emotional relationship with a personally meaningful place. This finding is supported by a study which investigated the use of arousal maps and found that romantic couples would like to share this data with their romantic partner as a way to increase intimacy (Leahu et al., 2008). In this case, the interest is thus mostly focused on the other person and their personal emotional relationship with the place.

However participants also expressed an interest in the emotional person-place relationship with people they do not necessarily have a close social relationship with but do share a professional or personal interest with. In this case the interest focused on the place in the emotional person-place relationship. It is anticipated that if a person that someone has a shared interest with has created an emotional bond with a place based on that shared interest, **the place itself could also be of interest** to themselves. In this case the participant is thus interested in what their own relationship with someone else's personally significant place might be. This means that emotional person-place relationship data based on the emotional experience-in-place

of Interest, can be particularly relevant to people that one has a shared interest with (e.g. engineering).

## Desire to experience positive emotions

However, the interest in emotional person-place relationship data also depends on the **type of emotion**. Emotions that people identify with because they are **related to their sense of self** (e.g. optimism "because I am an optimistic person in general") or otherwise personally relate to (e.g. because they struggle or struggled with feelings of homesickness themselves and longed for an emotional experience-in-place of belonging) tend to be more interesting to those particular individuals. This is supported by the literature on place attachment indicating that attachment tends to form to places that seem to represent or fit with self-attributes, known as place-congruent continuity (Scannell & Gifford, 2014; Twigger-Ross & Uzzell, 1996).

In addition, if the positive emotion connected to a place on the emotion map is expected to be **generalisable across different people** because the participant thinks that it is evoked by the physical and social dimension of place, then there is an interest in these places in the urban environment. Unlike negative emotions, this interest is then not limited to emotional person-place relationship data, but people also have a desire to visit that place to have the same emotional experience-in-place. These findings are a refinement of the finding by Scannell and Gifford (2017), who found that an experienced psychological benefit of place attachment is experiencing positive emotions attached to their own personally meaningful place. The interest in positive emotions attached to personally meaningful places in the urban environment is thus **not limited to one's own personally meaningful places, but it extends to the personally meaningful places of others**. This further highlights the potential for sharing emotional person-place relationships.

## Interest in extreme positive and negative emotions in city of residence, namely sadness, romance, and anger, but only interest in positive emotions in unknown or unfamiliar city.

Results indicated that there is a significant difference in the way emotional person-place relationship data in the form of emotion maps are consumed in a city a person is

familiar with like their current city of residence, or an unfamiliar city. In an unfamiliar city, all positive emotions on the emotion map are interesting. Firstly, because when visiting an unfamiliar city (e.g., as a tourist) people want their experience to be a positive one. So they are particularly interested in visiting places that can evoke strong, positive emotions. Secondly, people are not interested in visiting places with a negative emotion related to it. For example, to ensure their personal safety, participants anticipate that they will prefer to avoid places with a negative emotion related to it in an unknown city, even if they likelihood of them having a negative experience-in-place is considered to be low. An **emotion map has the power to prime** a person for an expected emotional experience of place, meaning that a person expects to experience the emotion indicated on the emotion map at the location on the map. This is also why there is a **preference to consume positive emotional person-place relationship data in-situ, while negative emotional person-place relationship data is preferably only consumed remotely**. These findings are in supported by Urry (2000) work on the tourist gaze. He found that the set of expectations that tourists have of a place captured and reproduced through photos, postcards, and movies and cultivated by the tourist industry (e.g. Paris being a romantic city), affect and reinforce the experience of the place in question accordingly (Urry, 2000; Urry & Larsen, 2011). Emotion maps and other emotional person-place relationship data can prime the emotional experience of a place in a similar way.

However, for emotional person-place relationship data from a city that a participant is familiar with or knows well like their **city of residence, there is an interest in emotional person-place relationships where the affective component contains extreme positive and extreme negative emotions,** in particular **sadness, love, and anger**. For extreme emotions, people want to sympathise and empathise with the person who had the emotional experience-in-place, even if this person is a stranger. In order to enable this, it is important that not only the emotion, but also the person's experience-in-place is accessible in a suitable representation, for example in the form of a story or memory, especially if the emotion attached to the place is extremely negative. This further informs the design guideline to design for emotional experience-in-place rather than emotion.

Other emotional person-place relationships that spark interest within the city of residence, are personally significant **places where the related emotion is perceived to be "out of place"** (e.g. optimism in a busy shopping street) or that are located near to the participant's home or are even the same as a participant's own personally significant place. However, less than half of the participants express an interest in these places on the map. Matassa and Vernero (2014) hypothesized that in particular a conflicting emotion related to one's own personally significant place would be perceived as a provocation, triggering stewardship behaviour in the form of restorative behaviour to "correct" and preserve the special place meaning (Scannell & Gifford, 2014) . They intended to use this stewardship behaviour related to place attachment as a tactic in a critical design approach in further research to create engagement and discussion, and spur participants into action to provide a "correct" emotional person-place relationship data for the place in question in their UMap app (Matassa & Vernero, 2014). Results in this research appear to indicate that this approach is unlikely to work for personally meaningful places. The participants show only a moderate interest in, and are sympathetic to, alternative place meanings of their own personally significant places. But at the same time these are not deemed very interesting and are therefore easily ignored and discarded in favour of one's own personal place meaning. It appears to be the case that this is exactly because a person's personal emotional relationships with their own personally meaningful places are strong emotional bonds. These are not easily influenced or changed by other people's alternative or conflicting emotional person-place relationships, not even from people they have a close social relationship with. Nor is there a need to challenge these alternative place meanings, as there is an awareness that there is no one "correct" place meaning.

## Tension between willingness to share and interest in negative emotional person-place relationship data within the city of residence.

Results indicate that there is a tension between people's interest in consuming negative emotional person-place relationships data on one hand, and unwillingness to share this data themselves on the other hand. Only 9% of all emotional person-place relationships with personally meaningful places in Edinburgh are negative emotional

person-place relationships. These negative person-place relationships are often not shared, not even with people they have a close social relationship with. This is because negative person-place relationships are considered personal and private. However, when looking at the interest in emotional person-place relationship data on the emotion map of Edinburgh, **sadness ranks the highest**, and all participants express an interest in negative emotional person-place relationships in their city of residence. In addition, anger indicates the other negative person-place relationship on the emotion map, and ranks third for overall interest from participants, with more than half of the participants expressing an interest in emotional person-place relationship characterised by anger on the emotion map. These results indicate that there is a discrepancy between willingness to share negative emotional person-place relationships on one hand, and people's interest in consuming this type of data related to their own city of residence on the other hand. This **could lead to potential privacy issues and unwanted behaviour**, in particular in the context of negative emotional person-place relationships which appear to be particularly privacy-sensitive.

The main findings discussed in this section indicate that personal emotional person-place relationship data can indeed be of interest to other people. Applications in the field of Urban Interaction Design tend to focus on a specific emotion (e.g. safety or serenity) or use an emotion map of the city as a user interface for their application. The research typically focuses on how to determine and visualise emotions related to places or routes in the urban environment, or on how to fill the emotion map with content using crowdsourced data, resulting in aggregated emotion maps. However, there is a gap in knowledge how people would actually use emotion maps and interact with emotion data related to places in the urban environment. Results appear to indicate that **interest in emotions related to places in the urban environment changes depending on a person's familiarity with the city**. This means that applications and research should take into account the relationship that the user has with the city. Studies focusing on recommending places and routes through the urban environment based on emotions related to the experience of place, tend to focus on so called happy places (i.e., places evoking emotions such as joy, fun, or happiness) or places for relaxation (i.e., places evoking emotions such as calmness, serenity, or distraction) (Candeia et al., 2017; Quercia, O'Hare, et al., 2014; Quercia, Schifanella, et al., 2014).

However, results of this research suggest that these emotions and related places are particularly of interest to users when they are not familiar with the urban environments. They are only moderately interesting when it comes to a person's city of residence, due to the medium or low intensity of these emotions. When using emotion maps as a user interface or designing applications based the emotional experience of places for the city of residence, the focus should be on designing for extreme, intense positive and negative emotional experiences-in-place characterised by emotions of sadness, love, or anger, as these appear to be more interesting to residents of the city.

In addition, the only limited interest in the emotion of joy on the emotion map with other people's emotional person-place relationships in Edinburgh (including "happiness" and "fun" as it is sometimes referred to in other studies) has implications for applications that use emotion maps as a user interface to interact with emotional person-place relationship data. Results indicate that it is not only the low intensity of the emotion that makes joy only a moderately interesting emotion, but this emotion might also be too generic. When interacting with and interpreting the emotion map of Edinburgh, participants attempt to determine the type of emotional experience-in-place related to the place based on the emotion provided. Quercia et al.'s (2014) basic categories of "beauty", "quiet" and "happiness" provide some indication of the actual experience-in-place with "beauty" implying an emotional experience-in-place of Aesthetic Pleasure, and "quiet" implying an emotional experience-in-place of Relaxation. "Happiness" however appears to be too generic and does not indicate which emotional experience-in-place is related to it. This is supported by the outcomes of the Walking & Talking sessions, showing that "joy" is related to 51% of all personally meaningful places and is also mentioned in relation to most types of positive experience-in-place. Therefore, from joy can only be inferred that the emotional experience-in-place is likely to be positive. This is particularly a problem when research and applications use it as the only positive emotion on their emotion map in order to create new insights of people's perceptions of urban places within a city (e.g. Resch et al., 2016). Using other emotion categories that are indicative of the emotional experience-in-place (e.g. "love" is indicative of a romantic experience-in-place, while "pride" is indicative of an emotional experience-in-place of achievement) or the types

of emotional experience-in-place themselves, would be more beneficial for users of the emotion map or related application. It is also likely to result in a better understanding of people's perceptions of ,or emotional person-place relationships with those places in the city.

### 7.1.4 Research Question #4: How can people's personal, emotional relationships with personally meaningful places in the urban environment potentially inform the design of future technological devices & services for the hybrid city of the near future?

The fourth research question investigated and explored, how those emotional person-place relationships could identify potential for and inform the design of technological devices and services to augment the urban lived experience for the hybrid city of the near future. The focus was on investigating and exploring this design space, by using PACT-analysis, the SCAMPER-technique, and Tactics for Ambiguity as design techniques to create a suite of three speculative design fictions for a speculative design approach. This suite of speculative design fictions explored and speculated about a wide variety of future possibilities grounded in- and informed by the trends and themes in the data corpus.

The first speculative design fiction took the form of a short film named "Smellification". It articulated and communicated the main findings that there is a desire to represent emotional person-place relationships with non-visual representations using the sensory experience of smell instead, and that parks, bars, and pubs are the most common types of places people develop an emotional person-place relationship with within their city of residence. It furthermore explored the sharing of emotional person-place relationships. It is based on and designed for the emotional experience-in-place of belonging, relaxation, reminiscing, and escaping. It speculates about a possible future scenario of the hybrid city, where personal memories and personally meaningful experiences in places are recorded and shared using smells as a representation (see Section 5.3).

The second speculative design fiction took the form of a comic named "Emotion-based Place Access". It articulated and communicated the main findings that there is no one-to-one relationships between emotion and place, and the use of personally significant places in their city of residence as a tool to self-regulate their emotional state. It is

based on the magical moment emotional experience-in-place, and of socialising, bonding, and aesthetic pleasure. It speculates about a possible future scenario of the hybrid city, where a person is only allowed to enter a place or event if they are in the desired emotional state (see Section 5.4).

The third speculative design fiction took the form of a short film named "Personal Virtual Monuments". It articulated and communicated the main findings that emotional person-place relationships and the experiences-in-place and related emotions from which they develop can also be negative. For the city of residence there is an interest in extreme positive and negative emotional person-place relationships of other people, characterised by emotions of sadness, love, and anger. But there is a tension between interest in and willingness to share negative experience-in-place related to personally meaningful places in the city of residence. It is based on the negative emotional experiences-in-place, and the emotional experiences-in-place of romance and achievement. The speculative design fiction speculates about a possible future scenario of the hybrid city where a speculative technological service exists that allows people to create and place their own personal virtual monuments anywhere they like in the city (see Section 5.5).

The suite of speculative design fictions has subsequently been discussed in three focus groups, to collect the responses of non-expert citizens of Edinburgh to this suite of speculative design fictions. These discussions in the focus groups validated and refined themes and trends identified in the data corpus gathered using the Walking & Talking sessions. It successfully provoked emotional responses, thought, and reflection from participants, enabling these non-experts to engage in a discussion with the researcher. These discussions enable speculation about possible future scenarios and potential design implications, social implications, and negative implications for each of the speculative scenarios. They further reflected on current practices and interactions revolving around their own emotional person-place relationships with personally significant places in the urban environment, and how technology could potentially augment this urban lived experience in a hybrid city of near future. This created a better understanding of the relationship between person, place, and technology in the urban environment, and informed a set of design guidelines for urban interactions

designers aiming to design technological devices and services that leverage the emotional person-place relationships in the city of residence.

### Main findings from Focus Groups regarding Speculative Design Fiction #1 "Smellification" short film

When discussing the first Speculative Design Fiction in the form of the short film named "Smellification", participants across all three focus groups easily and immediately came up with smells that are typical of their city of residence Edinburgh (e.g. smell of the brewery, smell of the biscuits factory), that are specific to their own personally significant places, or to a particular time (e.g. childhood or season), evoking specific personal memories and emotions for participants. Participants discussed many pleasant and unpleasant smells related to their own personally meaningful places in the urban environment, which enabled and augmented an emotional experience-in-place of belonging or reminiscing, and have a direct impact on their emotional state (i.e., relaxation). This **validated and refined the use of smells as a representation of emotional person-place relationships**. Findings indicate that smells can also be reminiscent of important people in one's life, such as a (former) romantic partner or one's parents or grandparents, thus refining the types of smells that could be suitable for reminiscing and bonding, and informing design by identifying which smells would be suitable to augment different types of emotional experience-in-place. Participants reflected on their own current use of smells from personally meaningful places for self-regulation of emotions, mainly in the context of homesickness and relaxation. These smells are used to enable or augment an emotional experience of place (e.g. a participant using essential oils made from roses her garden to alleviate feelings of anxiety and help her relax at the airport) and participants see the speculative smell technology as a way to create a personalised, augmented experience-in-place similar to, for example, wearing headphones in busy public places. The interactive nose piercing is the preferred speculative technology for recording and consuming smells for a relaxation experience-in-place. This is because the interaction with the speculative technology is subtle and non-disruptive. It also enables people to have smells needed for the self-regulation of emotions at hand at all times. The speculative interactive smellstick is preferred for capturing and consuming smells for a reminiscing

experience-in-place, as participants anticipate only occasionally wanting to consume those smells and compare the **desired interaction** with the speculative interactive smellstick to the interaction with a memory box. Participants mainly see potential for using smells as representations of emotional person-place relationships for **personal use** for the self-regulation of emotions and reminiscing, and only having limited potential for sharing emotional person-place relationships with others. Smells would be suitable to share and communicate emotional person-place relationships with people who have the same association with the smell (e.g. compatriots). But it is less suitable than pictures as smells provide less contextual information for people who do not have the same association with the smell or the place. It is anticipated that smells will have a less strong emotional effect on others and for some people is too personal, sensitive, and intrusive as a sense in general to use for sharing emotional experiences-in-place. Potential **negative implications** of the speculative smell technology are addiction to nostalgia depicted in the speculative design fiction and the negative impact it might have on emotional wellbeing. There is also a fear that unauthentic or place-related smells will be used to influence consumer behaviour.

## Main findings from Focus Groups regarding Speculative Design Fiction #2 "Emotion-based Place Access" comic

The second speculative design fiction in the form of the comic named "Emotion-based Place Access", acted as a catalyst for discussing participant's own emotional person-place relationships with personally significant places in the urban environment that they use as a tool to self-regulate their own emotions, as well as urban places that evoke negative emotions. Responses indicate that places for the self-regulation of emotions are typically visited alone if the place has developed meaning through an experience-in-place of relaxation. Places that have become personally meaningful through a socialising or bonding experience-in-place such as pubs can also be used for the self-regulation of emotions. In this case, having a shared experience, in particular in pubs and bars with other people one has social relationships with, enable a person to transition from a negative to a positive emotional state. This **validated and refined the main finding that personally meaningful places are used for the self-regulation of emotions**.

