

# Do Web Pages Have Personalities?

Phil Turner

Susan Turner

Leanne Wilson

Centre for Interaction Design, School of Computing, Edinburgh Napier University, Edinburgh, UK

[p.turner@napier.ac.uk](mailto:p.turner@napier.ac.uk)

[s.turner@napier.ac.uk](mailto:s.turner@napier.ac.uk)

[l.wilson@napier.ac.uk](mailto:l.wilson@napier.ac.uk)

## ABSTRACT

We are fundamentally social animals: we are geared to understanding each other; to gauging each other's moods and states of mind; and we are very adept at judging each others personalities. This ability to judge personality can also be generalized to a range of interactive technology including web sites. We present evidence that judgments of personality of different genres of website are not only internally consistent but are also correlated with perceptions of the sites' usability and aesthetics. It is proposed that this approach may be helpful in designing websites which are not only usable and attractive, but are also more predictable and better tailored to their target users. The vocabulary of personality traits should also support clearer communication between designers and clients

## Keywords

H.5.1.2 [User/Machine Systems]

## 1. INTRODUCTION

It is now commonplace to look beyond usability in the quest for enhanced user satisfaction. User satisfaction is usually associated with quality in use, yet defining the quality of an interface is not a simple matter. Not only may quality be perceived differently by different people, but as observed by [1] 'quality of use' as a broad concept, includes "...aspects of pleasure, fun and emotion", aspects which fall squarely in the realm of aesthetics.

This paper concerns the aesthetics of web design. We approach this complex domain at somewhat of a tangent, drawing on research in the attribution of personality to people and consumer products. There is evidence that we can judge someone's personality from a photograph of their face, that we can do that very quickly, and that this ability has value as a functional adaptation. Moreover, it has been established by design and product researchers that consumer products also have discernible personalities, that perceptions of product personalities may be described reliably and that specific personalities can be created by designers. There is also evidence that people may prefer products with personalities they judge to be similar to their own. We report the results of asking people the following question: if this webpage were a person, what kind of personality would it have?

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

ECCE 2009, September 30 – October 2, 2009, Helsinki, Finland.  
Copyright 2009 ACM 1-58113-000-0/00/0004...\$5.00.

## 2. THE AESTHETICS OF INTERACTIVE TECHNOLOGIES

Although intrinsically complex, the term 'aesthetics' is widely used to describe features of our everyday life; architecture, interior design as well as people, most frequently with reference to physical appearance. Aesthetics can imply anything pleasurable to the senses, but most commonly it refers to our visual senses in how we experience and see things, and their impact on our emotions. Lindgaard [2] offers a comprehensive account including a host of definitions from various authors "...beauty in appearance" [3], visual appeal [4], an experience [5], an attitude [6], a property of objects [7], a response or a judgment [8], and a process [9]. The common thread is some idea of a feeling of pleasure towards something or someone. Further, aesthetics can be regarded as possessing a dual nature "On the one hand, it is being viewed as properties of objects, and on the other, it is regarded as human responses to such properties" [10].

There has been comparatively little reported research concerning the aesthetics of interactive technologies. The reason for this is unclear: however it may be related to reluctance by those in the field of computer science to compromise matters of substance and usefulness in favour of artistic merit. While technical and analytical aspects are typical of this domain, the less tangible aspects such as 'look and feel' are sometimes disregarded [11]. Literature in this area is renowned for its complexities, perhaps another reason why many researchers tend to take a wide berth. The definition of aesthetics, as noted above, is contested. Nonetheless there have been a number of attempts to devise theories of aesthetics in this context.

Lavie and Tractinsky [3] established an empirically based classification of visual aesthetics for the web which adopts two dimensions, namely classical and expressive. Classical aesthetics are described as those steeped in history, which have reigned through changing trends. Properties include order, logical layout, and clear-cut design. Reference to classical aesthetics in interactive systems concerns properties such as colour, layout, and menu design, while expressive aesthetics on the other hand represents the judgments and feelings of the subject when interacting with the system; the user experience. The expressive dimension is associated with creativity and originality and shows little regard for design conventions. We can see that there are some contradictions between the two: indeed the authors themselves observe that "there is an intricate interplay between the cognitive and the emotional aspects of aesthetics".

In contrast, Lindgaard [11] takes a more cognitive approach, building on Berlyne's work [12, 13], based on the concept that beyond a certain level of complexity, the arousal level of the user will drop, suggesting that an experience will become less favourable as complexity is increased – in short, simplicity is preferred over complexity. Thus extra design elements can create unnecessary design problems [14]. Apple's ability to

design simple products has established a reputation for straightforward, (aesthetically pleasing) good design: a conscious effort to keep features out has allowed Apple to differentiate itself.

