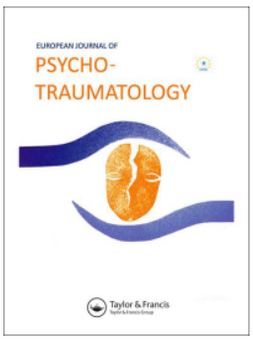

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BASIC RESEARCH ARTICLE

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Traumatic life events as risk factors for psychosis and ICD-11 complex PTSD: a gender-specific examination

Grace W. K. Ho[a], Philip Hyland[b], Thanos Karatzias[c,d], Daniel Bressington[e] and Mark Shevlin[f]

[a]School of Nursing, The Hong Kong Polytechnic University, Kowloon, Hong Kong SAR; [b]Department of Psychology, Maynooth University, Kildare, Ireland; [c]School of Health & Social Care, Edinburgh Napier University, Edinburgh, Scotland; [d]Rivers Centre for Traumatic Stress, NHS Lothian, Edinburgh, Scotland; [e]College of Nursing and Midwifery, Charles Darwin University, Darwin, Australia; [f]School of Psychology, Ulster University, Derry, Northern Ireland

ABSTRACT

Background: Numerous studies found robust associations between psychosis and posttraumatic stress disorder (PTSD), but few have examined the relationships between psychosis and recently formulated ICD-11 Complex PTSD (CPTSD). Further, no known study has examined the effects of different traumatic life events on CPTSD and psychotic-like symptoms in a manner that permits gender-specific effects to be identified.
Objective: Using a nationally representative sample of 1,020 Irish adults, we examined gender-differences in (a) psychotic-like symptoms, CPTSD, and exposure to 21 different traumatic life events, and (b) the unique associations between different traumas with CPTSD and Psychosis.
Method: Bivariate analyses and structural equation modelling were performed.
Results: Consistent with the literature, no gender differences were observed in psychotic-like symptoms. Females reported slightly higher levels of CPTSD and were more likely to be exposed to sexual and emotional abuse, whereas men reported greater exposure to physical violence, accidents, and disasters. Psychosis symptoms were explained by trauma exposure to a considerate degree and at a level similar to CPTSD; a moderate correlation was also found between CPTSD and Psychosis. Physical/emotional neglect was the only traumatic life event that significantly and most strongly predicted both conditions. Two gender-specific associations between different traumatic life events and CPTSD and Psychosis were identified out of the 42 possible effects modelled.
Conclusions: The present investigation provides initial evidence that psychotic-like symptoms and CPTSD are moderately correlated constructs in the general population. Results also highlight the importance of conducting a detailed assessment of trauma history for all clients presenting with symptoms of CPTSD, psychosis, or both.

Eventos vitales traumáticos como factores de riesgo para psicosis y TEPT complejo de la CIE-11: Una examinación específica de género

Antecedentes: Numerosos estudios han encontrado asociaciones robustas entre la psicosis y el trastorno de estrés postraumático (TEPT), pero pocos han examinado la relación entre la psicosis y el recientemente formulado TEPT Complejo (TEPT-C). Es más, no existe algún estudio conocido que haya examinado los efectos de diferentes eventos vitales traumáticos en el TEPT-C y los síntomas psicóticos de una forma que permita identificar efectos específicos por género.
Objetivo: Usando una muestra representativa a nivel nacional de 1.020 adultos irlandeses, examinamos las diferencias de género en (a) los síntomas psicóticos, el TEPT-C, y exposición a 21 eventos vitales traumáticos diferentes, y (b) las asociaciones únicas entre los diferentes traumas con el TEPT-C y la Psicosis.
Método: Se llevaron a cabo análisis bivariados y modelamiento de ecuaciones estructurales.
Resultados: Consistente con la literatura, no se observaron diferencias de género en los síntomas psicóticos. Las mujeres reportaron niveles levemente más altos del TEPT-C y fueron más propensas a estar expuestas a abuso sexual y emocional, mientras que los hombres reportaron mayor exposición a la violencia física, accidentes, y desastres. Los síntomas de la psicosis fueron explicados por la exposición a trauma en un grado considerable y en un nivel similar al TEPT-C; se encontró también una correlación moderada entre el TEPT-C y la Psicosis. La negligencia física/emocional fue el único evento vital traumático que predijo significativamente y más fuertemente ambas condiciones. De los 42 posibles efectos modelados, se identificaron dos asociaciones específicas al género entre eventos vitales traumáticos y el TEPT-C y la Psicosis.
Conclusiones: La presente investigación proporciona evidencia inicial que los síntomas psicóticos y TEPT-C son constructos correlacionados moderadamente en la población general. Los resultados también subrayan la importancia de conducir una evaluación detallada de la historia de trauma de todos los clientes presentando síntomas de TEPT-C, psicosis, o ambos.