This speculative design fiction also effectively **communicated the complexity of relationships between person, place, and technology in the urban environment**. Participants commented on the simplicity of the one-to-one relationship between person and place currently assumed in many emotion maps and applications in urban interaction design, compared to the complexity of their own relationships with personally meaningful places. Participants highlight the subjectivity of the emotional experience of a place even if the emotions are evoked by the place dimension, the different emotional experiences-in-place and emotions related to a single personally significant places, and the evolving emotional person-place relationship with their own personally significant places over time. They also comment on the technological limitations of the speculative emotion bracelet. Participants perceive the emotion bracelets to be unrealistically precise in determining place-based emotions, commenting on the difficulty of grounding the emotion as well as the sensitivity in picking up even short switches between emotions. Therefore, in order to provide useful emotion data, one of the design implications is that the speculative emotion bracelets should reflect a prolonged or overall emotional experience-in-place related to places or the user's mental wellbeing, rather than reflecting brief, real-time changes in experienced emotions. Another design implications informed by the focus groups is that of **designing for privacy and control**. An individual's place-based emotion data is considered to be more privacy sensitive than personal data currently being collected by activity trackers and smartwatches or other Quantified-Self technologies. Participants in the focus groups appear to perceive Quantified-Self data such as a person's hear rate, number of steps or number of calories burned, and GPS trace related to for example a run in the park, as personal but trivial. When examining the sharing of arousal maps containing an individual's arousal levels related to places, Leahu et al. (2008) also found that privacy was not a concern. Arousal levels are perceived as being "just bodily signals" that lack meaning and are too personal to be of interest to other people. In addition, studies on public authoring found similar results regarding created content regarding personally meaningful places. Participants felt privacy was not an issue, as it would not reveal anything about themselves or their habits that they could not control (Lane et al., 2005). However, results of this study appear to indicate that once meaning is added by interpreting those bodily signals as

emotions or technological being able to interpret such signals as emotions, this makes this data more interesting for personal use and sharing. This also increases privacy concerns. Participants indicate a need and desire for having control over their own emotional person-place relationship data, so they can decide themselves who to share this type of data with.

This was also reflected in the discussions regarding the sharing of place-based emotion data. If this happened voluntarily within a small, trusted social circle, participants anticipated that this data can be used a conversation starter to share and bond over an emotional person-place relationship with a personally meaningful place, or to improve the emotional wellbeing of the user. This validated that this type of data is preferably shared with a specific person or group of people that the user has a close social relationship with. However, participants anticipated far-reaching **social implications** if this data would be publicly shared. It could undermine social conventions, social etiquette, and force people to keep up appearances (see Section 6.2.2).

The focus groups also discussed potential **negative implications**. The lack of control over the data and technology in the context of the speculative design fiction and the top-down enforced use, prompted participants in various focus groups to come up with strategies to deceive or cheat the speculative emotion bracelet technology in order to be able to access the places and events they would like to attend. This illustrated the need for a bottom-up, human-centred design approach to the design of technological devices and services for the urban environment where the user is in control of the technological devices and services and the related emotional person-place relationship data.  Another negative implication discussed by the focus groups, was that if urban places get emotion-profiles, this can have negative implications for place. Regardless of the emotions being positive or negative. Negative emotion-profiles of places can lead to people avoiding what has been categorised as a bad place, resulting in a self-fulfilling prophecy. If the emotion profile is extremely positive, this can set unrealistically high expectations resulting in a disappointing emotional experience-in-place. Both these concerns were also already voiced by participants in the Walking & Talking sessions when interaction with the speculative emotion map of Edinburgh. A design implication is that a place that has become personally meaningful

from a Magical Moment experience-in-place, is not well suited to be used as a tool for self-regulation of emotions. It also cautions against using design or innovative technology to try and recreate such an intensely positive, one-off, experience-in-place, because it is unlikely that the emotional experience-in-place can be replicated.

**Main findings from Focus Groups regarding Speculative Design Fiction #3 "Personal Virtual Monuments" short film**

The discussion of the third speculative design fiction in the form of the short film named "Personal Virtual Monuments", **validated and refined the importance of negative experience-in-place and negative person-place relationships, in particular with regards to the loss of a loved one**. It also refined the use of monuments as a representation for an experience-in-place of achievement, romance, and exploring & discovering. Several design implications emerged from the discussion in the focus groups. The current designs of the personal virtual monuments depicted in the short film are basic, generic and underwhelming, and should be **customisable and be more personalised**. To enable this, the personal virtual monuments should be made easy to create from basic building blocks comparable to the augmented reality version of Minecraft. Alternatively, the creation process should be supported by professional digital artists, resulting in a marketplace and economy revolving around personal virtual monuments. Discussions also highlighted **the importance of location** in relation to personal virtual monuments, with some opposing to the virtual personalisation of public place in the same way they oppose to physical personalisation of a public place with personal shrines. Most participants however see it as a way to enable different layers of meaning of place to be articulated at the location, and feel that this is important and should be allowed exactly because it democratises and encourages shared us of public place. In case of a personal virtual monument for a lost loved one, it provides an important focal point for emotion regulation during the grieving process, in particular for people whose loved one has been cremated, the body has never been found, or are buried far away. The **lack of physicality** of personal virtual monuments is both an advantage as well as a disadvantage. The lack of physicality means there is that there is no wear and tear, and that the monument cannot be removed by the council and also cannot be vandalised. A perceived disadvantage is that in particular

for personal virtual monuments for lost loved ones, the personal virtual monument cannot be touched. This limited the person to be able to feel physically close to their lost loved one, as well as the opportunity for catharsis that comes from touching the monument. There is also concern that because the monument does not need to be maintained, this might disrupt the traditional behaviour of revisiting and maintenance, which could make it more difficult to process the grief. This informed the design implication that personal virtual monuments should be designed for **continued interaction**.

The main finding is that across the three focus groups, participants see personal virtual monuments as a **representation for shared use** rather than individual, personal use. For the negative experience-in-place related to a lost loved one, some people prefer to grieve alone. Others find emotional support in grieving together and want the personal virtual monument to be visible for a small circle of people to have a shared experience-in-place at the location of the monument. This also enables the co-creation of the personal virtual monument. Personal virtual monuments as representations for the experience-in-place of achievement, romance, and exploring & discovering are speculated to be created as a digital gift for someone else, offering the recipient an augmented, personalised emotional experience-in-place. This finding is supported by recent studies in the cultural heritage sector, investigating and exploring the potential of digital gift giving in museums (Fosh, Benford, Reeves, & Koleva, 2014; Kwon, Koleva, Schnädelbach, & Benford, 2017; Spence, 2019; Spence et al., 2019). Rather than curators identifying and designing experiences based often on oversimplified general types of museum visitors, this research advocates gifting a personalised museum experience for a specific person that they have a close social relationship with. This is done by digitally gifting a personal interpretation of a museum piece. For example by creating a picture of the museum piece with a personal audio note attached to it using the dedicated GIFT smartphone app. The receiver can only "unwrap" this digital gift using the app once they have located the shared item in the museum. This resulted in the design of intense, personalised and sometimes provocative shared experiences of the museum, for both the giver and the receiver of the digital gift (Fosh et al., 2014; Kwon et al., 2017; Spence, 2019; Spence et al., 2019). The desire to create and gift personalised digital virtual monuments to a person that someone has a close personal

relationship with, could in a similar way provide a highly personalised, shared emotional experience-in-place in the urban environment.

The discussion of the suite of speculative design fictions in the focus groups identified potential for the speculative technological devices for using smells as a representation of emotional person-place relationships, and the speculative service for creating and placing personal virtual monuments in the urban environment. It should be noted though that the suite of speculative design fictions are not user scenarios for the actual design of these speculative technologies. As noted by Baumer et al. (2020), with the use of speculative design fictions becoming more commonplace, too often speculative design fictions are used and misused. Particularly by large organizations and corporations but also within HCI research, to portray their vision of what life in the future with their technological device, service or product will be like. However, the focus should be on knowledge production, not on the promotion of a specific future product, service, technology,  or prototype, where its need, use, usefulness are assumed (Baumer et al., 2020).  Therefore, the aim of this suite of speculative design fictions presented in the focus groups is to take a critical design approach to inform a set of design guidelines. The suite of speculative design fictions are conversation pieces that speculate about what life in a hybrid city of the near future might be like, acting as a catalyst for discussion by aiming to provoke an emotional response, and critical thought and reflection from citizens on current practices and interactions as well as future possibilities. This creates a better understanding of the relationship between person, place, and technology in the urban environment, through the lens of emotion and people's emotional person-place relationships with personally meaningful places in their city of residence. As evidenced by the main findings from the **responses to the suite of speculative design fictions** in the focus groups, the focus group discussions **validated and refined the trends and themes** in the data corpus, and **produced knowledge** by informing potential design implications, social implications, and negative implications for technological devices and services for augmenting the urban lived experience in the hybrid city of the near future. This has resulted in a **set of design guidelines for urban interaction designers** aiming to design technological devices and services to that leverage emotional person-place relationships in the urban environment to augment the urban lived experience. These

design guidelines are to design for emotional experience-in-place in the urban environment; Support the creation, customisation, and personalisation of representations of emotional person-place relationships; Design for personal and shared use; Design for privacy and control; and Design for continued interaction. These design guidelines have already been discussed in more detail in Section 6.3.

## 7.2   Strengths and Limitations

The Walking & Talking sessions provided rich, intimate, and contextualised data regarding the different types of experience-in-place and emotions from which people's emotional person-place relationships with personally meaningful places in the city of residence develop. Compared to the sedentary semi-structured interviews with evaluative map techniques used in the first and third stage of this three-staged multi methods approach, the walking interview with participants in Edinburgh provided a more fine-grained view and experience of the urban environment, as participants were visiting their own personally significant places along their everyday walking routes. Being in-situ worked as a catalyst with cues from the urban environment prompting specific stories, memories, and details from the participant's experience-in-place that would have been difficult to recall by simply imagining being in the place. This includes things like the smell of a specific flower, particular weather conditions, certain people that play a role in their personal relationship with a personally meaningful place, or specific events that took place at the location that contributed to shaping their emotional person-place relationship. In addition, it enabled participants to actually experience how being in their personally significant place makes them feel or to some degree made them feel during their experiences-in-place. This made it easier for participants to identify and describe the emotions related to their personally meaningful places, with some participants becoming quite emotional again while doing so. This is illustrated by a quote form a participant below when describing her feelings related to a personally meaningful bridge:

> *It was the first time I felt like I belonged. I felt very grateful and appreciative that I had the opportunity that I can live here. [..] It was looking at this amazing city [..] You'll have me in tears at the end [i.e., of the walking interview] thinking of all my lovely memories of Edinburgh!"" -* **P5**

It was observed that the Plutchik Emotion Wheel proved to be a useful tool in identifying and articulating emotions related to personally meaningful places, in particular for male participants. Female participants appeared to find it easier to identify emotions and open up. They talked more freely about their emotional person-place relationships. Male participants relied more on the Plutchik Emotion Wheel to identify the emotions and it also took more time for them to open up.

Another advantage of being in-situ during the walking interview in the second stage of the Walking & Talking sessions, is that it also reminded participants of other personally meaningful places encountered along the walking routes within the city of residence. These were places that they had not initially thought of prior to participating or when locating their personally meaningful places on a map of Edinburgh in the first stage of the three-stage multi methods approach. This led to several participants adding personally meaningful places to the discussion during the walking interview in the second stage, resulting in a more detailed overview of their web of personally meaningful places in their city of residence.

A potential limitation is that, although the resulting taxonomy of sixteen types of emotional experience-in-place that emerged from the analysis of the data corpus collected during the Walking & Talking sessions is based on a study of 45 personally meaningful places in their city of residence, it is based on the responses of a small group of eight participants who are all living Edinburgh in the United Kingdom. This is expected to have impacted the resulting sixteen types of emotional experience-in-place identified in the city of residence in several ways. Firstly, the taxonomy of sixteen types of emotion experience-in-place is not expected to be complete. For example, a type of religious emotional experience-in-place was not identified in this particular data corpus, although several participants in the focus groups hinted at it. Several frameworks of place attachment do take into account this particular type of place attachment (Mazumdar & Mazumdar, 2004; McCullough, 2001, 2004; Scannell & Gifford, 2010, 2014), and several studies in HCI have focused on designing technology for religious experiences (e.g. Blythe & Buie, 2014). If this study would have been conducted in a different city in a different country or in a culture where religion plays a more prominent role, for example in Mecca, Jerusalem or Lourdes, an emotional

experience-in-place of religion from which emotional person-place relationships develop would likely have been identified. Secondly, participants describe their perception of and relationship with the city of Edinburgh as a whole, as a beautiful, historic, vibrant, cultural city that is small and walkable. But it lacks a sense of community and the weather is cold and rainy (Section 4.2.1). This could have resulted in certain types of emotional experience-in-place found in Edinburgh to be more (or less) salient or common in comparison to other cities both within the United Kingdom and across other countries the world. For example, the emotional experience-in-place of Aesthetic Pleasure is a more common occurrence in the data corpus collected in Edinburgh than in the set of experienced psychological benefits of personally meaningful places among Swedish nationals living in Sweden (Scannell & Gifford, 2017). A possible explanation is that this is because Edinburgh with its historic city centre which is part of the UNESCO World Heritage, is considered particularly beautiful in comparison to other, perhaps more industrial cities. Thirdly, the sample of participants is expected to have influenced the findings. All but one of the participants in the Walking & Talking sessions were not born and raised in Edinburgh and more than half of the participants (five out of eight) were born and raised in other countries outside the United Kingdom, with most of them having moved to Edinburgh as students. This could account for the emotional experience-in-place of Belonging ranking highly within the set of sixteen types of experience-in-place and the use of personally meaningful places to self-regulate and alleviate feelings of homesickness potentially being overrepresented. However, recent studies on place attachment indicate that due to increasing mobility and globalization, for an increasing number of people having a migration background is becoming the norm (Gustafson, 2014; Masso et al., 2019; Palladino, 2019; Trąbka, 2019). As a result, people live in and have multiple personally meaningful relationships with places in different cities and different countries at the same time, suggesting that the importance of the different types of individual, emotional experience-in-place depends on each individual's relationship with the city under investigation (Masso et al., 2019).

Kanstrup et al. (2014) identified a lack of walking methods being used in a HCI design context, and a need to better integrate walking methods with other methods. Although walking interviews have been used in the social sciences to investigate

people's individual experience of and relationships with the urban environment, and in HCI mainly to evaluate technology or prototypes in "in the wild", walking interviews in the field of Urban Interaction Design that inform speculative design are even less common. One of the strengths of this research lies in the combination of the Walking & Talking method producing rich, contextualised and intimate data regarding people's individual emotional person-place relationships with personally meaningful places in the urban environment, and using this to inform the design and creation of a suite of speculative design fictions that participants in the focus groups consider to be engaging, emotionally and thought provoking , feel authentic (i.e., based on real experiences, places, people, and interactions), and are perceived to be personally relevant to the participants. This enabled the effective communication and discussion of the main findings of the research regarding the complex relationship between person, place, and technology in the context of emotional person-place relationships in the urban environment. This complexity is poorly captured and communicated using traditional emotion maps, but the suite of speculative design fictions provided an easy accessible format for non-expert citizens (Brewer & Dourish, 2008; de Lange, 2013; Stals et al., 2018) (see Section 5.1.1).

**Fun & Engaging**

When discussing and reflecting on the suite of speculative design fictions in the three focus groups, participants commented on them being fun and engaging, making it feel like the focus group flew by:

> P2.4: "I really enjoyed it! I couldn't believe two hours had gone already!"

> **Focus Group #2 on the speculative design fictions being fun and engaging**

That the speculative design fictions are engaging also became clear from observations of the participants, in particular while watching the short films. Participants exhibited observable positive emotional reactions to the speculative design fictions. For example, participants laughed at the rude, over the top reaction of the local student towards the family of tourists blocking the pavement in the Smellification short film. They cheered and laughed when the widow slapped the two developers caught spying on her in the short film Personal Virtual Monuments. In the subsequent discussions,

participants also stated their emotional reactions to each of the three speculative design fictions. The following participant for example describes her shock of smells being misused as an addictive substance, which was inspired by the smell of cannabis being identified as a smell in the park. It provoked thought and reflection on the potential misuse or negative implications of using smells to record and consume personally meaningful experiences and memories in places:

> *P1.3: That's the thing, because the more we've been discussing it, the more like, yeah, I see it from a nostalgic point of view. But when it turned into that group [of students] using it, I thought "Wait, hang on!" I guess a lot of it comes my own ignorance, because I was like, oh, happy [tourist] family. And then it was, "oh, that's another use for it!?"*

> **Focus Group #1 on the shock caused by the potential negative implications of using smells as substance abuse**

## Thought provoking

Participants also commented on the how the speculative design fictions provoked not only an emotional reaction but also thought and reflection. In the quote below for example, participants start thinking and reflecting on how other people, in this case tourists, would perceive the urban environment in the participant's city of residence:

> *P1.4: Yeah, it made me feel like, I wonder what be like, if I was a tourist in Edinburgh, I have never been a tourist here. So maybe think about that. So I've never experienced Princes Street. I never really thought about it but experiencing it for the first time. You know, see the One O'clock Gun [traditional firing of the canon at the castle]. So it made me feel like I was there a little bit.*

> *P1.3: You tend to sort of forget the One O'clock Gun is actually a thing. So just so that sort of reminded me of, like: Oh yeah, that is every day.*

> **Focus Group 1 on how speculative design fiction provoked thought on how tourists experience Edinburgh.**

It enabled participants to see their own city through the eyes of someone else. The scene with the tourist family is based on the finding resulting from the Walking &

Talking sessions indicating a difference in interest in emotions evoked by places in an unknown or unfamiliar city compared to their city of residence. By showing both perspectives in the speculative design fiction, it enables participants to take on different roles and think about how a tourist would experience certain places in Edinburgh based on the smells. It helped them reflect on what is important to them as a tourist when visiting an unknown city.