A more holistic conceptualization of aesthetics is presented by Petersen [15] who propose a Pragmatist framework to distinguish between approaches to aesthetics in interactive systems. They examine how aesthetics fits within our everyday lives. This approach implies that aesthetics involves a seamless integration of context, use and instrumentality. They base this on the premise that any artefact can possess aesthetic potential, but it will only be released through attachment to context and use. In this view aesthetics is not closely related to artistic properties. Rather, it is related to our experience of quality and value. The focus in the design of interactive systems shifts from promoting visual pleasure to fostering “everyday experiential qualities”. Croon Fors and Stolterman [16] also emphasise experiential aspects, arguing that “The sublime and beautiful dimension provides notions and concepts that can be used in order to frame this technology as an expressive form with an organic character...” They reject traditional boundaries of inside and outside such as those between object and subject. When describing the relationship between information technology and people, they see us as equally important participants of the design fabric as the technology itself. Technology is a mix of practical experience that occurs as one part of the composition of our life world.

Zettle [17] offers yet a further slant, with specific relevance to the web: “Aesthetics is not an abstract concept but a process by which people examine a number of visual elements, and their reactions to them”. Krauss [18] adds further detail: “The aim of visual aesthetics is to induce the user to unknowingly, unconsciously, and unsuspectingly choose to become involved in the message and the website of concern. Here aesthetics is a communication mechanism.

Empirically based studies of judgments of web aesthetics illustrate further the complexities of operationalising the concept. Park [19] report studies with both users and designers, intended to investigate “aesthetic fidelity” – the degree to which designers’ aesthetic intentions are conveyed to users - concluding *inter alia* that user perceptions of aesthetics are subject to strong individual differences. Interestingly for the personality-based approach we explore in this paper, the 13 aesthetic dimensions identified by authors include tense, strong, popular, adorable and hopeful – characteristics that are strongly redolent of human personality traits. Lack of consensus in aesthetic judgment is also noted by [20]. This study used as stimuli web pages that had been selected as exemplifying high or low levels of visual appeal, although expert designers were unable to reach a reliable consensus as to the graphical properties underlying such appeal. While participants exposed to the stimuli were able to assess visual appeal after only about 50ms (microsecond) exposure, the authors conclude that understanding the specific design factors contributing to such judgments was “too hard to do”. Speed of judgment was also recorded by Robins and Holmes [21] who found that sites with a “higher aesthetic treatment” were judged as more credible than the same sites stripped of visual enhancements. Such assessments were made in an average time of 3.42 seconds.

Finally perhaps the most comprehensive treatment of web and mobile service aesthetics thus far is the work reported by Hartmann [22]. The authors propose a framework for user judgments of design quality based on Adaptive Decision making theory, arguing strongly for the task- and context-bound

nature of such judgments. Using measures of aesthetics developed by Lavie and Tractinsky [3] and the attractiveness heuristics from Sutcliffe [23], participants evaluated websites with strongly contrasting aesthetics and the customization features of mobile services. Perceived aesthetic quality dominated overall judgment of quality, even where substantial usability problems were also apparent, but this effect was reversed in a context of serious information seeking. Substantial individual differences were however noted: the authors speculate that “there may be subgroups of aesthetically sensitive and non-aesthetically sensitive participants”.

To summarise, the definition and theorization of aesthetics is contested, both in general and in the context of interactive technologies, while the investigation of the role of aesthetic factors in the experience of such technologies is further confounded by issues of context and individual difference. However, as we shall see below, there is evidence about the way we can make rapid judgments of human personality traits which suggest it may be fruitful to treat the personality of a website as a convenient proxy for its aesthetic.

### 3. JUDGING HUMAN PERSONALITY TRAITS

The identification and description of stable, reliable personality traits have long been a concern for psychologists. Milestones include the work of Sheldon, for example, who linked personality to body shape [24], but the first fully systematic model was that of Cattell who developed a 16 factor model, operationalised as the once widely-used 16PF Questionnaire [25]. In work roughly contemporary to that of Cattell, Eysenck developed a theory of personality comprising two dimensions, extraversion-introversion and neuroticism-stability, each associated with component traits [26]. Later researchers have failed to replicate Cattell’s 16 factors, and the consensus model now has five factors – the so-called ‘Big Five’ - extraversion and neuroticism being completed by agreeableness, conscientiousness and openness, each again comprising a number of more specific traits [27, 28]. The Big Five are also viewed by many as causal dispositions, and have been shown to be cross-culturally valid and reliable [29]. A brief summary of the five factors is shown in table 1 below.

**Table 1. The ‘Big Five’ personality traits, after Costa and McCrae (1985)**

| Personality traits | Characteristics  |
|--------------------|--|
| Extraversion       | Sociable vs. retiring<br>Fun-loving vs. sober<br>Affectionate vs. reserved                         |
| Agreeableness      | Soft-hearted vs. ruthless<br>Trusting vs. suspicious<br>Helpful vs. uncooperative                  |
| Conscientiousness  | Well organised vs. disorganised<br>Careful vs. careless<br>Self-disciplined vs. weak-willed        |
| Neuroticism        | Worried vs. calm<br>Insecure vs. secure<br>Self-pitying vs. self-satisfied                         |
| Openness           | Imaginative vs. down-to-earth<br>Prefers variety vs. prefers routine<br>Independent vs. conforming |

Despite such consensus other factors continue to be investigated, as we shall see in the next section.