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Psychosis; complex PTSD; traumatic life events; structural equation modelling; gender-differences; psychotic-like symptoms

PALABRAS CLAVE
Psicosis; TEPT-C; eventos vitales trauma; modelamiento de ecuaciones estructurales; diferencias de género; síntomas psicóticos

关键词
精神病; 复杂性 PTSD; 创伤性生活事件; 结构方程模型; 性别差异; 精神病样症状

HIGHLIGHTS

- Structural equation modelling of data from 1,020 Irish adults showed symptoms of psychosis and complex posttraumatic stress disorder moderately correlate.
- Physical emotional neglect was the only traumatic life event that significantly and most strongly predicted both conditions.

CONTACT Grace W. K. Ho grace.wk.ho@polyu.edu.hk PQ426 School of Nursing, The Hong Kong Polytechnic University, Hung Hom, Hong Kong

创伤性生活事件作为精神病和 ICD-11 复杂性 PTSD 的风险因素:一项对性别特异性的考查

背景: 许多研究发现精神病与创伤后应激障碍 (PTSD) 之间存在密切关联, 但很少有人研究精神病与最近制定的 ICD-11 复杂性 PTSD (CPTSD) 之间的关系。此外, 没有已知研究以允许识别性别特异性影响的方式考查不同的创伤性生活事件对 CPTSD 和精神病样症状的影响。
目的: 使用一个1,020 名爱尔兰成年人的全国代表性样本, 我们考查了 (a) 精神病样症状, CPTSD 和暴露于 21 种不同创伤性生活事件中的性别差异, 以及 (b) 不同创伤与 CPTSD 和精神病之间的独特关联。
方法: 进行了双变量分析和结构方程模型。
结果: 与文献一致, 在精神病样症状中没有观察到性别差异。女性报告的 CPTSD 水平略高, 更有可能遭受性虐待和情感虐待, 而男性报告更多遭受身体暴力, 事故和灾难。精神病症状可以通过创伤暴露来解释, 与 CPTSD 程度相似; 在 CPTSD 和精神病之间也发现了适度的相关性。身体/情感忽视是唯一能显著且最强预测这两种情况的创伤性生活事件。在建模的 42 种可能影响中, 确定了两种不同创伤性生活事件, CPTSD 和精神病之间的性别特异性关联。
结论: 当前的调查提供了初步证据, 表明精神病样症状和 CPTSD 在一般人群中是中等相关的构念。结果还强调了对所有出现 CPTSD, 精神病或两者症状的患者进行详细创伤史评估的重要性。

1. Introduction

Robust associations between posttraumatic stress disorder (PTSD) and psychosis have been well documented, with trauma exposure as a key aetiological risk factor for both conditions (Bendall, Alvarez-Jimenez, Hulbert, McGorry, & Jackson, 2012; Varese et al., 2012). The symptomatology of psychosis and PTSD share certain similarities. Flashbacks in PTSD and hallucinations in psychosis are phenomenologically similar in that they both represent vivid and unwelcome intrusions of unpleasant thoughts and images (Alsawy, Wood, Taylor, & Morrison, 2015; Anketell et al., 2010; Hardy et al., 2005; McCarthy-Jones et al., 2014). Prior studies have also demonstrated PTSD and psychotic-like symptoms can co-occur (Shevlin, Armour, Murphy, Houston, & Adamson, 2011), and that PTSD is more common among individuals with a psychotic disorder compared with those in the general population (Aakre, Brown, Benson, Drapalski, & Gearon, 2014; Buckley, Miller, Lehrer, & Castle, 2009). Different models have been proposed to explain the relationships between trauma, PTSD, and psychosis. For example, one model suggests that PTSD mediates the relationship between trauma and psychosis (Mueser, Rosenberg, Goodman, & Trumbetta, 2002). Another model posits that PTSD and psychotic symptoms fall within an underlying spectrum of trauma-related responses (Morrison, Frame, & Larkin, 2003), and that both conditions are caused and maintained by the same psychological mechanism following trauma exposure (Brand, Rossell, Bendall, & Thomas, 2017).