That the suite of speculative design fictions is thought-provoking, is further illustrated by a participant who directly after participating in the focus group wanted to visit the location of the purple personal virtual monument:

> *"I really want to go to Princes Street now. Because if I am not mistaking that is where the purple monument is no? I mean, I know it is not really there, but I feel I should go there now."*
>
> **Focus Group #3 participant wanting to visit the location of the purple monument.**

She emailed the researcher two weeks after participating in the focus group. She expressed that she was still thinking about the speculative technological service that would allow her to create and place personal virtual monuments in her own personally meaningful places:

> *P3.5: "I really enjoyed your session. [..] Plus I thought it was all very interesting. I keep thinking about those virtual monuments."*
>
> **Focus Group #3 participant expressing in an email she is was still thinking about the Personal Virtual Monuments short film two weeks later.**

This indicates that for some participants the thought provocation did not stop after the focus group had finished, but that they continued to think about it well beyond the duration of the focus groups.


**Authentic human interactions in the hybrid city of the near future**

Participants also commented on perceived authenticity of the different types of emotional experience-in-place depicted in the speculative design fictions, and the

authenticity of the characters and their interactions with technology in the urban environment. This was achieved first and foremost by basing the design for the speculative technology on the types of emotional experience-in-place in the typology that had emerged from the analysis of the data corpus collected using the Walking & Talking sessions (Section 4.2.3). The intimate, rich, and contextualised data regarding the participant's emotional person-place relationships with personally meaningful places in the urban environment revealed which aspects of the emotional experience-in-place are most salient for each type. It detailed the type of place where the experience-in-place is likely to be experienced, the emotions a person feels, how they behaved, other people that play a part in this experience-in-place, and the use of and interactions with technology in this context. Using this rich, contextualised, and intimate data as a basis, resulted in an authentic, recognisable depiction of the emotional experience-in-place in the speculative design fictions, that is relatable to participants. For example, in particular the two participants how had recently lost their father related to authentic portrayal of the interactions surrounding this negative experience-in-place depicted in the Personal Virtual Monuments short film. In addition, they related to the way the speculative technological service was contextualised within this type of negative emotional experience-in-place, and augmented it by addressing their need for having a place to go grieve and commemorate:

> *P3.5: I quite like the idea you could have your wee private place invisible to everyone else, and you could create something that's meaningful in an invisible way. [..] It was intriguing. The thing with like the Pokémon Go and all those things, it just was like, "Well, what do we do with that technology? Where do we take it next?" And I found that interesting. There is plenty of adults that have been caught up in that world, not me, but loads. And when I saw this, I thought "Finally a useful application for that technology!" That is something I would use it for.*
>
> **Focus Group #3 on the authentic use of the speculative technology contextualised within the negative experience-in-place**

Even when the possible future scenario was dystopian or the speculative technology was disliked, as was the case with the emotion bracelets in the "Emotion-based Place Access" comic. Participants could still relate to it because it is based on authentic experiences and depicted authentic responses from the characters. For the dystopian speculative design fiction for example, participants still commented on how the main character Stefani felt like a real person, and how she and her friends exhibited authentic responses to the experience-in-place and the speculative technology in the urban context:

> *P2.5: It is ridiculous that they got kicked out of the club because of her emotions. But I really liked that when Stefani was kicked out the club, that her friends went out with her, to see if she was ok and if they could help her. I mean, if I was in that situation, I would do the same.*
>
> *P2.1: Yeah, me too.*
>
> *P2.5: Yeah, I thought that was quite realistic, I liked that.*
>
> **Focus Group 2 on the characters exhibiting authentic responses, increasing relatability for the participants.**

If the experiences, characters, and interactions depicted in the speculative design fictions are perceived to be authentic, this makes it easier for participants to identify and sympathise with the characters, enabling participants to relate to the speculative design fiction resulting in more informative responses. In the quote below, the participant identifies with the father in the tourist family, because he relates to the father's experience-in-place as a tourist and feels he would also interact with his family and the speculative smellstick technology in a similar way if he was in a similar situation:

> *P1.2: I like the tourist dad. From all the other characters, it seems to me that he was the only one that was having a good natural time with his wife and daughter. And he was trying really to make a memory without external help. It was just in the end when he used the technology to capture the memory. But you know, he was really asking questions. Where was the best place, strolling with the map, keeping an eye on the child and the wider world. Very, you know,*

*like, happy to the kid who was in a bad mood a little bit. So I like I like him, I mean, for me was the most natural human.*

*P1.6: Yeah, he wasn't preoccupied with the technology or thinking, "I have to record this, or I have to record that".*

*P1.2: Exactly!*

***Focus Group #1 on identifying with the tourist father and his interaction with the speculative smellstick technology***

This, in combination with responses from other participants, informed the design implication that if smells are recorded and used for personal reminiscing, the speculative interactive smellstick is preferred due to the limited interaction with it, compared to the interactive nose piercing.

In addition, the detailed scripts for the speculative design fictions are based on real stories that participants shared during the Walking & Talking sessions. They are changed is certain areas to protect the privacy of the participant and other people named in their stories (e.g. names and specific locations), and to make the story fit in with the overall narrative of the speculative design fiction. Basing it on the real stories shared by participants makes it easier to add details to the story. This resulted in several participants of the focus groups commenting on the speculative design fictions "feeling real" rather than made up:

*P2.3: That was very interesting! I think you should make more stories! More videos. Actually, I think they were very good. They were very good at getting the point across. There is a lot of creativity there in making the videos and the comic. But I was wondering… how did you come up with those stories? Did you make them up or…?*

*Researcher: They are based on walking interviews that I did with other participants to investigate their relationships with places that are important to them personally in the city. So the stories are based on those interviews basically.*

*P2.3: Yeah, that's what I thought. You can tell there is a lot of research behind it. It makes them feel very real. I'm impressed!*

***Focus Group #2 on how the speculative design fictions "feel real" as they are based on real stories related to personally meaningful places told by participants during the Walking & Talking sessions.***

From a more practical point of view, using real aspects and details from the stories shared by participants during the Walking & Talking session also makes it easier for the researcher to write the narrative and script for the speculative design fiction without having to have the necessary talent, skills or experience for scriptwriting.

**<u>Personally relevant</u>**

A survey conducted by the Institution of Engineering and Technology (IET) in May 2016, showed that 82% of British people do not know what a smart city (or hybrid city) is (Engelbert et al., 2019; IET, 2016). The suite of speculative design fictions enabled the researcher to engage citizens of Edinburgh, who have no idea of what a smart city is or have an affinity with smart city technology, in an informed discussion regarding this unfamiliar design space. By focusing on the emotional experiences-in-place that people have in the urban environment, this enabled the researcher to engage with participants on a personal, human level. This makes the issues that the field of Urban Interaction Design aims to address, feel personally relevant to the participants in the focus groups. The participant in the quote below for example commented on how the speculative design fiction "Personal Virtual Monuments" had made issues regarding privacy in the hybrid city more personally relevant for him:

*P1.4: People are always trying to talk to you about privacy and personal data and GDPR and bla bla bla. Which you know, is really important but also really boring to talk about. But when you then see it in the video, you suddenly realise: "Hang on a minute. That could actually happen." I can totally see now how my data could be used to spy on me or stalk me in public.*

***Focus Group #1 on realising the personal importance of privacy regarding emotion data related to personally meaningful places.***

Another participant also commented on how the suite of speculative design fictions, helped her realise how this research in the field of Urban Interaction Design is personally relevant for her and relates to her own urban lived experience:

> *P2.4: This is the first study that I took part in that I felt afterwards "this really meant something to me". That felt important to me. You always get those weird experiments here [in the School of Computing] and I have taken part in those as well, you know, to help the person out. But afterwards you just think "what is the point?!" Like, I have done some of those experiments where you have to sit in a room and listen to sounds with headphones on. It just gets so boring after a while. And it actually made me feel sick afterwards. Your brain just goes brwrwrewrerw afterwards."*

> **Focus Group #2 on feeling the research is made personally relevant through the use of speculative design fictions based on authentic, emotional experiences-in-place in the urban environment.**

This shows that the focus on people's personal emotional experience-in-place in the urban environment does not only lead to a better understanding of the relationship between person, place, and technology. It also helps to engage and empower non-expert citizens on a human, personal level, to actively contribute in this human-centred, bottom-up approach to the design of technological devices and services for augmenting the urban lived experience in the hybrid city of the near future.

What also contributes to this, is that the two short films are situated in Edinburgh, the city of residence of the participants in the focus groups. Participants recognised the places in the city, making it easier for participant to reflect on current practices and the potential implications on a personal level:

> *P1.6: What I really liked, was the familiarity of the places, like the park for example. Just because I have my own memories of walking through there with friends during summertime. [..] And Princes Street is always a bit crazy. I have got my own emotional connections to those places. You know, it triggers my own memories and I know for example that I have had similar experiences in*

*the Meadows. It makes you think like, what I would do with that technology in the park, or what other people might be doing with it there."*

**Focus Group #1 on how the use of recognisable places in Edinburgh in speculative design fictions made it more personally relevant, helping them to reflect on their own current practices and potential implications***.*

This indicates that it can be beneficial to situate the speculative design fictions within the participants' actual city of residence, as advised by Auger in his strategies for constructing speculative design (Auger, 2013). It makes the discussion regarding the potential future possibilities and implications more concrete, and more personally relevant for participants. Although speculative design fictions can be tailored to a specific city to this end, it is not and should not be dependent on the participants' familiarity with the city. In fact, an advantage of using speculative design fictions over emotion maps to communicate and share emotional person-place relationships in the urban environment, is that emotion maps rely more on familiarity with the city it depicts. The efficacy of emotion maps is therefore limited to local audiences and participants in the study regarding describing their emotional relationship with the urban environment and opening up issues for discussion (Nold, 2009, 2018).

Overall, the resulting suite of speculative design fictions enabled the effective communication of the main findings of the research (i.e., the complex relationships between person, place, and technology) in a fun, engaging, understandable, effective and efficient way to non-expert citizens, and validated and refined themes discovered in the data corpus. It also enabled the researcher to engage non-expert citizens on a human, personal level in an informed discussion speculating and exploring possible future scenarios to inform the design of technological devices and services that could augment the urban lived experience in a for them unfamiliar design space. The potential implications (i.e., design implications, social implications, negative implications), reflection on current practices, interactions, and the role of technology in their experience of emotional person-place relationships with personally significant places in the urban environment, and articulation of their desired human interactions and experiences augmented by technology in a hybrid city of the near future, resulted in a better understanding of the complex relationship between person, place and

technology in the context of emotional person-place relationships in the urban environment. It produced knowledge which informed a set of design guidelines for urban interaction designers aiming to design technological devices and services that leverage emotional person-place relationships in the urban environment to augment the urban lived experience in the hybrid city of the near future.

## 7.3   Concluding Remarks

In this chapter, the main findings that answer these research questions have been discussed and positioned within existing literature. Also the strengths, limitations and the implications of the research have been discussed.

In the next chapter, the research questions and how this thesis has addressed them will be concisely reiterated, contributions of this thesis to the field of Urban Interaction Design will be identified, and opportunities for future work will be discussed.

# Chapter 8:  Conclusion

## 8.1  Introduction

In this final chapter, the research questions and how this thesis has addressed them will be reiterated. The contributions will be identified and opportunities for future work will be discussed.

The overall aim of this thesis in the field of Urban Interaction Design, has been to create a better understanding of the relationship between person, place, and technology in the urban environment through the lens of emotion. It has investigated the overall research question: *How can people's personal emotional relationships with their own personally meaningful places in the urban environment, and in particular their personally meaningful experiences-in-place and emotions connected to these personally significant places in their city of residence, inform the design of technological devices and services for the hybrid city of the near future*?

## 8.2  Answering the Research Questions

To answer this overall research question, the following sub questions have been formulated and answered:

**Research Question 1:** *How are people's personal emotional place meanings (i.e., their personally meaningful experiences-in-place and emotions) connected to their own personally significant places in the urban environment?*

In Chapter 4, the range of different types of places within the participants' city of residence, Edinburgh, that people develop emotional person-place relationships with has been identified (Section 4.2.1). This includes a **wide variety of different types of mostly mundane, (semi-)public places** which are not limited to the home, neighbourhood, or workplace. Parks, bars and pubs are the most common types of places that people develop emotional person-place relationships with. In Section 4.2.2, the range of different types of positive and negative emotions related to personally significant places within the city of residence is discussed. Results regarding the affective component of the emotion person-place relationships indicate that most **emotions** related to personally significant places **are positive (51%), 39% are negative, and 11% are neutral**. However, most emotional person-place relationships are

considered positive by participants (89%), with 9% being classified as negative attachments to personally meaningful places and 2% being classified as neutral or ambivalent. This indicates that **emotional person-place relationships can also be negative,** and develop from negative experiences and emotions. More importantly however, is the finding that there is **no one-to-one relationship between emotion and place**, but that there are **between two and seven different emotions** related to each personally meaningful place. This means that emotions maps used in the field of Urban Interaction Design as a user interface for applications or as representations for creating a better understanding of the emotional person-place relationships or to communicate and share emotional person-place relationship within the urban environment, oversimplify and inaccurately represent the complex emotional person-place relationships in the urban environment. In addition, these findings support the **holistic approach** taken in this thesis to investigate and focus on the full range of positive and negative experiences-in-place and related emotions from which emotional person-place relationships with all types of personally meaningful places in the urban environment develop, rather than focusing on a specific (type of) place, technology, or emotion. It provides a more fulsome and deeper understanding of the emotional experiences-in-place that people have in their personally significant places in their city of residence.

This resulted in a **taxonomy of sixteen types of emotional experience-in-place** and related emotions from which emotional person-place relationships with personally meaningful places in the urban environment develop, and their occurrence within the city of residence have been identified (see Section 4.2.3). These are Reminiscing (41%), Socialising (27%), Belonging (25%), Bonding (25%), Relaxation (18%), Romance (16%), Aesthetic Pleasure (16%), Knowledge & Secrets (16%), Escaping (13%), Negative Experiences (11%), Exploring & Discovering (11%), Interest (11%), Achievement (9%), Inspiration & Motivation (9%), Imagination (7%), and Magical Moments (7%). This creates a **better understanding of the emotional person-place relationships** people currently have **within their city of residence**. The taxonomy also **provides guidance for urban interaction designers** for the design of technological devices and services that could potentially augment this urban lived experience of the hybrid city of the near future.

**Research Question 2**: *How can these personal emotional meanings of place be represented and communicated?*

In Section 4.3, opportunities and motivations for technology to capture, represent, consume, and share emotional person-place relationship data have been identified. Personally meaningful places are used as a tool for **emotion regulation** (Section 4.3.1). In Section 4.3.2, twelve categories of physical and digital representations have been identified that people would like to use to represent and communicate their emotional person-place relationships, informing the different forms this data can take. Although visual representations in the form of pictures, video and drawings are the most common, this also revealed a **desire to represent emotional person-place relationships using different types of representations and sensory experiences**. In order of preference, these are smell, taste, audio, and touch. This means that there could be potential for technological devices and services that use **smells** to capture, represent, consume, and share a person's emotional person-place relationship with other people, to augment the urban lived experience in a hybrid city of the near future. In Section 4.3.3, the different types of people that play a role in shaping a person's emotional person-place relationships and that a person potentially would like to share this type of data with, are identified. More importantly however, is the finding that unlike Quantified-Self data such as arousal levels currently gathered using wearables to investigate emotional person-place relationships, **emotional person-place relationship data is considered to be non-trivial, personal, and private**. As such, it is not shared publicly, but is shared with a specific person or small group of people that the person has close social relationships with, had a shared emotional experience-in-place with, or shares personal or professional interests with. Several **motivations for sharing** (and not sharing) emotional person-place relationship data have been identified and discussed in more detail in Section 4.3.3.