### 3.1 Judging personality from faces

Among the stimuli for the current work have been empirical results suggesting that judgments of personality are made with exceeding rapidity from facial appearance alone, paralleling the rapid judgments of website appeal reported by [20]. Willis and Todorov [30] show that people can make a judgment about the traits of attractiveness, likeability, trustworthiness, competence and aggressiveness based on unfamiliar faces depicted in a monochrome photograph in less than 100ms. Similarly, Penton-Voak *et al.* [31] have demonstrated that people are able to make judgments of personality in terms of the Big Five traits from pictures of faces. More recently, accurate perception of extraversion has been elicited after 50ms exposure to photographs [32]. These inferences can be characterized, in the terms of dual-process theory [33] as “fast, intuitive and unreflective”. It has been further argued that such assessments are based on quickly extracted, rudimentary information which allows us to form rapid impressions by a process of analogy with people we already know [35, 36].

Work investigating the perception of specific traits has shown that judgments of trustworthiness reflect the overall positive or negative valence of face evaluations [37] and this quality may be the subject of an automatic categorization process in the amygdala [38] which may in turn support the allocation of attention and the adoption of appropriate approach/avoidance behaviours. Of the Big Five personality dimensions, agreeableness (followed at some distance by extraversion) is the most prevalently attributed trait in open-ended judgments of people in photos, videos and face-to-face encounters [34]. The authors suggest this effect is grounded in peoples’ concern to anticipate the behaviour of others towards them and the associated need to structure relations accordingly. However, agreeableness is assessed quite inaccurately when compared to ratings made by the target subjects themselves and their friends and colleagues and to ratings of other Big Five traits.

## 4. ATTRIBUTING PERSONALITIES TO PRODUCTS

Just as in the case of human personality, it has been amply demonstrated that people can readily attribute personality traits to consumer products based on their appearance alone. Three of the Big Five personality dimensions – extraversion, agreeableness and conscientiousness – were found by Govers [39] to be salient to products, while Jordan [40] showed that consumers were able to rate photographs of vacuum cleaners, alarm clocks, kettles and toasters according to the Myers-Briggs Personality Indicator [41] dimensions: extrovert/introvert; sensible/intuitive; thinking/feeling and judgmental/perceptive. In a later small-scale study designed to elicit and apply personality descriptors which were more meaningful to the layperson, 17 dimensions – including, *inter alia*, authoritarian/liberal, bright/dim and conformist/rebel - were used to assign personalities to irons, shavers, shaver bags, epilators, air-cleaners, hair-dryers and coffee-makers, again depicted in photographs [42]. Similarly, Govers *et al.* [43] suggests that respondents could attribute happiness, cuteness and toughness to drawings of domestic consumer products, in this case, irons. The attributions made matched the personality traits intended by the product designers.

Mugge [44] developed this approach further in the derivation of a product personality scale. Their work combined items from human personality scales with existing instruments from design

and marketing studies designed to capture personality associations. These items were complemented by data from qualitative studies in which consumers were asked to describe a range of household products “as if they were a person”. The final scale items (aloof, boring, cheerful, childish, cute, dominant, easy-going, honest, idiosyncratic, interesting, lively, modest, obtrusive, open, pretty, provocative, relaxed, serious, silly and untidy) were found to be reliable in the attribution of personality to pictures of cars and vacuum cleaners.

In the domain of interactive technologies, there is also substantial evidence that people often think of and treat interactive technology as though it was their friend, a pet or another person [e.g. 45, 46] and ascribe a broad range of human attributes including personality to interactive technology (e.g. [47, 48, 49, 50, 51]).

Designers also appear to be able to design products with specific personalities, although there are fewer reports here. As noted above, Govers *et al.* ([39] report that domestic irons designed by students to embody a range of personality traits were accurately recognised by respondents, while Desmet *et al.* [52] established that devices intended to have a dominant, elegant or neutral (tangible) interaction style conveyed these traits effectively.

### 4.1 Product personality preference

The balance of evidence to date falls towards product preferences that mirror consumers’ own personalities. Jordan’s 1997 study suggests such a trend, based on participants’ self-rating of their own personality. This is also evident in Govers and Mugge [39], albeit using a 3<sup>rd</sup> party method where participants made judgements about the attachment of fictional consumers described in scenarios, to ‘extrovert’ and ‘conscientious’ toasters. Participants chose between statements such as “*This toaster has no special meaning to Susan*” and “*This toaster is very dear to Susan*” (sic).

The more extensive study reported by Govers and Schoormans [53] investigates this trend in greater depth. Forty-eight participants first described the personalities of each of several variants of screwdrivers, coffee-makers, soap-dispensers and wines “as if it were a person”, then completed a questionnaire scale designed to capture the degree of perceived similarity between their own personality and that of the product and lastly a scale capturing the perceived quality, desirability and attractiveness of the product. Products which were perceived to be similar to the participant’s own personality were significantly preferred. Finally, we should note that Jordan [42] found no such relationship between participant personality and product preference, albeit using data from a workshop with only four participants.