**Research Question 3:** *What is the relevance of these emotional person-place relationships to other people?*

Section 4.3.4 addresses what the relevance of these personal emotion-person place relationships might be to other people, and where people's interest would lie in exploring and using another person's emotional person-place relationships data. For a

specific person, interest is based on **closeness of the social relationship and shared personal or professional interest**. However, the interest in emotional person-place relationship data also depends on the **type of emotion**. It revealed a desire to empathise and sympathise with other people's negative emotional person-place relationships, and a desire to experience the positive emotions related to other people's personally meaningful places in the urban environment. It also revealed a difference between familiar and unfamiliar cities. In particular, there is an **interest in extreme positive and negative emotional person-place relationships in the city of residence, characterised by emotions of sadness, love, or anger.** But in an unfamiliar city people are only interested in the positive emotional person-place relationships, regardless of the intensity of the related emotions. This indicates that there might be potential for designing a technological device or service for negative experiences-in-place within the city of residence based on the loss of a loved one. In addition, it revealed a **tension between a willingness to share** their own individual negative emotional person-place relationships, **and interest in other people's negative emotional person-place relationships within the city of residence**.

**Research Question 4:** *How can people's personal, emotional relationships with personally meaningful places in the urban environment potentially inform the design of future technological devices and services for the hybrid city of the near future?*

The answer to this fourth research question has been addressed in Chapters 5 and 6. Chapter 5 discusses how using a speculative design approach, the main findings of this thesis regarding people's emotional person-place relationships with personally meaningful places in their city of residence could identify potential for and informed the design of technological device and services for the hybrid city of the near future. A suite of three speculative design fictions has been created that explore the design space and articulate possible future scenarios of how technology could potentially augment the urban lived experience in the hybrid city of the near future. These speculative design fictions are intended to be emotionally provocative conversation pieces to be used as a catalyst for discussion. They speculate about how technological devices and services might augment the urban lived experience in the hybrid city of the near future, and enable critical thought and reflection on current practices and

interactions regarding emotional-person place relationships in the urban environment. Using PACT-analysis to design the speculative technology, and Tactics of Ambiguity and the SCAMPER design technique to create the provocations, a suite of three speculative design fictions has been created.

The first speculative design fiction in Section 5.3 took the form of a short film named "Smellification". It articulated and communicated the main findings that there is a desire to represent emotional person-place relationships with non-visual representations using the sensory experience of smell instead, and that parks, bars, and pubs are the most common types of places people develop an emotional person-place relationship with within their city of residence. It explored the sharing of emotional person-place relationships and is based on the emotional experience-in-place of belonging, relaxation, reminiscing, and escaping. It speculated about a possible future scenario of the hybrid city, where speculative technological devices are used for recording, consuming, and sharing emotional person-place relationships using smells as a representation.

The second speculative design fiction in Section 5.4 took the form of a comic named "Emotion-based Place Access". It articulated and communicated the main findings that there is no one-to-one relationships between emotion and place, and that people use personally significant places in their city of residence as a tool to self-regulate their emotional state. The speculative design fiction speculated about what using personally meaningful places for the self-regulation of emotions might look like in a hybrid city of the near future and what the potential implications might be. It depicted a dystopian future scenario where a person is only allowed to enter a place or event if they are in the desired emotional state.

The third speculative design fiction in Section 5.5 took the form of a short film named "Personal Virtual Monuments". It articulated and communicated the main findings that emotional person-place relationships and the experiences-in-place and related emotions from which they develop can also be negative, that for the city of residence there is an interest in the extreme positive and negative emotional person-place relationships of other people, in particular regarding emotional person-place relationships characterised by the emotions of sadness, love, and anger. At the same

time, there is a tension between interest in other people's negative emotional person-place relationships, and a person's willingness to share their own negative emotional person-place relationship data related to personally meaningful places in the city of residence. The speculative design fiction speculated about a possible future scenario of the hybrid city where a speculative technological service exists, that allows people to create and place their own personal virtual monuments anywhere they like in the city, that are only visible for a specific person or a specific group of people.

The subsequent discussion of **the suite of speculative design fictions** has been presented in Chapter 6: . A series of three focus groups with sixteen residents of Edinburgh **enabled non-expert citizens to engage in an informed discussion** with the researcher regarding the complex relationship between person, place, and technology in the urban environment. It enabled reflection on current practices and interactions regarding their emotional person-place relationships with personally meaningful places in the urban environment, and speculation regarding possible future scenarios of how technology could augment this urban lived experience in a hybrid city of the near future. The suite of speculative design fictions was considered to be engaging and relatable by citizens of Edinburgh, as it depicted **authentic, personally relevant human interactions** in the hybrid city of the near future.

The focus group discussions of the suite of speculative design fictions validated and refined the main findings of the thesis, and informed potential design implications, social implications, and negative implications for each of the speculative future scenarios (see Section 6.2). This created a better understanding of the relationship between person, place, and technology in the urban environment, and **informed a set of design guidelines for urban interaction designers** (see Section 6.3). These design guidelines inform the design of technological devices and services that aim to leverage the emotional person-place relationships in the urban environment, to augment the urban lived experience of the hybrid city of the (near) future. These design guidelines advocate to design for emotional experience-in-place in the urban environment; support the creation, customisation, and personalisation of representations of emotional person-place relationships; design for personal and shared use; design for

privacy and control; and design for continued interaction. These design guidelines are discussed in more detail in Section 6.3.

## 8.3   Contributions

This thesis makes several contributions in the field of Urban Interaction Design.

Firstly, it applies a novel, holistic approach in the field of Urban Interaction Design to create a better understanding of emotional person-place relationships in the urban environment. This approach combines the positive and negative experiences-in-place and emotions related to different types of personally meaningful places in the urban environment. This resulted in a taxonomy of sixteen types of emotional experience-in-place that people have within their city of residence. It validates and refines existing frameworks of place attachment and can inform the design of new technological devices and services for the hybrid city of the near future.

Secondly, the combination of using the Walking & Talking method to inform the design and creation of a suite of speculative design fictions, provides a powerful way to communicate the complexity of emotional person-place relationships in the technology-rich urban environment to non-expert citizens. The Walking & Talking method produced rich, contextualised, and intimate data, regarding people's emotional person-place relationships with personally meaningful places in their city of residence. This informed the design and creation of speculative design fictions that are authentic, personally relevant, and engage citizens on a personal, human level in a discussion regarding the complex relationship between person, place, and technology in the hybrid city of the near future. This resulted in a set of design guidelines for urban interaction designers aiming to design technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future.

## 8.4   Future Work

This thesis highlighted several opportunities for future work. In Chapter 4, sixteen types of emotional person-place relationships that can inform the design of technological devices and services for the hybrid city of the near future have been identified. However, as highlighted in Section 7.2 regarding the strengths and limitations of this research, this list of types of emotional experience-in-place and related emotions is not expected to be complete as they are based on the emotional

person-place relationships of a small number of participants with their own personally meaningful places in one specific city of residence, Edinburgh. Future research should focus on conducting similar research in other cities in other cultures and other countries in the world, to generate a more complete list of types of individual emotional experience-in-place and related emotions that people have in their city of residence. By focusing on different cities of residence and also different types of citizens, this will also create a better understanding of how the relative importance of certain types of emotional experience-in-place might differ between cities and citizens. This would further contribute to an overall better understanding of the complex relationship between person, place, and technology.

Furthermore, only a handful of the sixteen different types of emotional experience-in-place have been explored further using the suite of speculative design fictions in Chapter 5. In particular the types of emotional experience-in-place of Relaxation, Reminiscing, Belonging, and Negative Experiences have been addressed in the suite of speculative design fictions. However, also the other types of emotional experience-in-place identified in this thesis can be used to explore and articulate future possibilities using speculative design fictions. For example, the emotional experience-in-place of Achievement has not yet received much attention in the field of Urban Interaction Design, but was identified in the analysis of the Walking & Talking sessions as well as in the responses in the focus groups as a type of emotional experience-in-place that people would like to augment using technology in the urban environment. In addition, responses from the focus groups to the speculative design fiction "Personal Virtual Monuments", indicate that there might be potential for augmented reality to create a shared experiences-in-place around the negative experience-in-place of having lost a loved one. The discussion in the focus groups created a better understanding of how technology could potentially augment this negative experience-in-place in the hybrid city of the near future, and identified some potential design implications, social implications and negative implications. This could also inform future work, by acting as a starting point for taking a more traditional, more focused, participatory design approach. By focusing specifically on participants who have recently lost a loved one, future work could investigate how augmented reality technology which is currently mainly used for urban gaming in an urban context, could also be used to create a

shared interactive experience-in-place in the context of commemorating the loss of a loved one.

## 8.5 Concluding remarks

This thesis in the field of Urban Interaction Design has aimed to create a better understanding of the complex relationship between person, place, and technology in the urban environment, by taking a holistic approach to investigating the personal, emotional person-place relationships that individuals currently have with their own personally meaningful places in their city of residence. In particular, it focuses on the experience-in-place and emotions from which these individual emotional person-place relationships develop with different types of urban places, resulting in a taxonomy of emotional experience-in-place and identified opportunities for technology to capture, represent, consume and share this emotional person-place relationship data. This rich, contextualised, and intimate data has informed the design and creation of a suite of speculative design fictions. This suite informed the design of future technological devices and services for this unfamiliar design space, by exploring, articulating, and discussing authentic, personally relevant human interactions in the hybrid city of the near future with residents of Edinburgh. This resulted in a set of design guidelines for urban interaction designers aiming to design technological devices and services that leverage emotional person-place relationships in the hybrid city of the near future.

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# Appendix A: Glossary of Terms

**Critical Design:** A specific approach to Speculative Design. It applies a critical lens to the design speculation by using design as a medium to engage their audiences, provoke an emotional response. It asks carefully formulated "What if"-questions to make the audience think and open up issues to discussion regarding current practices and future possibilities (Dunne & Raby, 2001, 2007).

**Emotions**: Affective states which are consciously experienced and have an apparent object or cause (Boehner et al., 2007; Coyne, 2016a; de Lange, 2013; Norman, 2004; Westerink et al., 2011, 2008).

**Experience-in-Place**: The combination of the personally meaningful experience and emotions that a person has in a place, from which the emotional person-place relationship (i.e., place attachment) develops, and that make that place personally meaningful (Manzo, 2005).

**Focus groups:** Structured, moderated group discussions (sometimes also referred to in the literature as "group interviews" or "focused interviews") that explore people's meanings, desires, motivations, priorities, values, memories, and personal, first-hand experiences of a complex phenomenon (Goodman et al., 2012)

**Grounded theory approach:** Approach to data analysis and data gathering that is grounded in the data. It attempts to move beyond description to generate a general explanation or deeper understanding of a process, action, interaction, or phenomenon that is experienced by participants over time, through interrelating categories of information based on data collected from individual participants and shaped by the views of the participants (Charmaz, 2009, 2014; Creswell & Poth, 2018).

**Human Geography:** A branch of geography that is associated with and deals with humans and their relationships with communities, cultures, economies, and interactions with the environment, by studying their relations with and across locations (Johnston, 2000).

**Hybrid City:** City in which the physical world of the urban environment, and the digital world in the form of technological devices and services, and increasing layers of different digital data augmenting the urban environment, come together (Smyth, Helgason, & Brynskov, 2013; Smyth et al., 2015).

**Identity of Place:** The persistent sameness and unity which allows that place to be differentiated from other places (Relph, 1976).

**Place:** A meaningful location (Lewicka, 2011b).

**Placelessness**: The increased homogeneity of places and the eradication of distinctive, cultural, authentic, significant places, leading to disappearing sense of place (Relph, 1976).

**Place Attachment**: A multidimensional concept that characterises the emotional relationship between a person and their personally meaningful places (Scannell &

Gifford, 2010). Develops from the experiences-in-place and emotions that a person has in a place.

**Place Dependence:** Highlights the physical characteristics of a place as central to place attachment because it provides amenities or resources to support one's goals (Scannell & Gifford, 2010). Also referred to in the literature as functional place attachment (Scannell & Gifford, 2014).

**Place Identity:** Those dimensions of the self that define the individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, beliefs, preferences, feelings, values, goals and behavioural tendencies (Proshansky, 1978).

**Place Identity**: Aspect of place attachment highlighting the self-definitions that are derived from places, incorporating place in the larger concept of self. This occurs when individuals draw similarities between self and place, and incorporate cognitions about the physical environment (memories, thoughts, values, preferences, categorizations) into their self-definitions (Scannell & Gifford, 2010). Also referred to in the literature as place-related self-identity (Gustafson, 2001a).

**Place meaning**: An emotional person-place relationship or attachment to a place that can be positive or negative (Gustafson, 2001a).

**Non-places:** Places without relational or historical identity that do not integrate with existing places and cultural and historical context of the country or city they are in, such as airports, shopping malls, and hotel rooms (Augé, 1995).

**Phenomenology of place**: A holistic interpretive study of place and the human experience of place, which aims to reveal events, meanings and experiences that can occur in a person's everyday life, but typically take place below the level of conscious awareness (Relph, 1976). A phenomenological approach is a holistic approach which seeks to qualify the long- term relationship between an individual and a place through lived experience. Emphasis is placed on subjective place experience, deep emotional ties, and individually constructed place meaning (Raymond et al., 2017; Relph, 1976; Seamon, 2014; Tuan, 1974, 1977).

**Psychogeography**: The study of the (precise laws and) specific effects of the geographical environment, consciously organized or not, on the emotions and behaviour of individuals (Debord, 1955).

**Public authoring**: The mapping and publicly sharing of local knowledge, memories, stories, information, and experiences, using maps (Angus et al., 2008; Lane et al., 2005).

**Sense of place**: Umbrella term which encompasses other place-related concepts such as meaning of place, place dependence, and place identity (Scannell & Gifford, 2010). Tuan defined is as an awareness of a positive feeling for place (Tuan, 1974, 1977).

**Smart City:** The five key elements of the traditional smart city, are that it is a technology-driven top-down approach which operates at the urban scale, the

technology is invisible and working in the background, the technology is in control, the focus on managing urban infrastructures , and aim is to increase the efficiency and productivity of the urban infrastructures and processes (Hill, 2013).

**Smart Citizen:** People living in cities are not seen as passive consumers, nodes in a network, or human sensors. Instead, they are viewed as active, engaged, citizens that make the city smart, by using this new technological layer in the urban environment to shape the city in expected and unexpected ways for city making. That is, to create pleasant cities to work, live, play, create wealth, culture and more people (Hemment & Townsend, 2013; Hill, 2013)

**Social Knowledge:** The everyday essential sharing of information, stories, knowledge, memories, and stories with family, friends, neighbours and strangers through storytelling, a social and cultural practice that is not just for informational or practical purposes, but because it is enjoyable and strengthens social ties (Angus et al., 2008; Lane et al., 2005).

**Speculative Design:** A methodology or approach which uses design to speculate about possible futures. It is a critical, discursive design practice, based on critical thinking and dialogue, which questions the practice of design and its modernist definition, and uses design to speculate about and envision possible future scenarios. It comprises a number of similar practices, including critical design and speculative design fictions, and consists of three key elements: A focus on the implications of technology and problem finding, the use of fiction to speculate on future products, services, systems, and worlds that do not exist yet, and the ability to act as conversation pieces (Auger, 2013; Mitrovic, 2015; SpeculativeEdu, 2018).

**Speculative Design Fictions:** A specific genre of Speculative Design that finds its origins in science fiction. This approach entails the creation of fictionalised designs for exploring the design space that lies beyond the here and the now, by contextualising it at the edges of our current knowledge. It is the creation of stories that speculate about social practices that may be constructed around and through the designed artefacts and systems, known as *diegetic prototypes* (Bleecker, 2009; Bleecker & Nova, 2009; Sterling, 2012).

**Thick Data:** An integrative approach to research complementary to Big Data, using qualitative, ethnographic research methods to uncover people's emotions, stories, experiences, and models of their world (T. Wang, 2016).

**Topophilia:** Love of place, a term coined by human geographer Tuan (Tuan, 1977).

**Triangulation:** The process by which some external stimulus provides a linkage between people and prompts strangers to talk (Whyte, 1980).

**Ubiquitous computing**: Vision of Mark Weiser that invisible ubiquitous computing technology would weave itself into the fabric of everyday life. It does not demand focus or attention, but rather results in seamless interaction where the technology fades and disappears into the background until it becomes indistinguishable from the environment itself (Weiser, 1991).

**Urban Interaction Design (UrbanIxD):** A human-centred, bottom-up design approach operating at the human scale (i.e., the level of the individual or group) which aims to identify the needs, desires, routines, behaviours and experiences of people in the urban environment, to inform the design of innovative technological devices and services for the hybrid city of the (near) future (UrbanIxD, 2014).

**Urbanisation:** A complex socio-economic process that transforms the built environment, converting formerly rural into urban settlements, while also shifting the spatial distribution of a population from rural to urban areas. A major consequence of urbanization is a rise in the number, land area and population size of urban settlements and in the number and share of urban residents compared to rural dwellers. The degree or level of urbanization is typically expressed as the percentage of population residing in urban areas (United Nations, 2019).