### 4.2 Personality and design qualities

Although there is rather less extant work which links personality traits with specific design qualities, one such study is reported by Brunel [54] and Brunel and Kumar [55]. In this instance participants rated a range of products represented in black-and-white photographs – automobiles, telephones, TVs and wall-clocks – against the five brand personality dimensions identified in Aaker [56] - sincerity, excitement, competence, sophistication, and ruggedness, so far paralleling the procedure of many other studies. However, participants were also required to rate products against the aesthetic facets of recognition, simplicity, harmony, balance, unity, dynamics, timeliness/fashion, and novelty. A significant relationship was found between each of the personality dimensions and evaluations of aesthetic facets. Excitement, for example was

related to timeliness and dynamism, while competence was associated with dynamism, unity and novelty.

## 5. JUDGING WEBSITE PERSONALITIES

Thus, people are able to judge human personalities reliably and very quickly from visual appearance alone; such judgments can be credibly applied to consumer products; and people frequently treat interactive devices as if human.

It is therefore hypothesized that people can make judgments about the ‘personality’ of websites from their appearance alone. Based on previous work, the widely-accepted Big Five account of personality is the most obvious candidate for this study. So, to amplify the opening question, “If this webpage was a person ...”, our investigation will ask people to judge this ‘personality’ in term of the traits of extroversion, agreeableness, conscientiousness, neuroticism, and open-mindedness.

### 5.1 Method and Participants

A booklet was prepared comprising five questions reflecting the five personality traits. These were of the form:

**“If this web page were a person, I would judge its personality to be hard working and dependable (tick a box).”**

Very conscientious Not very conscientious

|    |    |    |    |    |   |    |    |    |    |    |
|----|----|----|----|----|---|----|----|----|----|----|
| +5 | +4 | +3 | +2 | +1 | 0 | -1 | -2 | -3 | -4 | -5 |
|    |    |    |    |    |   |    |    |    |    |    |

In addition to these questions, people were also asked to judge the attractiveness and usability of the page using the same scale.

The participants in these studies were drawn from the second year undergraduate computing students at Edinburgh Napier University.

The number of participants was 55 (38 male and 17 female) and this yielded 48 completed, usable questionnaires.

The data collection was conducted by a small group of postgraduate students at Napier as part of their practical work on the module ‘user experience’. These students chose both the website ‘genres’ and the instance of each – three clothing retail sites, namely, ([www.gap.co.uk](http://www.gap.co.uk), [www.firetrap.com](http://www.firetrap.com) and [www.republic.co.uk](http://www.republic.co.uk)); three news sites ([www.bbc.co.uk](http://www.bbc.co.uk), [www.yahoo.com](http://www.yahoo.com) and [www.msn.com](http://www.msn.com)) and three social networking sites ([www.facebook.com](http://www.facebook.com), [www.myspace.com](http://www.myspace.com) and [www.youtube.com](http://www.youtube.com)).

The home page of each website was displayed in turn to the participants using a standard lecture theatre projector for 5 minutes each.

### 5.2 Results

This section reports the results for each website genre. For each group of sites, we first provide the mean scores for each of the Big Five personality traits, then the correlations between individual traits and ratings for usability and attractiveness. We take attractiveness to be a simple indicator of aesthetic appeal. We also report data on the relationship between these qualities and examine correlations between usability and attractiveness.

#### 5.2.1 Comparing Retail Clothing Sites

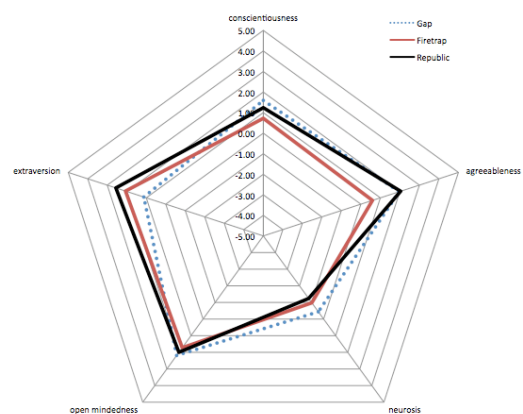
Table 2 holds the mean scores for the three retail clothing home web pages for the five personality traits. All are rated moderately positively (0 is the neutral point) for all traits except

neurosis, which is rated negatively indicating its a relative absence.

**Table 2. Mean scores for personality traits for clothing sites**

|                   | Gap   | Firetrap | Republic |
|-------------------|-------|----------|----------|
| conscientiousness | 1.59  | 0.72     | 1.24     |
| agreeableness     | 1.97  | 0.60     | 2.04     |
| neurosis          | -0.44 | -0.98    | -1.24    |
| open mindedness   | 2.19  | 1.72     | 2.00     |
| extraversion      | 1.13  | 2.06     | 2.56     |

Figure 1 is a plot of these results for the three websites. From inspection it is evident that the personality profile of each is similar.



**Figure 1. The ‘personalities’ of the Gap, Firetrap and Republic home web pages**

Table 3 holds details of a series of pair-wise correlations between the judgments of conscientiousness, agreeableness, neurosis, open-mindedness and extraversion and usability, attractiveness and familiarity. The figures in **bold** indicate significant correlations, ( $p < 0.05$ ). Both agreeableness and open-mindedness are positively correlated with attractiveness in all instances. Similarly conscientiousness and (not being) neurotic are significantly correlated with attractiveness in two of the three judgments.

Usability is similarly correlated with conscientiousness for two of the three but otherwise there is no apparent pattern.

**Table 3. Correlations between personality traits, usability and attractiveness for retail clothing sites**

|                       | Gap          | Firetrap    | Republic     |
|-----------------------|--------------|-------------|--------------|
| <b>Attractiveness</b> |              |             |              |
| conscientiousness     | 0.23         | <b>0.55</b> | <b>0.76</b>  |
| agreeableness         | <b>0.41</b>  | <b>0.40</b> | <b>0.61</b>  |
| neurosis              | <b>-0.40</b> | -0.14       | <b>-0.38</b> |
| open-mindedness       | <b>0.41</b>  | <b>0.41</b> | <b>0.37</b>  |
| Extraversion          | 0.07         | 0.04        | 0.22         |
| <b>Usability</b>      |              |             |              |
| conscientiousness     | 0.12         | <b>0.43</b> | <b>0.47</b>  |
| agreeableness         | 0.24         | 0.17        | 0.19         |
| neurosis              | -0.15        | -0.17       | -0.16        |
| open-mindedness       | 0.18         | <b>0.36</b> | 0.17         |
| extraversion          | <b>0.43</b>  | 0.28        | -0.01        |

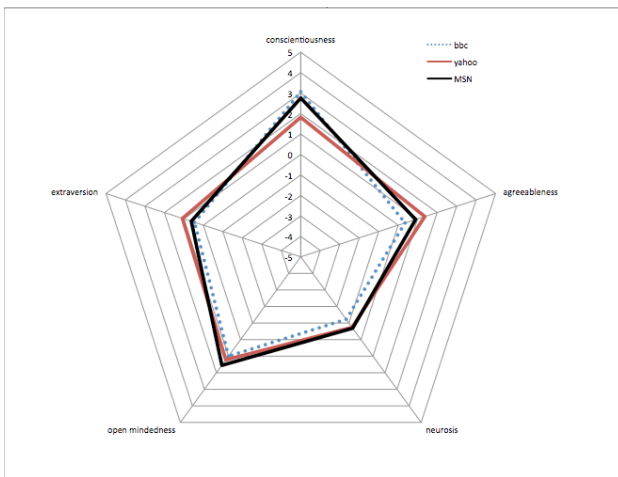
### 5.2.2 Comparing News Sites

Table 4 holds the mean scores for the three news home web pages for the five personality traits. All are rated moderately positively (0 is the neutral point) for all traits except neurosis, which is rated negatively indicating its a relative absence.

**Table 4. Mean scores for personality traits for news sites**

|                   | BBC   | Yahoo | MSN   |
|-------------------|-------|-------|-------|
| conscientiousness | 3.06  | 1.81  | 2.76  |
| agreeableness     | 0.35  | 1.37  | 0.90  |
| neurosis          | -1.23 | -0.74 | -0.69 |
| open-mindedness   | 1.00  | 1.22  | 1.55  |
| extraversion      | 0.45  | 1.07  | 0.62  |

Figure 2 is a plot of these three websites. Again the sites are rated positively for all traits except neurosis. From inspection it again appears that these home web pages have congruent 'personality profiles'.



**Figure 2. The 'personalities' of the BBC, Yahoo and MSN websites**

**Table 5. Correlations between personality traits, usability and attractiveness for news sites**

|                       | BBC          | Yahoo       | MSN         |
|-----------------------|--------------|-------------|-------------|
| <b>Attractiveness</b> |              |             |             |
| conscientiousness     | 0.16         | <b>0.43</b> | 0.06        |
| agreeableness         | 0.00         | <b>0.59</b> | <b>0.56</b> |
| neurosis              | <b>-0.35</b> | 0.13        | -0.03       |
| open-mindedness       | <b>0.44</b>  | <b>0.54</b> | <b>0.71</b> |
| extraversion          | 0.02         | <b>0.48</b> | <b>0.54</b> |
| <b>Usability</b>      |              |             |             |
| conscientiousness     | 0.04         | <b>0.33</b> | 0.04        |
| agreeableness         | 0.06         | <b>0.52</b> | <b>0.45</b> |
| neurosis              | -0.20        | -0.23       | -0.11       |
| open-mindedness       | <b>0.56</b>  | <b>0.50</b> | <b>0.85</b> |
| extraversion          | 0.12         | 0.17        | <b>0.55</b> |

Table 5 holds details of a series of pair-wise correlations between the judgments of conscientiousness, agreeableness, neurosis, open-mindedness and extraversion and usability, attractiveness and familiarity. The figures in **bold** indicate significant correlations, ( $p < 0.05$ ).

Again agreeableness is positively correlated ( $p < 0.05$ ) with attractiveness for two sites, as is extraversion, while for all three sites open-mindedness is associated with attractiveness.

In the news context, usability and open-mindedness appear to be related for all three sites.