# Appendix B: Application for Ethical Approval

Application for Cross-University Ethical Approval

## 1. Research Details

| | |
|---|---|
| **Name:** | Shenando Stals |
| **School or Professional service department:** | School of Computing |
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| **Contact number:** | +441314552791 |
| **Project Title:** | UrbanIxD: Exploring Human Interactions for the Hybrid City |
| **Start Date:** | 01-03-2015 |
| **Duration of Project:** | 3 years |
| **Type of Research:** Doctoral Student | |

## 2. Screening Questions

Please answer the following questions to identify the level of risk in the proposed project:
**If you answer 'No' to all questions, please complete Section 3a only.**
**If you have answered 'Yes' to any of the questions 5-14 please complete Section 3a and 3b.**
**If you have answered 'Yes to any of the questions 1-4, complete all of Section 3.**

| | You Must Answer All Questions | Yes | No |
|---|---|---|---|
| 1. | Is the research clinical in nature? | ☐ | ☒ |
| 2. | Is the research investigating socially or culturally 'controversial' topics (for example pornography, extremist politics, or illegal activities)? | ☐ | ☒ |
| 3. | Will any covert research method be used? | ☐ | ☒ |
| 4. | Will the research involve deliberately misleading participants (deception) in any way? | ☐ | ☒ |
| 5. | Does the Research involve staff or students within the University? | ☒ | ☐ |
| 6. | Does the Research involve vulnerable people? (For example, people under 18 or over 70 years of age, disabled (either physically or mentally), those with learning difficulties, people in custody, migrants etc). | ☐ | ☒ |

| 7. | Is the information gathered from participants of a sensitive or personal nature? | ☒ | ☐ |
|----|----------------------------------------------------------------------------------|-----|-----|
| 8. | Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? | ☒ | ☐ |
| 9. | Have you identified any potential risks to the researcher in carrying out the research? (For example physical/emotional/social/economic risks?) | ☐ | ☒ |
| 10. | Are there implications from a current or previous professional relationship i.e., staff/student/line manager/managerial position that would affect the voluntary nature of the participation? | ☐ | ☒ |
| 11. | Will the research require the use of assumed consent rather than informed consent? (For example, when it may be impossible to obtain informed consent due to the setting for the research – e.g. observational studies/videoing/photography within a public space) | ☐ | ☒ |
| 12. | Is there any risk to respondents' anonymity in any report/thesis/publication from the research, even if real names are not used? | ☐ | ☒ |
| 13. | Will any payment or reward be made to participants, beyond reimbursement or out-of-pocket expenses? | ☐ | ☒ |
| 14. | Does the research require external ethics clearance? (For example, from the NHS or another institution) | ☐ | ☒ |
| 15. | Does the research involve the use of secondary data? | ☐ | ☒ |

## 3A. Details of Project

In this section, please provide details of your project and outline data collection methods, how participant consent will be given as well as details of storage and dissemination.

| **Please give a 300-word overview of the research project** |
|--------------------------------------------------------------|
| This research investigates the different kind of experiences and emotions people have in places in the city that are meaningful to them on a personal level, and how technology could play a role in this in the future. (Walking) interviews between the researcher and participant will be used to gather data regarding the participant's emotional person-place relationships with personally meaningful places within their current city of residence. |

Video and audio recordings and pictures will be made of this interview. All responses will be anonymised. Paper materials will be stored in a locked filing cabinet in the secure university PhD office C35. The recordings and digitised materials will be kept on the university's secure hard drive, which is encrypted, and password protected. The results may be published in a journal or presented at a conference, which might include clips of the video recording, stills of the video recording or pictures taken during the interview.

| **Data Collection** | |
|---|---|
| **1.** | **Who will be the participants in the research?** |
| | People aged 18+ who speak English and live in a city. |
| **2.** | **How will you collect and analyse the research data? (Please outline all methods e.g. questionnaires/focus groups/internet searches/literature searches/interviews/observation)** |
| | (Walking) interviews including evaluative map techniques. Thematic analysis of the transcripts of the interviews and facial expression recognition of the videos of the interviews. |
| **3.** | **Where will the data be gathered (e.g. in the classroom/on the street/telephone/on-line)** |
| | On the street and in a public location (e.g., coffee shop) of the participant's choice |
| **4.** | **Please describe your selection criteria for inclusion of participants in the study** |
| | Current residents of Edinburgh, who have been residents of Edinburgh for at least two years and are able to walk for about an hour. The aim is to recruit participants that have at least one social connection with one of the other participants taking part in the research. |

| 5. | If your research is based on secondary data, please outline the source, validity and reliability of the data set |
|----|----|
| | No |

| **Consent and Participant Information** | |
|----|----|
| 7. | How will you invite research participants to take part in the study? (e.g., letter/email/asked in lecture) |
| | Email |
| 8. | How will you explain the nature and purpose of the research to participants? |
| | Participant information sheet. |
| 9. | How will you record obtaining informed consent from your participants? |
| | Signed informed consent sheet |

| **Data storage and Dissemination** | |
|----|----|
| 10. | How and in what format will data be stored? And what steps will be taken to ensure data is stored securely? |
| | Paper materials will be filed in a locked cabinet in the secure university PhD office C35, digital files will be stored on an encrypted, password protected university hard drive. |
| 11. | Who will have access to the data? |
| | The researcher and potentially a third-party transcription service. |
| 12. | Will the data be anonymised so that files contain no information that could be linked to any participant? |
| | Yes, the data will be anonymised, but the participant may still be recognisable from video recordings, audio recordings, and pictures gathered during the interview. In addition, data provided during this study may potentially be |

| | shared with other participants of the study, but only if the participants give their written consent. |
|---|---|
| **13.** | **How long will the data be kept?** |
| | Up to ten years after completion of the PhD. |
| **14.** | **What will be done with the data at the end of the project?** |
| | Securely destroyed. |
| **15.** | **How will the findings be disseminated?** |
| | Published in the PhD thesis, journal and conference papers, and presented at conferences, which might include clips of the video recording, stills of the video recording or pictures taken during the interview. |
| **16.** | **Will any individual be identifiable in the findings?** |
| | N/A |

## 3B. Identification and Mitigation of Potential risks

This section is designed to identify any realistic risks to the participants and how you propose to deal with it.

1. **Does this research project involve working with potentially vulnerable individuals?**

| Group | Yes | NO | Details (for example programme student enrolled on, or details of children's age/care situation, disability) |
|---|---|---|---|
| **Students at Napier** | ☒ | ☐ | PhD students could potentially be included as participants. |

| Staff at ENU | ☒ | ☐ | ENU staff could potentially be included as participants. |
|---|---|---|---|
| **Children under 18** | ☐ | ☒ | |
| **Elderly (over 70)** | ☐ | ☒ | |
| **Disabled** | ☐ | ☒ | |
| **Migrant workers** | ☐ | ☒ | |
| **Prisoners / people in custody** | ☐ | ☒ | |
| **Learning difficulties** | ☐ | ☒ | |

2. **If you are recruiting children (under 18 years) or people who are otherwise unable to give informed consent, please give full details of how you will obtain consent from parents, guardians, carers etc.**

> N/A

3. **Please describe any identified risks to participants or the researcher as a result of this research being carried out**

> Participants might get emotional when visiting a personally meaningful place or talking about their personal memories and experiences related to a personally meaningful place.

4. **Please describe what steps have been taken to reduce these identified risks? (for example providing contact details for appropriate support services (e.g. University Counselling, Samaritans), reminding participants of their right to withdraw and/or not answering questions, or providing a full debriefing to participants)**

> When the participant is invited to participate by email, they are encouraged to think about which personally meaningful places they would like to talk about and visit in Edinburgh prior to participating in the interview. In addition, they are reminded

> directly prior to the start of the interview and during the interview of their right to withdraw and/or not answer certain questions.

**5. If you plan to use assumed consent rather than informed consent, please outline why this is necessary**

> N/A

**6. If payment or reward will be made to participants, please justify that the amount and type are appropriate (for example the amount should not be so high that participants would be financially coerced into taking part, or that the type of reward is appropriate to the research topic).**

> N/A

## 3C. Justification of High-Risk Projects

If you answered 'Yes' to the screening questions 1-4 this section asks for justification on the choice of research topic and methodology.

**1. If you have answered yes to question 1, please give a full description of all medical procedures to be used within the research and provide evidence that the project has obtained NHS ethical approval.**

**2. If you have answered yes to questions 2 (research into a controversial topic) please provide a justification for your choice of research topic and describe how you would deal with any potential issues arising from researching that topic.**

**3. If you have answered yes to questions 3 or 4 (use of deception or covert research methods) please provide a justification for your choice of methodology, and state how you will mitigate the risks associated with these approaches.**

<table>
<tr><td></td></tr>
</table>

| Declaration | |
|---|---|
| | |
| ☒ | I consider that this project has no significant ethical implications to be brought to the attention of Research Integrity Committee |
| ☐ | I consider that this project may have significant ethical implications to be brought to the attention of the Research Integrity Committee |

| Researcher Signature: | Date: 02-03-2016 |
|---|---|
| █████████ | |
| Director of Studies Signature: | Date: 02-03-2016 |
| █████████ | |

**Checklist**
All applications require the following to be submitted with the application form

| Participant Information Sheet | ☒ |
|---|---|
| **Informed Consent Form** | ☒ |
| **Interview/Survey Questions** | ☒ |

# Appendix C: Interview Questions Walking & Talking Sessions

## A. Personal information

*Factors to be expected to produce variations in meanings of place based on literature.*

1. Gender?
2. Age?
3. Nationality?
4. Relationship status?
5. Education / Professional background?
6. Place of residence?
7. How long have you been living in Edinburgh?
   a. Which locations?
   b. Which periods?
8. Life path: Please tell me a bit about your life path. Where were you born, where did you grow up, and how did you end up in Edinburgh?
9. Tech savviness: Do you own or use any of the following:
   a. Selfie stick
   b. Smartphone
   c. Smartwatch or activity tracker
   d. Laptop or pc
   e. Gaming console

10. Capturing important moments in your life
    a. How do you currently capture important moments?
    b. Which important moments in your life have you captured, or would you like to capture?

11. Sharing important moments in your life
    a. Do you share what you capture in any way shape or form (online and/or offline)?
    b. With whom do you share it and why?
    c. How and when do you share it?

12. Perception of Edinburgh
    a. What is your overall impression or experience of Edinburgh as a city so far?
    b. Did you have you had any positive experiences in Edinburgh?
    c. Did you have any negative experiences in Edinburgh?

13. Moving through the city
    a. How do you normally go from A to B in Edinburgh?
    b. How do you go from home to work?
    c. Do you go for runs?
    d. Do you go for cycle trips?
    e. Do you go for walks (e.g., for leisure or to walk a dog)?

14. While on such a journey through the city, do you use any technology or services? And if so, why?
    a. Music player (e.g., iPod) Smartphone, Camera, GoPro, Smartwatch or Activity Trackers (e.g. Fitbit)?
    b. Google Maps
    c. Facebook or Facebook Places
    d. Foursquare
    e. Tinder
    f. TripAdvisor
    g. Instagram
    h. Snapchat
    i. Twitter
    j. Flickr
    k. Strava

15. Repeat question 13a and 14, but now for a city that you are unfamiliar with.

## B. Evaluative Map Technique

*Focus on the location, experience-in-place, place meaning, importance*

1.  On the map, can you please indicate where your home is?

2. On the map, can you please indicate where your workplace is?

3. On the map, can you draw routes that you regularly take? With which mode of transport?

4. I have asked to you think about 4 places in Edinburgh that are important or meaningful to you on a personal level, and/or that you have an emotional connection with.

[Repeat the questions below for each place picked by the participant]

a. Could you please indicate on the map where the first place that you have selected is located?

b. Why did you pick this place?

c. How did this place become important/meaningful to you?

d. What were the emotions related to that experience? => Emotion Wheel

e. When did this place become meaningful to you?

f. Are there other people that played a part in this experience?

g. Has the meaning of this place changed over time? Why (not)?

h. Has the way you feel about this place changed over time? Why (not)?


5. Order the places according to personal importance on a scale from 1 to 5, with 5 being the most personally important place and 1 being the least important place.

6. Why did you pick this order?

## C. Walking & Talking

*Focus on the experience-in-place and emotions currently connected to each place, behaviours, capturing and sharing, social connections.*

For each place that will be visited during the Walking & Talking interview, the following set of questions will be asked:

1. Place Meaning & Experience-In-Place
   a. Why did you pick this place?
   b. Why is this place personally important to you? /What does this place mean to you?
   c. What is the story behind this place?

2. Emotions
   a. Which emotions are for you related to this place? => Emotion wheel
   b. How does being in this place make you feel right now?
   c. How does being in this place make you feel in general?

3. What is the (main) reason you feel this way?

4. If you had to pick one emotion, what would be the main emotion connected to this place be for you?

5. Has this place always made you feel the same way or has it changed over time? / Have you always had the same emotion related to this place or did it change over time?

6. Experience-In-Place: When did this place become important to you? / When was this connection made?

7. Evolving meaning:
   a. Has the importance or value of the place changed over time?
   b. Has your experience of the place changed over time?
   c. Have the emotions connected to this place changed or evolved over time?
   d. Why has the importance or value of this place / experience of these place / the emotions connected to this place (not) changed over time?

8. Behaviour:
   a. How often do you visit this place?
   b. What do you normally do when you are in this place?

9. Social connections
   a. Is this place for you connected to other people in any way? / Do other people play a part in your experience of this place?
   b. Do you typically go here alone or with other people?
   c. Are there people that you would not take to this place?

10. Technology, Representations & Sharing
    a. If there would not be any technological limitations, how would you like to represent your experience of this place or your relationship with this place, if the representation could be anything you like? (e.g., something physical or digital like a picture, video, smell, song, take something with you from the

place like a souvenir or memento, or leave something at a place like lovers putting a padlock on a bridge)
b. Why did you choose this representation?
c. Would you share this representation with anyone? Why (not)?
d. Have you already captured your experience of or relationship with this place in any way, shape or form? (e.g., picture, video, memento or souvenir)
e. If so, what did you do with it?
f. Have you shared it with anyone? Why (not)?
g. Have you shared your experience of or relationship with this place with anyone? Why did you (not) share it with anyone?

11. With whom would you like to share your experience of or relationship with this place (or not share it with) and why?
(e.g., Person with you, partner, strangers, friends, family, people who were part of experience, people from neighborhood, other people at same location, people which visit same places as you do, nobody)

12. Evaluation: Without having to go into detail, are there any places that you thought about selecting as a personally meaningful place in preparation for this interview, but did not mention? For example, a place with negative emotions or experiences connected to it?

**D. Speculative Evaluative Map Technique**

D.1 SOCIAL MAP OF EDINBURGH

1. How would you describe your relationship with [Participant X]?
2. Which of the places on the map, if any, would you curious about and potentially be interested in exploring or knowing more about?
   [Repeat questions 2a-c for each place on the map picked by the participant].
   a. Why (not)?
   b. We are not going to visit any of these places now as part of this study, but is that a place you would you want to go to at some point, and/or is it a place you would like to know more about (e.g., the personal story behind the place?) Why (not)?
   c. Would you prefer to have that information available to you while you are at the location itself (e.g., via a location-based app), or would you prefer to be able to access this information remotely at any time, without having to be at the specific location (e.g. via an interactive map like this on an app or website)?
3. Which places on the map close to [our current location], if any, would you be interested in exploring or more about? Why (not)?
4. Repeat question 3 for the personally meaningful places that the participant has selected.
5. Repeat question 3 for current home.
6. Repeat question 3 for current workplace.

D.2 EMOTION MAP OF EDINBURGH

1. Which of the places on this map, if any, would you be curious about and potentially be interested in exploring or knowing more about?
   [Repeat questions 1a-c for each place on the map picked by the participant].
   a. Why (not)?
   b. We are not going to visit any of these places now as part of this study, but is that a place you would you want to go to at some point, and/or is it a place you would like to know more about (e.g., the personal story behind the place?) Why (not)?
   c. Would you prefer to have that information available to you while you are at the location itself (e.g., via a location-based app), or would you prefer to be able to access this information remotely at any time, without having to be at the specific location (e.g. via an interactive map like this on an app or website)?
2. Which places on the map close to our current location, if any, would you be interested in exploring or knowing more about? Why (not)?
3. Repeat question 2 for the personally meaningful places that the participant has selected.
4. Repeat question 2 for current home.
5. Repeat question 2 for current workplace.

D.3 UNFAMILAIR CITY & DIFFERENT PERSON

The two maps that I just showed you, are based on personally meaningful places in the city where you live, Edinburgh. These places are selected by other people who have taken part in this study, including strangers, friends, and [Participant X]. Now imagine that you would be visiting a city you do not know or are unfamiliar with, and you would have this kind of information or these two types of maps available to you.