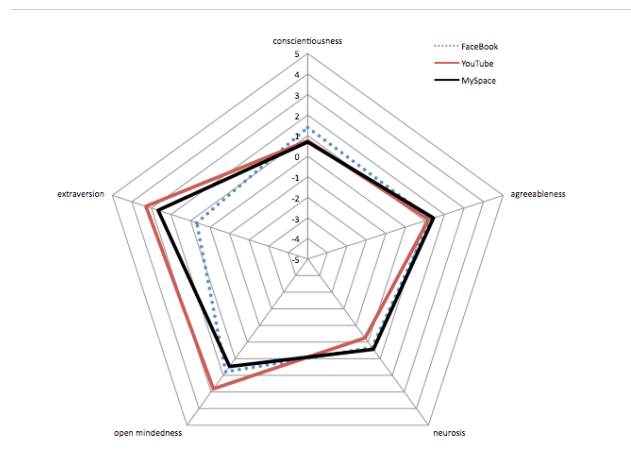
### 5.2.3 Comparing Social Networking Sites

Table 4 holds the mean scores for the three news home web pages for the five personality traits. All are rated moderately positively with only one negatively rated web page.

**Table 6. Mean scores for personality traits for social networking sites**

|                   | FaceBook | YouTube | MySpace |
|-------------------|----------|---------|---------|
| conscientiousness | 1.40     | 0.75    | 0.69    |
| agreeableness     | 1.31     | 1.19    | 1.44    |
| neurosis          | 0.32     | -0.25   | 0.44    |
| open-mindedness   | 1.79     | 2.81    | 1.47    |
| extraversion      | 0.68     | 3.28    | 2.66    |

Figure 3 is a plot of these three websites. Inspection suggests that while the profiles of the sites are similar for conscientiousness, agreeableness and neurosis, YouTube and Facebook in particular differ on the dimension of extraversion – YouTube being the more extraverted, while YouTube is also perceived as being more open-minded than comparison sites.



**Figure 3. The 'personalities' of the Facebook, YouTube and MySpace websites**

Table 7 holds details of a series of pair-wise correlations between the judgments of conscientiousness, agreeableness, neurosis, open-mindedness and extraversion and usability, attractiveness and familiarity.

Open-mindedness is positively correlated ( $p < 0.05$ ) with both attractiveness and usability. For two of the sites (Facebook and YouTube), usability is related to agreeableness, open-mindedness and extraversion.

**Table 7. Correlations between personality traits, usability and attractiveness for social networking sites**

| Attractiveness    | Facebook    | YouTube     | MySpace     |
|-------------------|-------------|-------------|-------------|
| conscientiousness | 0.22        | 0.22        | 0.24        |
| agreeableness     | 0.19        | <b>0.68</b> | 0.29        |
| neurosis          | 0.07        | -0.31       | 0.11        |
| open-mindedness   | <b>0.38</b> | <b>0.51</b> | <b>0.43</b> |
| extraversion      | <b>0.48</b> | 0.08        | 0.17        |
| <b>Usability</b>  |             |             |             |
| conscientiousness | 0.04        | 0.16        | 0.25        |
| agreeableness     | <b>0.35</b> | <b>0.47</b> | 0.26        |
| neurosis          | 0.02        | -0.28       | -0.15       |
| open-mindedness   | <b>0.51</b> | <b>0.65</b> | <b>0.62</b> |
| extraversion      | <b>0.31</b> | <b>0.38</b> | -0.07       |

## 6. DISCUSSION

The most striking finding we report is that personality does seem to be a meaningful concept in this context. We have identified four immediate uses for our findings:

Firstly, it may be possible for designers to create websites with specific personality traits which would render them more predictable, and as such, acceptable for their potential users.

Secondly, it may be possible to tailoring design for “people like us”. There is evidence that consumers prefer product personalities that accord with their own [52]. It is reasonable to suppose websites could be created to match the personality traits of their intended users. Further, if we can design for specific personality traits then we can design for personas, thus forging a direct link between website design, website aesthetics and persona-based design

Thirdly, the use of this ‘personality profiling’ for websites may be a tool which could be used to differentiate between two designs of similar usability.

Finally, designers of websites are often faced with the challenge of talking to their client about aesthetics without having a clear, common language – hence the extensive use of iterative prototyping and “enlightened trial and error”. However, in adopting this ‘personality’ based approach there is a ready-made and completely comprehensible language which can empower designer and client alike.

## ACKNOWLEDGMENTS

We would like to acknowledge the hard work of the 2009 postgraduate *User Experience* class at the School of Computing, Edinburgh Napier University, who collected the data reported here.