1. Do you think having this type of information available to you (i.e., the social map or the emotion map) in a city you are unfamiliar with, would be useful in any way? (e.g., an unfamiliar city you are visiting) Why (not)?
2. How do you think you might use that kind of information?
3. Which places in this unfamiliar city would you be interested in visiting or knowing more about, if any? The places highlighted by strangers, by friends, or by [Participant X]?
4. The places with which type of emotion connected to it would you be interested in visiting or knowing more about, in this unfamiliar city, if any?

As part of this study, I have asked you about your personal relationship with places in Edinburgh, and I have showed you two maps of Edinburgh, which included the personally meaningful places picked by strangers, friends, and [Participant X].

5. Now imagine that this would not be the places picked by [Participant X], but could be the places picked by anyone you like. Would you be interested in knowing anybody else's personal relationship with places in Edinburgh? Why (not)?
6. Which person would that be? (e.g., family member, partner, or friend?)
7. Why did you pick that person?

D.4 EVALUATION

1. How was it for you to participate in this study?
2. Do you have any feedback or comments regarding your participation in this study?
3. I will be interviewing more people for this study. Do you have any recommendations for future interviews? (e.g., things that I could do or organise differently or better?)
4. Do you know anyone else who might be interested in participating in this study?
5. Ask if participant would like to stay updated findings of this study (+ email address).

# Appendix D: Participant Information Sheet

Thank you for considering taking part in this study.

**About the study**:  My name is Shenando Stals and I am a PhD researcher in the School of Computing at Edinburgh Napier University.  The overall goal of this research study is to investigate the different kind of experiences and emotions people have in places in the city that are meaningful to them on a personal level, and how technology can play a role in these experiences. The findings of this study will inform the design of new technological devices and services.

**What will taking part involve?** You will be invited to participate in a (walking) interview, which is estimated to take two hours in total to complete. This interview consists of three stages. In the first stage (30 min.), you will be asked to indicate four places that are personally meaningful to you and/or that you have an emotional connection with, on a map of Edinburgh. Examples of such places could be the place where you have met your partner, your favourite pub, or the close where you got mugged. In the second stage (60 min.), you will be asked to show the researcher the places you have selected during a walking interview in Edinburgh, and talk about why that place is important to you. In the third and final stage (30 min.), you will be asked to evaluate a map of Edinburgh.

It would be helpful if you could think in advance about approximately 4 places that are personally meaningful to you and/or that you have an emotional connection with in Edinburgh. The reasons why you pick those places are entirely up to you and can be positive or negative.

In addition, it would be helpful if you could choose a quiet, indoor place close to one of the personally meaningful places that you have selected, for us to meet up for the first part of the interview, such as a bar or a coffee shop.

**What will be done with the data?** Some of your responses provided during this study will potentially be shared with other participants of the study. Video and audio recordings and pictures will be made of the interview. All responses will be anonymised. Paper materials will be stored in a locked filing cabinet in the secure university PhD office C35. The recordings and digitised materials will be kept on the university's secure hard drive, which is encrypted and password protected. A transcription service may be used to transcribe the recordings of the interview. Besides the PhD thesis, the results may also be published in a journal or conference paper or presented at a conference, which might include clips of the video recording, stills of the video recording or pictures taken during the interview.

**Who can take part?** Current residents of Edinburgh who are 18+ years old, have been a resident of Edinburgh for at least two years, speak English, and are able to walk through Edinburgh for about an hour. Ideally, the aim will be to recruit another participant that you know to also take part in this study.

Shenando Stals
*PhD Researcher*
*Centre for Interaction Design / School of Computing / Edinburgh Napier University*
*Telephone: +44 (0)131 455 2791 / Email: s.stals@napier.ac.uk*

# Appendix E: Informed Consent Form – Walking & Talking

Edinburgh Napier University requires that all persons who participate in research studies give their written consent to do so. Please read the following and sign the form if you agree with what it says:

I freely and voluntarily consent to be a participant in the PhD study on the topic of personally significant places to be conducted by Shenando Stals, who is a PhD researcher in the Edinburgh Napier School of Computing. The broad goal of this study is to explore and understand how people's personal stories and emotions are connected to places in the urban environment. Specifically, I have been asked to participate in a (walking) interview which is estimated to take two hours to complete.

I have been told that a video recording will be made of this interview. All my responses will be anonymised, but I might be identifiable from the video recording or pictures taken during the interview. The results may be published in a journal or presented at a conference, which might include clips of the video recording, stills of the video recording or pictures taken during the interview, unless I choose to opt out below:

( ) I do **NOT** want clips of the video recording, stills of the video recording or pictures in which I am identifiable, to be used in any publication of the results.

( ) I **DO** consent to my responses provided during this experiment to potentially be shared with other participants of the study.

I also understand that if at any time during the interview I feel unable or unwilling to continue, I am free to leave without having to provide any explanation. That is, my participation in this study is completely voluntary, and I may withdraw from it at any time without consequences. In addition, should I not want to answer any particular question(s).

I have been given the opportunity to ask questions regarding the interview, and my questions have been answered to my satisfaction. I have read and understood this form and consent to participate in this study. My signature is not a waiver of my legal rights. Furthermore, I understand that I will be able to keep a copy of the informed consent form for my own records.

-----------------------------------          -----------------------------------------

Participant's signature               Date

======================================================================

I have explained and defined in detail the research procedure in which the respondent has consented to participate. Furthermore, I will retain a copy of the informed consent form for my records.

----------------------------------------        ----------------------------------------

Researcher's signature              Date

## Appendix F: Speculative Design Fiction #3 – Comic "Emotion-based Place Access"

**Emotion-based Place Access**                                    by Shenando

## Appendix G: Application Ethical Approval - Focus Groups

Application for Cross-University Ethical Approval

### 3. Research Details

| | |
|---|---|
| **Name:** | Shenando Stals |
| **School or Professional service department:** | School of Computing |
| **Email:** | s.stals@napier.ac.uk |
| **Contact number:** | +441314552791 |
| **Project Title:** | UrbanIxD: Exploring Human Interactions for the Hybrid City (Focus Groups) |
| **Start Date:** | 01-03-2015 |
| **Duration of Project:** | 3 years |
| **Type of Research:** Doctoral Student | |

### 4. Screening Questions

Please answer the following questions to identify the level of risk in the proposed project:

**If you answer 'No' to all questions, please complete Section 3a only.**

**If you have answered 'Yes' to any of the questions 5-14 please complete Section 3a and 3b.**

**If you have answered 'Yes to any of the questions 1-4, complete all of Section 3.**

| | You Must Answer All Questions | Yes | No |
|---|---|---|---|
| 1. | Is the research clinical in nature? | ☐ | ☒ |
| 2. | Is the research investigating socially or culturally 'controversial' topics (for example pornography, extremist politics, or illegal activities)? | ☐ | ☒ |
| 3. | Will any covert research method be used? | ☐ | ☒ |
| 4. | Will the research involve deliberately misleading participants (deception) in any way? | ☐ | ☒ |
| 5. | Does the Research involve staff or students within the University? | ☒ | ☐ |
| 6. | Does the Research involve vulnerable people? (For example, people under 18 or over 70 years of age, disabled (either physically or mentally), those with learning difficulties, people in custody, migrants etc). | ☐ | ☒ |

| 7. | Is the information gathered from participants of a sensitive or personal nature? | ☐ | ☒ |
|---|---|---|---|
| 8. | Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? | ☐ | ☒ |
| 9. | Have you identified any potential risks to the researcher in carrying out the research? (For example physical/emotional/social/economic risks?) | ☐ | ☒ |
| 10. | Are there implications from a current or previous professional relationship i.e., staff/student/line manager/managerial position that would affect the voluntary nature of the participation? | ☐ | ☒ |
| 11. | Will the research require the use of assumed consent rather than informed consent? (For example, when it may be impossible to obtain informed consent due to the setting for the research – e.g. observational studies/videoing/photography within a public space) | ☐ | ☒ |
| 12. | Is there any risk to respondents' anonymity in any report/thesis/publication from the research, even if real names are not used? | ☐ | ☒ |
| 13. | Will any payment or reward be made to participants, beyond reimbursement or out-of-pocket expenses? | ☒ | ☐ |
| 14. | Does the research require external ethics clearance? (For example, from the NHS or another institution) | ☐ | ☒ |
| 15. | Does the research involve the use of secondary data? | ☐ | ☒ |

## 3A. Details of Project

In this section, please provide details of your project and outline data collection methods, how participant consent will be given as well as details of storage and dissemination.

| **Please give a 300-word overview of the research project** |
|---|
| This research investigates the different kind of experiences and emotions people have in places in the city that are meaningful to them on a personal level, and how technology could play a role in this in the future. The broad goal of this research study is to investigate the different kind of experiences and emotions people have in places in the city and how technology can play a role in this. Specifically, participants |

will be asked to fill out a questionnaire to screen their eligibility prior to the focus group, watch two short films and read a comic during the focus group, and discuss these in a group discussion. This should take no longer than 120 minutes to complete. All responses will be anonymised. Paper materials will be stored in a locked filing cabinet in the secure university PhD office C35. The digital recordings and digitised materials will be kept on the university's secure hard drive, which is encrypted and password protected. The results will be published in the PhD thesis, journal and conference papers, and presented at a conference, which might include clips of the video recording, stills of the video recording or pictures taken during the interview.

| **Data Collection** |  |
|---|---|
| 1. | **Who will be the participants in the research?** |
|  | People aged 18+ who speak English and live in a city. |
| 2. | **How will you collect and analyse the research data? (Please outline all methods e.g., questionnaires/focus groups/internet searches/literature searches/interviews/observation)** |
|  | A Questionnaire and Focus groups will be used to collect research data. Thematic analysis will be used to analyse the data. |
| 3. | **Where will the data be gathered (e.g. in the classroom/on the street/telephone/on-line)** |
|  | In the Sensorium User Experience Laboratory (C78) at Merchiston Campus. |
| 4. | **Please describe your selection criteria for inclusion of participants in the study** |
|  | Current residents of Edinburgh, are 18+ years old, who have been residents of Edinburgh for at least two years, and have a good command of the English language. |

| 5. | If your research is based on secondary data, please outline the source, validity and reliability of the data set |
|---|---|
| | No |

| **Consent and Participant Information** | |
|---|---|
| 7. | How will you invite research participants to take part in the study? (e.g., letter/email/asked in lecture) |
| | Participants will be recruited using flyers. Participants will be invited by email. |
| 8. | How will you explain the nature and purpose of the research to participants? |
| | Participant information sheet. |
| 9. | How will you record obtaining informed consent from your participants? |
| | Signed informed consent form. |

| **Data storage and Dissemination** | |
|---|---|
| 10. | How and in what format will data be stored? And what steps will be taken to ensure data is stored securely? |
| | Paper materials will be filed in a locked cabinet in the secure university PhD office C35, digital files will be stored on an encrypted, password protected university hard drive. |
| 11. | Who will have access to the data? |
| | The researcher and potentially a third-party transcription service. |
| 12. | Will the data be anonymised so that files contain no information that could be linked to any participant? |
| | Yes, the data will be anonymised, but the participant may still be recognisable from video recordings, audio recordings, and pictures gathered during the focus groups. |

| 13. | How long will the data be kept? |
|---|---|
| | Up to ten years after completion of the PhD. |
| 14. | What will be done with the data at the end of the project? |
| | Securely destroyed. |
| 15. | How will the findings be disseminated? |
| | Published in the PhD thesis, journal and conference papers, and presented at conferences. |
| 16. | Will any individual be identifiable in the findings? |
| | N/A |

## 3B. Identification and Mitigation of Potential risks

This section is designed to identify any realistic risks to the participants and how you propose to deal with it.

7.  **Does this research project involve working with potentially vulnerable individuals?**

| Group | Yes | NO | Details (for example programme student enrolled on, or details of children's age/care situation, disability) |
|---|---|---|---|
| **Students at Napier** | ☒ | ☐ | PhD students could potentially be included as participants. |
| **Staff at ENU** | ☒ | ☐ | ENU staff could potentially be included as participants. |
| **Children under 18** | ☐ | ☒ | |
| **Elderly (over 70)** | ☐ | ☒ | |

| | | | |
|---|---|---|---|
| **Disabled** | ☐ | ☒ | |
| **Migrant workers** | ☐ | ☒ | |
| **Prisoners / people in custody** | ☐ | ☒ | |
| **Learning difficulties** | ☐ | ☒ | |

8. **If you are recruiting children (under 18 years) or people who are otherwise unable to give informed consent, please give full details of how you will obtain consent from parents, guardians, carers etc.**

N/A

9. **Please describe any identified risks to participants or the researcher as a result of this research being carried out**

N/A

10. **Please describe what steps have been taken to reduce these identified risks? (for example providing contact details for appropriate support services (e.g. University Counselling, Samaritans), reminding participants of their right to withdraw and/or not answering questions, or providing a full debriefing to participants)**

N/A

11. **If you plan to use assumed consent rather than informed consent, please outline why this is necessary**

N/A

12. **If payment or reward will be made to participants, please justify that the amount and type are appropriate (for example the amount should not be so high that participants would be financially coerced into taking part, or that the type of reward is appropriate to the research topic).**

Each participant will receive a £5 Amazon gift voucher.

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## 3C. Justification of High-Risk Projects

If you answered 'Yes' to the screening questions 1-4 this section asks for justification on the choice of research topic and methodology.

4. **If you have answered yes to question 1, please give a full description of all medical procedures to be used within the research and provide evidence that the project has obtained NHS ethical approval.**

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5. **If you have answered yes to questions 2 (research into a controversial topic) please provide a justification for your choice of research topic, and describe how you would deal with any potential issues arising from researching that topic.**

```

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6. **If you have answered yes to questions 3 or 4 (use of deception or covert research methods) please provide a justification for your choice of methodology, and state how you will mitigate the risks associated with these approaches**.