## 7. REFERENCES

- [1] Frøkjær, E., Hertzum, H. and Hornbæk, K., (2000). Measuring Usability: Are Effectiveness, Efficiency, and Satisfaction Really Correlated? In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (The Hague, The Netherlands, April 01 - 06, 2000). CHI '00. ACM, New York, NY, 345-352.
- [2] Lindgaard, G., (2007). Aesthetics, Visual Appeal, Usability and User Satisfaction: What Do The User’s Eyes Tell The User’s Brain? *Australian Journal of Emerging Technologies and Society*. **5**(1), pp 1-14.
- [3] Lavie, T. and Tractinsky, N. (2004) Assessing dimensions of perceived visual aesthetics of web sites. *International Journal of Human-Computer Studies* **60**(3), 269–298.
- [4] Lindgaard, G. and Dudek, C. (2003): What is this evasive beast we call user satisfaction? *Interacting with Computers*, **15** (3), 429-452.
- [5] Ramachandran, V.S. and Blakeslee, S. (1998) *Phantoms in the Brain*. William Morrow & Co,
- [6] New York. Cupchik, G.C. (1993) Component and relational processing in aesthetics, *Poetics*, **22**, 171- 183.
- [7] Porteous, J.D. (1996) *Environmental Aesthetics: Ideas, Politics and Planning*. Routledge, London.
- [8] Hassenzahl, M., (2004). The interplay of beauty, goodness and usability in interactive products. *Human-Computer Interaction*, **19**(4), 319–349.
- [9] Langer, S. (1967) *Mind: An Essay on Human Feeling Vol. I*. The Johns Hopkins Press, Baltimore.
- [10] Tractinsky, N. (2006). Noam Tractinsky on Aesthetics and HCI by Dr Gitte Lindgaard. Hot Topics [Online]. Publication of the Human Oriented Technology Lab, Carleton University. Available from: <http://www.carleton.ca/hotlab/hottopics/Articles/June2006-NoamTractinskyon.html>. [accessed 13/07/09].
- [11] Lindgaard, G. and Chattratichart, J. (2007): Usability testing: what have we overlooked?. *Proceedings of ACM CHI 2007 Conference on Human Factors in Computing Systems 2007*. pp. 1415-1424
- [12] Berlyne, D.E. (1971) *Aesthetics and Psychobiology* Appleton-Century-Crofts: New York.
- [13] Berlyne, D.E. (1972) ‘Experimental aesthetics’ in Dodwell, P.C. (ed) *New Horizons in Psychology* Penguin, Harmondsworth, UK.
- [14] Lidwell, W., Holden, K. and Butler, J. (2003) *Universal Principles of Design*. Rockport Publishers: Beverly, MA.
- [15] Petersen, M. G., Iversen, O. S., Krogh, P. G., and Ludvigsen, M., (2004). Aesthetic interaction: a pragmatist's aesthetics of interactive systems. In *Proceedings of the 5th Conference on Designing interactive Systems: Processes, Practices, Methods, and Techniques* (Cambridge, MA, USA, August 01 - 04, 2004). DIS '04. ACM, New York, NY, pp.269-276.
- [16] Croon Fors, A. and Stolterman, E., (2003) Information Technology and Everyday Aesthetics. The 5th European Academy of Design Conference (EAD), τεχνη—Design Wisdom, Barcelona, April, 2003.
- [17] Zettl, H. (1999). *Sight, Sound, Motion: Applied Media Aesthetics*. Wadsworth Publishing Company, USA.
- [18] Park S., Choi, D., and Kim, J. 2004. Critical factors for the aesthetic fidelity of web pages: Empirical studies with professional web designers and users. *Interacting with Computers*. 16, 2, 351– 376.