```

```

| Declaration | |
|---|---|
| | |
| ☒ | I consider that this project has no significant ethical implications to be brought to the attention of Research Integrity Committee |
| ☐ | I consider that this project may have significant ethical implications to be brought to the attention of the Research Integrity Committee |
| **Researcher Signature:** | **Date:** 30-06-2019 |

| ████████████ | |
|---|---|
| **Director of Studies Signature:** ████████████ | **Date:** 30-06-2019 |

**Checklist**

All applications require the following to be submitted with the application form

| | |
|---|---|
| **Participant Information Sheet** | ☒ |
| **Informed Consent Form** | ☒ |
| **Interview/Survey Questions** | ☒ |

# Appendix H: Participant Information Sheet

Thank you for considering taking part in this study.

**About the study**:  My name is Shenando Stals and I am a PhD researcher in the School of Computing at Edinburgh Napier University.  The overall goal of this research study is to investigate the different kind of experiences and emotions people have in personally meaningful places in the city, and how technology could play a role in these experiences. The findings of this study will inform the design of new technological devices and services.

**What will taking part involve?** You will be invited to participate in a group discussion (i.e., a focus group), which is estimated to take no more than two hours in total to complete. Specifically, participants will be asked to fill out a short questionnaire prior to the focus group, watch two short films and read a comic during the focus group, and discuss these in a group discussion. The focus group will take place at Edinburgh Napier University, Merchiston Campus, Room C78 (Sensorium) at the date and time provided by researcher. Drinks and snacks will be provided.

**What will be done with the data?** Video and audio recordings and pictures will be made of the focus group. All responses will be anonymised. Paper materials will be stored in a locked filing cabinet in the secure university PhD office C35. The recordings and digitised materials will be kept on the university's secure hard drive, which is encrypted and password protected. A transcription service may be used to transcribe the recordings of the interview. Audio and video recordings may be shared with a third-party transcription service. Some carefully anonymised information provided by the participants, will be shared externally in presentations and published research outputs. Besides the PhD thesis, the results may also be published in a journal or conference paper or presented at a conference, which might include clips of the video recording, stills of the video recording or pictures taken during the interview.

**Who can take part?** Current residents of Edinburgh who are 18+ years old, have been a resident of Edinburgh for at least two years, and have a good command of the English language.

Shenando Stals
*PhD Researcher*
*Centre for Interaction Design / School of Computing / Edinburgh Napier University*
*Telephone: +44 (0)131 455 2791 / Email: s.stals@napier.ac.uk*

## Appendix I: Informed Consent Forms for Focus Groups

### Edinburgh Napier University Research Consent Form

### UrbanIxD Focus Group

Edinburgh Napier University requires that all persons who participate in research studies give their written consent to do so. Please read the following and sign it if you agree with what it says.

1. I freely and gladly consent to be a participant in the research project on the topic of Urban Interaction Design to be conducted by Shenando Stals, who is a PhD researcher based at the School of Computing, Edinburgh Napier University.

2. The broad goal of this research study is to investigate the different kind of experiences and emotions people have in places in the city and how technology can play a role in this. Specifically, I have been asked to fill out a questionnaire prior to the focus group, watch two short films and read a comic during the focus group and discuss these in a group discussion. This should take no longer than 120 minutes to complete.

3. I have been told that the focus group will be recorded on video and audio, and that my responses from the questionnaire and during the focus group will be anonymised, but I may be identifiable from the audio or video recording. My name will not be linked with the research materials. Any data gathered will be kept secure on a password protected hard drive and pc.

4. I also understand that if at any time during the filling out of the questionnaire, watching of the short films and/or comic, or the group discussion I feel unable or unwilling to continue, I am free to leave without having to give a reason. That is, my participation in this study is completely voluntary, and I may withdraw without negative consequences. However, after data has been anonymised or after publication of results it will not be possible for my data to be removed as it would be untraceable at this point.

5. In addition, should I not wish to answer any particular question or questions, I am free to decline without having to give a reason.

6. I have been given the opportunity to ask questions regarding the research and my questions have been answered to my satisfaction.

7. I have read and understand the above and consent to participate in this study. My signature is not a waiver of any legal rights. Furthermore, I understand that I will be able to keep a copy of the informed consent form for my records.

Participant's Signature                                Date

I have explained and defined in detail the research procedure in which the respondent has consented to participate. Furthermore, I will retain one copy of the informed consent form for my own records.

Researcher's Signature                                Date

**Privacy Notice**

Edinburgh Napier University is providing you with this information in order for us to comply with the General Data Protection Regulation (GDPR), which requires us to tell you what we do with your personal information.

**Name of Research Project:** UrbanIxD Focus Group

**Description of Project:** This research investigates the different kind of experiences and emotions people have in places in the city and how technology could play a role in this in the future.

| | |
|---|---|
| Data Controller | Edinburgh Napier University |
| Purposes for collection/processing | The specific aim of this focus group and questionnaire is to investigate the different kind of experiences and emotions people have in places in the city and how technology can play a role in this. |
| Legal basis | Art 6(1)(e), performance of a task in the public interest/exercise of official duty vested in the Controller, is the basis for processing – the University's Statutory Instruments refer. |
| Whose information is being collected | People aged 18+ who speak English and live in a city. |
| What type/classes/fields of information are collected | Their experiences and feelings in urban places and their perspectives on the potential implications of technology use in this context. [Age; gender; profession; nationality; country, city and neighbourhood they grew up in and are currently living in; duration of residence]. |
| Who is the information being collected from | From the data subject directly. |
| How is the information being collected | Recorded focus group (audio and video). Paper participant worksheet provided as part of the focus group. Digital questionnaire sent out by email prior to the focus group. |
| Is personal data shared with externally | Some carefully anonymised information, provided by the participants, will be shared externally in presentations and published research outputs. Audio and video recordings may be shared with a third-party transcription service. |
| How secure is the information | The recordings of the focus groups, transcripts, digitized participant worksheets and the questionnaires will be kept on the university's secure hard drive. Once digitized, paper versions of the participant worksheets will be destroyed. |
| Who keeps the information updated | The information will not be updated. |
| How long is the information kept for | Recordings of the interview, transcripts, questionnaires, and participant worksheets will be kept up to ten years after completion of the PhD. |
| Will the data be used for any automated decision making | No |
| Is information transferred to a third country? Outside the EEA and not included in the adequate countries list. | No |
| For more information subject rights and data protection, please see: https://staff.napier.ac.uk/services/governance-compliance/governance/DataProtection/Pages/default.aspx | |

# Appendix J: Focus Group Discussion Guide

## 0. Preparation prior to participation:

- Check that everyone filled out and handed in the participant questionnaire

## 1. Introduction (10 minutes)

### 1.1 Introduction Researcher and Research (5 minutes)

- PhD student in the School of Computing
- I will be your facilitator leading the group discussion today.
- Study looking into the different kind of experiences and emotions people have in places in the city, and how technology can play a role in this in the future.
- **Goal of focus group**: Helping us to understand what kind of positive and negative personal experiences and emotions people have in places in a city. And how technology could play a role in this. What the implications might be for our relationship with places, and each other.
- To investigate this a bit further today, we will be showing you **two short films** and ask you to read a **comic**.
- Quickly write down **first impressions**
- Every time we finish watching a film or reading the comic, we will have a **small group discussion** about each of these stories.
- We are particularly **interested in**, are the **different opinions** that you might have.
- There are **no right or wrong answers**, just a discussion of your own honest, personal opinions.
- **You will not be hurting my feelings**. I have no emotional attachment with the films and comic. They are created by a team of digital media students.
- We are **interested in the discussion**, so feel free to say whatever you want.
- **I am neutral** and only here to facilitate the discussion.
- I will **prompt** you with questions, if necessary, but basically it **is up to you to discuss** if there are any **elements i**n the story that you might **like, don't like, or** perhaps feel **indifferent** about. And why?
- Even though it is a group discussion, you don't have to agree as a group. We are interested in the range of different opinions that you might have.
- **Terminology**: If I have used a word or phrase you are unfamiliar with or you are not sure what it means, please let me know.
- **Play nice**: be respectful to each other and of each other's opinions.
- <span style="color:red">**Do <u>NOT</u> share or discuss any input of other participants outside this focus group**</span>
- Most importantly: **Have fun!** ☺

**1.2 Informed Consent (5 minutes)**

- o Inform you of your rights as participants: Signing the informed consent forms basically means that you say you
  - ▪ are participating voluntarily, and
  - ▪ that you give us permission to record this discussion, and
  - ▪ that you allow us to use this recording for our research (and potential future publications).

- o Informed consent forms that set out your rights as a participant
  - ▪ You may **stop at any time** without having to provide a reason
  - ▪ You may **ask questions** at any time (but please not during film/comic)
  - ▪ If there is a question you **don't want to answer**, that is fine.
  - ▪ You may leave at any time
  - ▪ There is no deception involved
  - ▪ This session is being **recorded** (audio & video)
  - ▪ Your answers are kept **confidential**
  - ▪ Your answers will be **anonymised**

- o Allow participants to read and sign forms

- o Are there any questions before we begin?

- o Turn on recording devices!

**1.3 Participant Introduction (5 minutes)**

- o Let's get to know each other a bit better
  - ▪ Name
  - ▪ Where you are from?
  - ▪ How long you have been living in Edinburgh?
  - ▪ Favourite sweetie in the Celebrations box.
- o Does anyone know any of the other participants here today?

**1.4 Warm up Exercise (2 minutes)**

- Think about a specific place that you like and have good memories of (e.g., your favourite place in Edinburgh or place where you met your partner)
- Now think of a place that you personally don't like or have bad memories of (e.g., place where you had a bad experience or where you got mugged).
- Make clear that this is just a warmup exercise.

## 2. Main Focus Group Discussions

(Randomize order of design fictions over the 3 focus groups)

Before discussing design fiction, ask each participant to individually write down the following after seeing each design fiction:

- Initial emotional response?
- Rate desirability of this future scenario? (Write down some things you liked and some things you didn't like? And/or Likert scale rating?)


- Overall objectives for each design fiction:

    - Does the story strike a chord with the participants?
    - How would they react in such a situation in the story?
    - How would they use such technology in their own life?
    - What do they think the implications might be for our relationship with place, technology, and people?


- Make sure everyone has a chance to speak!
- Get opinions of other group members on points made or issues raised!

## Design Fiction 1 (15 minutes) – Emotion-based Place Access

## (Event/Going out)

**Objectives:**

- Explore and challenge the (incorrect) assumption in the literature that there is only one (correct/desirable/overall) emotion attached to and evoked by urban / personally significant place and in-place experiences. What would the (social) implications for our relationship with place be?
  - What do you think are the different emotions or feelings Stefani goes through during this night out?
- Using place as a tool to alter mood => Cemetery (typical) + Flat (personal)
- Evolving (emotional) meaning of place => Flat + Club
- Social connection: Does previously mundane place become meaningful / changed experience of place due to social connection + knowing background story? (NOTE: Do NOT focus on specific emotion here)
- Implications for relationship between people, place, and technology (in particular focus on social bonding via communicating stories?)


- Think of PACT-analysis (People, Activities, Context, Technology)
- Who, what, why, when, where, how?

---

**Introduction: What if, in the city of the near future, you will only be allowed to enter a place or event if you are in the desired mood / emotional state?**

**Set the scene: Stefani and her friends are excited for their night out. They are going to see their favourite band of all time, My Chemical Romance, perform at their favourite local club for the first time.**

---

1. **THERE CAN BE ONLY ONE**
   - This is a club for emo's, where you are only allowed in if you can prove that you are in a melancholical mood. Can you think of other places that are for people in a certain mood? (e.g., romantic).
   - What kind of place, person or event do you think could have such an "emotion policy"? And to what end? Would it be the place you are interested in, or the people, or something else?
   - If you had an emotion compass that would point you in the direction of places in the Edinburgh that evoke a certain emotion (positive or negative), where would you go? Why? When? With whom? How?
   - What do you think are the different emotions or feelings Stefani goes through during this night out?

2. **PLACE TO ALTER MOOD**
   - So the girl with the pink hair (Stefani) goes to the graveyard because she feels happy and wants to feel sad/melancholic, but it doesn't work. However, her old flat does the trick. Are there any places where you go to change the way you feel or get rid of a certain feeling, or help yourself feel better (or worse)?

3. **IMPLICATIONS FOR RELATIONSHIP BETWEEN PERSON, PLACE & TECHNOLOGY**

   **Social Connection + Sharing flat story: Bonding**

   - How would hearing this story of Stefani make you feel? (Empathy?)
   - If Stefani shared this story with you, what do you think would the influence be, if any, on your relationship/friendship with her?

   **Does meaning of place change for you (through social connection)?**

   - How would encountering that flat again once you know the background story make you feel?
   - Do you know a seemingly mundane place where something important / amazing / horrible has happened to someone you know, and you are reminded of this every time you see or pass this place?
   - What does that mean for relationship with: Place + Social relationship+ You?

4. **EVOLVING (EMOTIONAL) MEANING: (Club, Flat, Friendships, Band)**
   - Evolving meaning: Would you go back to that club in the future? Or see your favourite band, or would your friends still be your friends?
   - What do you think Stefani's overall feeling is about this night out?
   - Stefani's emotions during the night (which?), and her feelings about the club (and flat, and maybe band and friends) appear to change over time, what does this say?

- What would you prefer? The general overall emotional experience of the club (or other places in Edinburgh now) or a friend's personal experience of the flat? Why?
- Can you think of anyone who's relationship with a place you would like to know more of and why? To what end?
  - Stranger, Partner, Specific Friend, Colleague, Celebrity?
- Looking at the overall story, what kind of emotion should be measured or shown by the emotion bracelet? How you are feeling now? Overall feeling of the last month? Overall emotion in that place? => What would value of such technology be if any?

---

**Conclusion:**

**Where do we as a group feel this discussion lands on the Emotion Wheel?**

     **Initial emotional reaction to the story?**

     **How do we feel about this future now?**

---

**Focused questions (on scenario in comic)**

*Scene 1: Only allowed to enter club where My Chemical Romance concert takes place if you are in the desired emotional state*

- o How do you think this group of friends (especially the girl with the pink hair) are feeling when going to the club?
- o Why do you think this club has such a policy? Does that make sense?

- o Have you ever had a legendary night out, or been to a gig or concert of a lifetime?  Or perhaps even played a gig of a lifetime?
- o If you think about yourself and your own life, have there been any pubs or clubs that have played an important part of your life? Like for example a local pub or a place where you feel part of the furniture?
- o Do you still go there now? Why?
- o Has the meaning of this pub / club / venue changed? Why?

*Scene 2: Girl being removed from concert in club because she is not in the desired melancholical state.*

- o Would you be particularly interested in meeting people who go to this club and are all feeling melancholic?
- o Would you be interested in going to a place or meeting people that have been filtered for a different emotion? In what context would you want to do that?
- o How do you think being spotted and being removed from the club made Stefani feel?
- o What would you do if it happened to you?
- o Would you leave with Stefani or stay in the club?
- o What are your opinions on the emotion bracelet being visible by others?

*Scene 3: Friends use emotion compass to take her to cemetery, but this does not put her in desired melancholical mood.*

- o How do you think Stefani feels at the cemetery?
- o How would you feel if you were in a cemetery at night?
- o Cemeteries can make you feel scared. Can you think of any other places that evoke a certain (typical) emotion?

- o If you had an emotion compass that would point you in the direction of places in the city that evoke a certain emotion, where would you go? Why? When? With whom? How?
- o When would you use that emotion compass?
- o So the girl with the pink hair (Stefani) goes to the graveyard because she feels happy and wants to feel sad/melancholic, but it doesn't work. However, her old flat does the trick. Are there any places where you go to change the way you feel or get rid of a certain feeling, or help yourself feel better (or worse)?
  - Change your mood or the way you feel from what to what?
  - Is that because of the mood of the people around you? The physical place itself? Previous personal experience? Or another reason?
  - Does it always work?
  - When and how do you go there?
  - Do you go alone or with someone else? With whom?
  - What do you do when you are there?
  - How often do you go there?

### Scene 4: Flat where flatmate committed suicide does change her mood

- o Would you want to know the story of what happened to your friend Stefani in that flat? Why?
- o How would hearing this story make you feel? (empathy?)
- o If Stefani shared this story with you, what do you think would the influence be, if any, on your relationship with her?
- o How would encountering that flat again once you know the background story make you feel?
- o What do you think Stefani did in the flat?
- o How would you behave in that street or flat?

- o Do you have a positive or negative personal relationship with a for other people normal place, that evokes strong feelings in you?

- o Have you told anyone about this? Why?

- o How has that affected your relationship with that person or those people?

- o Do you know a seemingly mundane place where something important / amazing / horrible has happened to yourself or someone you know, and you are reminded of this every time you see or pass this place?

### *Scene 5: Not allowed into club anymore after she shared story with friends.*

- o Would you share such a story? And if so, with whom?
- o Would you like to know if something like this had happened to a friend?

- o Evolving meaning: Would you go back to that club in the future?

- o What do you think Stefani's overall feeling is about this night out?
- o So this is a club for emo's, where you are only allowed in if you can prove that you are in a melancholical mood. Can you think of other places that are for people in a certain mood? (e.g., romantic).

**Wider implications:**

- If you had an emotion compass that would point you in the direction of places in the city that evoke a certain emotion, where would you go? Why? When? With whom? How?
- Would it make a difference if this was the city you live in or an unknown city?
- How is the emotion bracelet technology similar or different to activity trackers and smart watches and the goal of reaching 10.000 steps) people are already using? Or sharing your runs on social media like Strava? (Note: this example is NOT place-based).
- Would you want to keep track of your emotions with an emotion bracelet? Why?
- Is there another way this could be used instead of getting access to a club?
- Looking at the overall story, what kind of emotion should be measured or shown by the emotion bracelet? How you are feeling now? Overall feeling of the last month? Overall emotion in that place?