- [19] Lindgaard G, Fernandes G., Dudek C. and Brown, J. (2006) Attention web designers: You have 50 milliseconds to make a good first impression! *Behaviour & Information Technology*, **25** (2), 115 – 126
- [20] Robins, D. and Holmes, J. (2008) Aesthetics and credibility in web site design, *Information Processing and Management* **44**, 386–399
- [21] Hartmann, J., Sutcliffe, A. and De Angeli, A. (2008) Towards a Theory of User Judgment of Aesthetics and User Interface Quality. *ACM Transactions on Computer-Human Interaction*, **15**(4) (no page numbers)
- [22] Sutcliffe, A. G. (2002). Assessing the reliability of heuristic evaluation for website attractiveness and usability. *Proceedings of the Hawaii International Conference on System Sciences (HICSS 35)*. IEEE Computer Society Press, Los Alamitos, CA, pp.1838–1847.
- [23] Sheldon, W. (1954) *Atlas of Men: A Guide for Somatotyping the Adult Male of All Ages*. New York, Harper.
- [24] Cattell, R.B., Eber, H.W. and Tatsuoka, M.M. (1977) *Handbook for the Sixteen Factor Personality Factor Questionnaire*, Champaign, (Illinois): IPAT.
- [25] Eysenck, H.J. (1975) *The Inequality of Man*, San Diego, California: Edits Publishers
- [26] Digman, J.M. (1990) Personality structure: Emergence of the five-factor model, *Annual Review of Psychology*, **41**, 417-40.
- [27] Goldberg, L.R. (1993) The structure of phenotypic personality traits, *American Psychologist*, **48**, 26-34.
- [28] Schmitt, D.P. and 126 others (2006) The Geographic Distribution of Big Five Personality Traits: Patterns and Profiles of Human Self-Description Across 56 Nations. *Journal of Cross-Cultural Psychology*, **38**(2), 173-212.
- [29] Willis, J. and Todorov, A. (2006) First Impressions Making Up Your Mind After a 100-Ms Exposure to a Face. *Psychological Science*, **17**(7), 592-598.
- [30] Penton-Voak, I.S., Pound N., Little A.C. and Perrett D.I. (2006) Accuracy in personality attributions made on the basis of facial characteristics. *Social Cognition*, **24**, 607-640.
- [31] Borkebau, P., Brecke, S., Möttig, C. and Paelecke, M. (2009) Extraversion is accurately perceived after a 50-ms exposure to a face, *Journal of Research in Personality*, **43**, 703-706.
- [32] Kahneman, D. (2003) A perspective on judgment and choice. *American Psychologist*, **58**, 697-720
- [33] Ames, D.R. and Bianchi, E.C. (2008) The Agreeableness Asymmetry in First Impressions: Perceivers' Impulse to (Mis)judge Agreeableness and How It Is Moderated by Power, *Personality and Social Psychology Bulletin*, **34**, 1719-1736.
- [34] Bar, M., Neta, M. and Linz, H. (2006) Very first impressions. *Emotion* **6**, 269–278.
- [35] Bar, M. (2007) The proactive brain: using analogies and associations to generate predictions. *Trends in Cognitive Science*, **11**(7), 280-289.
- [36] Todorov, A., Baron, S.G. and Oosterhof, N.N. (2008) Evaluating face trustworthiness: a model based approach, *SCAN*, **3**, 119-127
- [37] Engell, A.D., Haxby, J.V. and Todorov, A. (2007) Implicit Trustworthiness Decisions: Automatic Coding of Face Properties in the Human Amygdala, *Journal of Cognitive Neuroscience*, **19**(9), 1508–1519
- [38] Govers, P C M and Mugge, R (2004) 'I love my jeep, because its tough like me': the effect of product personality congruence on product attachment in A Kurtgözü (ed) *Proceedings of the Fourth International Conference on Design and Emotion*, Ankara, Turkey.
- [39] Jordan, P W (1997) Products as personalities in S A Robertson (ed) *Contemporary ergonomics*, London: Taylor & Francis, 73-78
- [40] Myers, I.B. and McCaulley, M.H. (1985) *Manual; A Guide to the Development and Use of the Myers-Briggs Type Indicator*, 5th edn. Palo Alto, CA: Consulting Psychologists Press.
- [41] Jordan, P W (2002) The personalities of products, in W S Green and P W Jordan (eds) *Pleasure with products: beyond usability*, London: Taylor & Francis, 19-48
- [42] Govers, P. C .M, Hekkert, P. and Schoormans, J. P. L. (2004) Happy, cute and tough: can designers create a product personality that consumers understand? in D MacDonagh, P Hekkert, J Van Erp and D Gyi (eds) *Design and emotion, the experience of everyday things*, Taylor & Francis, London, 345-349
- [43] Mugge, R., Govers, P.C.M. and Schoormans, J.P.L. (to appear) The development and testing of a product personality scale, *Design Studies*.
- [44] Reeves, B. and Nass, C. (1996) *The Media Equation: How People Treat Computers, Television And New Media Like Real People And Places*. Cambridge, UK: Cambridge University Press.
- [45] Nass, C. and Moon, Y. (2000) Machines and Mindlessness: Social Responses to Computers. *Journal of Social Issues*, **56**(1), 81-103.
- [46] Fogg, B.J. and Nass, C. (1997) Silicon sycophants: The effects of computers that flatter. *Int. Journal of Human-Computer Studies*, **46**, 551–561.
- [47] Brave, S., Nass, C.I. and Hutchinson, K. (2005) Computers that care: investigating the effects of orientation of emotion exhibited by an embodied computer agent. *Int. Journal of Human-Computer Studies*, **62**(2), 161–178.
- [48] Johnson, J.D., Marakas, G.M. and Palmer, J.W. (2006) Differential social attributions toward computing technology: An empirical examination. *International Journal of Human-Computer Studies*, **64**, 446–460.
- [49] Johnson, J.D., Marakas, G.M. and Palmer, J.W. (2008) Beliefs About The Social Roles and Capabilities Of Computing Technology: Development of The Computing Technology Continuum of perspective. *Behaviour and Information Technology*, **27**(2), 169-181
- [50] Turner, P. and Sobolewska, E. (2009) Mental Models, Magical Thinking and Individual Differences. *Human Technology*, **5**(1), 90-113.

- [51] Desmet, P.M.A., Nicolás, J.C.O. and Schoormans, J.P. (2008) Product Personality in Physical Interaction. *Design Studies*, **29**, 458-477.
- [52] Govers, P C M and Schoormans, J P L (2005) Product personality and its influence on consumer preference, *Journal of Consumer Marketing*, **22(4)**, 189-197
- [53] Brunel, F.F. (2006) *Design and the Big Five: linking visual product aesthetics to product personality*, Boston University School of Management Working Paper.
- [54] Brunel, F. F. and Kumar, R. (2007) Design and the Big Five: linking visual product aesthetics to product personality, *Advances in consumer research, Association for Consumer Research* **34**, 238-239
- [55] Aaker, J (1997) Dimensions of brand personality, *Journal of Marketing Research*, **34(3)**, 347-356