- What kind of place, person or event do you think could have such an "emotion policy"? And to what end?
- What do you think could change your relationship with a personally significant place or the way you feel about a place?
- How could this emotion tracking bracelet potentially be misused?

## Design Fiction 2 (15 minutes) – Smellification (Device)

**Objectives design fiction:**

- o The different smells that people associate with places, experiences, memories, seasons, people, food, drinks, smoking?
- o Explore the process of capturing, representing, consuming/reliving and sharing person-place relationships using smells.
- o Implications of smell technology and emotions it evokes for our relationship with place, technology and other people.


- o Think of PACT-analysis (People, Activities, Context, Technology)
- o Who, what, why, when, where, how?

---

**Introduction**:

**What if**, in the city of the near future, there will be technology that allows experiences and memories to be recorded as smells?

**Set the scene:** A family of American tourists are visiting Edinburgh. They are in a hurry because they want to catch the One O'clock Gun, the ceremonial firing of a canon at Edinburgh Castle which takes place every day at exactly 1pm.

---

1. Can you think of any other (pleasant or unpleasant) smells that are typical for Edinburgh? Or are related to Edinburgh or an area, street, place, or building in Edinburgh?
2. To which type of smellstick user do you relate the most: tourist, Greek exchange students, daffodil girl, or homeless smell addict?
3. Which smells would you capture and why? (Place, person, season, food, drink, something else)?
   - Why? What does it link to? What kind of **memories+emotions** does that smell evoke?
     - What do you think the beach in Thessaloniki smells like?
     - What do you think "Christmas 1987" smells like?
     - Smell of a place?
     - Person
     - Season?
     - Food
     - Drink
   - What kind of **emotions** or memories does that smell evoke?
   - Are there any smells that remind you of a certain (personally significant) place, experience, memory or person?
     - What: What would that smell be? (e.g., food, drinks, cigarettes, another person?)
     - How does smelling that smell make you feel?
     - Who would you share it with or personal use? How, when and where?
   - Which smells would you capture and why? (Place, person, season, food, drink, something else)? Why? What does it link to?
   - What would you do with those smells? How would you use those smells? (PACT)
     - Enhancing (across seasons?) => Influence your relationship with place?
     - Grounding?
     - Reminiscing?
     - Relieve homesickness? => How would that influence here and now?
     - Escaping reality? => What is now your relationship or experience of the park?
     - Bonding? => Would you have accepted the Greece smell or rejected it? => How would that influence your relationship with your Greek exchange student friends?
4. How would you prefer to use the **technology to capture / consume / share** those smells?
   - Smellstick?
   - Disposable smellstick?
   - Interactive nose piercing?

- o Some other way?
- When and why would you want to consume those smells?
5. Would that be for personal use or is it something you would like to share with others?
    - o Who would you share it with?
    - o Where would you do that?
    - o When: In what kind of situation?
    - o Why would you want to share it?
    - o How would you share it?
    - o What do you think other people will do when they see you consume or share smell? Or how would you react if you encountered:
        - Tourist family on Princes Street?
        - Encounter group of students zoned out of smells in the park
        - The girl walking the dog in the park at night
        - Homeless smell addict
6. Are there any experiences or places or social situations that you think smell technology is not suitable for? For example, if it would be an indoors location instead of outdoors?
7. Do you have any concerns regarding smell technology? How could it be misused?
- How do you think that the process of capturing, consuming or sharing smells might be similar to taking pictures and videos?
    - o How would it be different?
    - o Which way would you prefer it to be and why?
    - o Similar to smoking or vaping?

---

**Conclusion:**

**Where do we as a group feel this discussion lands on the Emotion Wheel?**

**Initial emotional reaction to the story?**

**How do we feel about this future now?**

---

**Focused questions (on scenario in short film):**

*Scene 1: Tourist family captures smell of One O'clock Gun, hindering locals.*

*(Edinburgh smells + Tourist perspective)*

- Typical Edinburgh smells
  - Have you been to Princes Street before?
  - Has anyone ever smelled gunpowder on Princes Street after the One O'clock Gun?
  - How would the gunpowder smell make you feel? Would it be a pleasant experience, unpleasant or neutral?
  - What kind of other (typical) smells do you think tourists would be able to capture in Edinburgh?
  - Can you think of other pleasant or unpleasant smells connected to a place in Edinburgh, or your neighbourhood or street, or specific building?
  - How would those smells make you feel?
- Different roles: Tourist vs. local: Could you see yourself or perhaps someone you know capturing, consuming, or sharing smells like the family of tourists, or the group of friends, or the girl walking the dog or the smell addict?
- Process of capturing, representing, consuming, and sharing: Who would be interested in having or using a

  - Interactive smellsticks
  - Disposable smellsticks
  - Interactive nose piercing
  - Personal use vs. sharing

*Scene 2: Group of Greek and local students share smell of beach in Greece*

*(Smell connected to different place, group sharing, rejecting, smells of seasons, weather, time of day)*

- Group sharing experience of different place (i.e., beach in Greece)

- o Would you have accepted or tried the smell of the beach in Greece if one of your friends had offered it to you in that situation? Why?
- o What do you think this "beach of Greece"-smell smells like?
- o What do you think would be the effect on you of smelling the beach in Greece?
- o How would it make you feel?
- o Now say you were not part of the group of friends, but just a member of the public, how would you feel about encountering a group of students using smellsticks in the park?


- o Are there any smells that remind you of a certain (personally significant) place, experience, memory or person?
  - What: What would that smell be? (e.g., food, drinks, another person?)
  - How does smelling that smell make you feel?
  - Why would you want to capture it or smell it again?
  - When and where would you capture it?
  - When and where would you want to smell it again?
  - Who would you share it with or personal use? How, when and where?
  - Who: Would that be something you share or use for personal use? Why?

- Girl rejects fake/relived experience provided by beach smell for daffodil smell in park
  - o What do you think could be a reason for the girl not to partake?
    - Being grounded?
    - Escaping or disconnecting?
    - Authenticity?
    - ….

  - o Girl goes to smell the daffodils. What kind of (pleasant and unpleasant) smells do you think you are likely to encounter in a park?


- Girl walks around the park alone to collect smells to be able to experience the same place across different times/seasons/weather conditions.
  - o Are there any smells tied to different times of day, seasons or weather conditions that you like?
    - How do they make you feel?

- Would you like to capture or use those? How? When? Why?
- When would you like to smell those again?

### Scene 3: Using smell to enhance experience of walking the dog in bad autumn/winter

### (Individual use of smell, smells connected to season, weather, time of day)

- Smell from park from different seasons (smell of summer used in autumn/winter)
  - Could you see someone use the smell of summer in this way across seasons or weather conditions? Why? Who?
  - Can you think of any other seasonal smells that you could use to enhance a certain experience?

- Smell influences her mood: Can you think of any smells that influence your mood?
  - To what place, person, memory, experience would that smell be related.

- Individual use of smell: Can you think of any smells you would use for private use?

- We have seen three smell technology devices now. How would you prefer to capture those smells?
  - Smellstick?
  - Disposable smellstick?
  - Interactive nose piercing?
  - Some other way?
- How would you like to consume them?
  - Smellstick?
  - Disposable smellstick?
  - Interactive nose piercing?
  - Some other way

### Scene 4: Girl walking dog encounters homeless smell addict in park trying to escape reality.

**(Smell of place/memory in the past to escape reality, health issues, smell technology abuse)**

- What do you think "Christmas 1987" might smell like?
- Do you have any smells that are related to a specific personal memory or experience?
- How does that smell make you feel?
- How would you use that smell?
- Homeless guy with smell addiction: How do you feel about the way the homeless guy is using the smellstick of "Christmas 1987"
- Escaping reality by dwelling on the past
  - Are there any situations where you would not want to capture or relive an experience or place (using smells)?
- How would you react or feel to encountering a smellstick addict? (At night in the park, at a party?)
- Newspaper headline "NHS issues smellstick warning": Would you be concerned about health issues?

- Any other issues regarding this smell technology that you would be concerned about?
- How do you think this smell technology could potentially be abused by someone (other than in a health-related way)?

**Wider implications:**

- Most smells in the film were related to nature. Could you think of any other types of smells that you might want to capture or sniff? (e.g., food, drinks, a person)
- Would it work in the same way for those smells, or would it be different somehow?
  - How it makes you feel?
  - Intensity of those feelings?
- And when and where would you capture and sniff those smells? Does it need to be in an outdoor environment?
- Do you think smells can replace pictures and videos some day? Why?
- How do you think that the process of capturing, consuming or sharing smells might be similar to taking pictures and videos?
  - How would it be different?
  - Which way would you prefer it to be and why?

- Who do you think would use such technology to capture and share person-place relationships (experiences and memories)?
- Who would not use such technology? Or in what kind of place or situation would you not use such a technology? Why?
- Do you think there will be any places where using such a technology would be frowned upon?
- For which experiences, memories or places do you think capturing smells would not be suitable technique?

## Design Fiction 3 (15 minutes) – Personal Virtual Monuments (Service)

**Objectives:**

- Investigate negative person-place relationships (don't want to share it, don't want to be there, but still commemorate at place or process and overcome trauma).
    - What kind of negative person-place relationships could this be?
    - Do you know anyone who has a negative relationship with a place?
    - How would you use it for negative person-place relationships?

- Explore different roles: Creator of Personal Virtual Monument vs Explorer/Consumer of emotion data.
    - How would you use this service? (Create vs. Explore)
    - Exploring: own city vs different city?
- To explore the curiosity for and consumption of place-based emotion data (i.e., sadness, love and anger). What kind of person-place relationships (and related emotions and experiences) would you use this service for?
- Explore the tension between unwillingness to share negative personal experiences related to sadness in particular, but the interest in exploring those negative personal experiences of others (producer vs consumer).
- Is the social relationship with the sharer of influence on the curiosity in exploring this particular person-place relationship? (This was not properly investigated in the first study because the emotion map did not contain the emotions related to a place of the specific social relationship in the social map). This is partially already investigated in DF2!
- Implications for triangular relationship between person, place and technology?
    - Difference between physical monument vs. virtual monument?
    - Roles: User, bystander/member of the public, shop owner, tourist, someone else?
        - Sharing: No sharing, Visibility, Location, Customisation
    - What would you do at the place of your monument?
    - What is someone else has monument in the same spot?
        - Or close to your home?
    - Do you see any downsides to this technology?

- Think of PACT-analysis (People, Activities, Context, Technology)
- Who, what, why, when, where, how?

**Introduction: What if**, in a city of the near future, a service will exist that allows you to create and place your own personal virtual monuments anywhere you like in the city?

**Set the scene:** Peter and David are two app developers who work at the same office. They are excited because their start-up has just launched a new service which allows people to create their own personal virtual monuments and place them anywhere they like in the city, using an app on their smartphone or special glasses.

1. Intro:
   o What do you think the purple monument is?
   o What do you think the purple monument is for?
   o What are your feelings towards the lady in black if any? **(Empathy?)**
   o What do you think the heart and the crosses are for?
2. Explore different roles: Creator of Personal Virtual Monument vs Explorer/Consumer of emotion data. How would you use this service?
   o Create:
      ▪ What kind of personal virtual monument would you like to create and why? Why would you not want one? (Different forms this data can take)
      ▪ What kind of person-place relationships? (Sadness, Love, Happy, Anger?)
        **=> Negative! (Commemorate, lost someone, overcome trauma?)**
      ▪ What size / shape / colour /position would it be?
      ▪ Where would you put that personal virtual monument if you could put it literally anywhere?
      ▪ Would it be just for you, or would other people be allowed to see it?  Know its location? Interact with it? Adjust it? Move it? Customize it? Which people?

   o Explore:
      ▪ Curiosity:  For which of the 3 virtual monuments (purple, heart, crosses), if any, are you most curious about? Why?
         • What would you want to know?
            o Backgrounds story?
            o Person?
            o Emotion (sadness, love, anger?)
            o Something else?
      ▪ What kind of person-place relationships? (Sadness, Love, Anger?)
      ▪ Whose monuments would you look up? Does social relationship matter?
      ▪ Exploring: own city vs different city?
3. **Implications for triangular relationship between person, place and technology?**
   o Difference between physical monument vs. virtual monument?
   o Roles: User, bystander/member of the public, shop owner, tourist, someone else?
   o Sharing
      ▪ No sharing
      ▪ Visibility

- Location
- Customisation
  - What would you do at the place of your monument?
  - What is someone else has monument in the same spot?
    - Or close to your home?
4. Investigate negative person-place relationships (don't want to share it, don't want to be there, but still commemorate at place or process and overcome trauma).
   - What kind of negative person-place relationships could this be?
   - Do you know anyone who has a negative relationship with a place?
   - How would you use it for negative person-place relationships?

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**Conclusion:**

**Where do we as a group feel this discussion lands on the Emotion Wheel?**

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### Focused questions (on scenario in short film)

- What are your feelings towards the lady in black? (Empathy? Nothing in particular?)
- How do you feel towards the two men?
- What would you have done if you were the woman in black?
- What does the monument look like to you?
- What do you think the purple monument is for?
- Does your social relationship with the lady in black make a difference? If this was a woman you know, would you be more curious to know what the monument is for or what the story behind it is than if it was a stranger?
- What do you think the heart and the crosses are for?
- Do you or do you know someone who has such an emotional relationship with place?
- How has that influenced your experience or relationship with that place?
- How has that influenced your social relationship with that person?
- How would you react if you encountered someone having such a private moment like the lady in black?
- How do you think other people would react (especially if they cannot see the monument)?
- Which of the personal virtual monument in the film are you most curious about, the purple one, the heart, or the crosses? Why?
- So in this video, the two app developers can see everyone's monuments everywhere. If you could do that, would you go look for monuments?
- Where would you look? Why?
- What if you could look up a specific person's monuments, who would that person be if it can be anyone in the world?
- How would you use this service to explore your own city?
- How would you use this service to explore an unknown city?

### Wider implications:

- What kind of personal virtual monument would you like to create and why? Why would you not want one?
- Would it be to commemorate a positive experience or a negative one?
- Which experience would it be for?
- Would it be for a person, pet, an event or something else?
- Where would you put that personal virtual monument if you could put it anywhere?
- Why would you put it there?
- What size / shape / colour /position would it be?
- Would it be moving, on the ground, floating, have sound, or taste or smell?
- Would there just be one, or would you have the same one in different locations?

- Would it be just for you, or would other people be allowed to see it?  Know its location? Interact with it? Adjust it? Move it? Customize it? Which people?
    - Would you tell people its location? Can they go there alone or only with you?
- What would you do at this location? (e.g., leave a real/virtual flower)
- Reaction of bystanders?
- What if someone else also puts a personal virtual monument in the same spot?
- What would be the pros and cons of a personal virtual monument as opposed to a personal physical monument?

## 3. Wrap Up (15 minutes)

Objective: Conclude focus group and give people contact information for further ideas.

**Discuss suite of design fictions as collection (rate: 1-3)**

- Reiterate the three design fictions
- Which future, if any, did you like best? Why? (Ask each person)
- Which future, if any, did you like the least? Why? (Ask each person)

- Which future do you think is most likely to happen? Why? (As a group)

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- Which of the films or comic did you like best? Why? (As a group)
- Which of the films or comic did you like the least? Why? (As a group)

- Rank most provoking to least provoking? (As a group)

- Any thoughts or feelings about having participated in the workshop today?

- Did any of these films or comic make you think of your experiences in the city or your relationship with places in the city in a different way?
    - Or the way we use technology to represent and share experiences with others?
    - Or your relationship with other people?

- ~~Which future do you think is most preferable?~~

**Practicalities (+5 minutes)**

- Thank everyone for participating.
- I hope you had fun today!
- Provide email address for further ideas and contact
- Would you like to be updated on the outcomes of this study?
- Any practical issues with the film or comic? (Sound, accents, font size,…?)
- Is there anything in terms of organizing or running the focus group that we could do better or different next?
- **Amazon vouchers**

# Appendix K: Table of Similar Studies

| Study | Number of participants (N) | Type of participants | Method | Duration | Number of places | Location |
|---|---|---|---|---|---|---|
| Sixsmith (1986) | 22 | Postgraduate students living in London | Sedentary interview with free association task | N/A | Types of home | London (UK) |
| Gustafson (2001a) | 14 | Swedish nationals with variety in demographic variables | Sedentary in-depth interviews | 1-3 hours | Up to participant | Sweden |
| Manzo (2005) | 40 | 25-35 years old residents of New York, raised in USA, but variety in demographic variables. | Sedentary in-depth interviews | N/A | Up to participant | New York (USA) |
| Paulos & Goodman (2004) | 8 | People in the street | Evaluate photos + urban walking tour | 45 min. | 4 per participant determined by researcher (square, park, post office, restaurant) | Berkeley (USA) |
| Stals, Smyth & IJsselsteijn (2014) | 11 | Residents of Edinburgh | Walking interview | 1-2 hours | 5 per participant | Edinburgh (UK) |
| Tilley et al. (2017) | 43 | Elderly adults (65+ years old) | EEG walk + interview | 15 min. | 2 routes, 1 route with two types of places per participant (urban | Edinburgh (UK) |

| | | | | | green, urban busy) determined by researcher | |
|---|---|---|---|---|---|---|
| Neale et al. (2017) | 95 | Elderly adults (65+ years old) | EEG walk | 15 min. | 3 areas in total, but 2 areas per participant, 6 routes in total, determined by researcher | Edinburgh (UK) |
| Aspinall et al. (2015) | 12 | Students | EEG walk | 25 min. | 3 areas per participant determined by researcher | Edinburgh (UK) |
| Nold (2004, 2009) | 3-14 | N/A | GSR walk + interview | N/A | Up to participants | N/A |
| Leahu et al. (2008) | 5 | Group of friends, including researchers | GSR walk + interview | 30 min. | Up to participant | New York (USA) |
| Mody et al. (2009) | 6 | All participants know each other | Ethnographic observations of walking method with mobile app | N/A | 11 places same for each participant | Berlin (Germany) |
| Matassa et al. (2013) | 16 | Cyclists | Contextual interviews | 1 hour | N/A | Torino (Italy) |
| Al-Barrak & Kanjo (2013) | 10 | 17-35 years olds | EEG walk + Questionnaire | N/A | 3 types of places, same for each participant | N/A |
| Al-Barrak et al. (2017) | 23 | Female students | EEG walk + Questionnaire | N/A | 3 types of places, same for | N/A |

| | | | | | each participant | |
|---|---|---|---|---|---|---|
| Ringas et al. (2011) | 12 | Individuals and pairs of people who know each other with various social relationships | Observations | N/A | 1 | Oulu (Finland) |
| Lane et al. (2005) | 11 | N/A | Walking method with mobile app | N/A | N/A | London (UK) |
| Quercia et al. (2014) | 30 | Residents of London | Virtual walks + Likert scale ratings + Crowdsourcing | N/A | 4 routes (beautiful, quiet, happy, short) | London (UK) |