The recently published 11th version of the *International Classification of Diseases* (ICD-11: World Health Organization, 2019) provided a revised formulation of PTSD and introduced a new diagnosis in the form of Complex PTSD (CPTSD) (Maercker et al., 2013). PTSD is defined more narrowly than previous descriptions and includes three symptom clusters of (1) re-experiencing in the here and now, (2) avoidance, and (3) sense of threat. CPTSD is defined by these PTSD symptoms plus three additional symptom clusters of (1) affective dysregulation, (2) negative self-concept, and (3) disturbed relationships that are collectively labelled 'Disturbances in Self Organization' (DSO). These DSO symptoms were included to reflect the greater complexity and severity of trauma responses that are commonly observed among individuals who have experienced sustained or repeated forms of interpersonal trauma that are difficult or impossible to escape from (Maercker et al., 2013). The DSO symptom clusters are also, to a certain extent, similar to the negative symptoms and experiences of psychosis, including difficulties regulating emotions, internalized stigma and shame, and loneliness and social isolation (Carden, Saini, Seddon, Watkins, & Taylor, 2020; Lim, Gleeson, Alvarez-Jimenez, & Penn, 2018; Michalska da Rocha, Rhodes, Vasilopoulou, & Hutton, 2018). Although trauma exposure is not a necessary antecedent to psychosis, interpersonal trauma has been identified as a major risk factor for both CPTSD (Cloitre, Garvert, Brewin, Bryant, & Maercker, 2013; Hyland et al., 2017; Karatzias et al., 2017) and psychosis (Arseneault et al., 2011; Bailey et al., 2018; Gibson, Alloy, & Ellman, 2016; Varese et al., 2012).

To our knowledge, only one study has investigated the relationship between psychosis and ICD-11 CPTSD (Frost, Louison Vang, Karatzias, Hyland, & Shevlin, 2019), which modelled the co-occurrence of these symptoms in a trauma-exposed general population sample from the United Kingdom using latent class analysis. Among the multiple classes identified, two were char-acterized by co-occurring symptoms of CPTSD and psychosis, with the accumulation of childhood adversities a significant predictor of membership for both classes. Similarities in the aetiology, symptomatology, and risk factors of psychosis and CPTSD, and evidence of the co-occurrence of these symptoms

(Frost et al., 2019), highlight the need to study these conditions in tandem. It is important to develop a better understanding how CPTSD and psychosis are correlated to one another, and how they relate to specific traumatic life events. Exploring these relationships may have important research and clinical implications as findings will help to illuminate the extent to which these conditions overlap, as well as potentially identifying their shared or unique underlying risk factors (e.g. distinct trauma profiles).

Another aspect that warrants further investigation is whether mean levels of CPTSD and psychosis symptoms differ by gender, and whether associations between specific traumatic life events and CPTSD and psychosis symptoms differ by gender. For CPTSD, results in the extant literature on gender-specific risk are mixed. Most studies have focused on gender differences at the diagnostic level with several studies finding no differences between males and females (Cloitre et al., 2013; Karatzias et al., 2019; Wolf et al., 2015). However, other studies have found that females are more likely to meet diagnostic criteria for CPTSD (Cloitre et al., 2019; Hyland et al., 2017; Perkonigg et al., 2016) and have higher symptoms of CPTSD (Hyland et al., 2017). We are not aware of any studies that have tested for gender-specific associations between trauma and CPTSD. The literature is also mixed for psychosis. There is evidence that men are at a higher risk of experiencing certain psychotic disorders such as schizophrenia (Li, Ma, Wang, Yang, & Wang, 2016) and may also have higher levels of psychosis symptoms (Hyland et al., 2020), however other studies have found no differences between the sexes (Caspi et al., 2014). The evidence of gender differences in the trauma-psychosis association is also inconsistent (Gibson, Alloy, & Ellman, 2016). For example, elevated risks for, and severity of, psychotic experiences after a traumatic life event have been reported for males (Pruessner et al., 2019), females (Bebbington et al., 2011; Gayer-Anderson et al., 2015), and neither (Shevlin, Murphy, Read, & Mark Shevlin, 2015). However, these mixed findings may be due to variation in how trauma exposure was measured and conceptualized across studies (e.g. most only included childhood adversities or utilized a cumulative approach to quantify trauma history). Indeed, although women have generally been found to appraise traumatic events more negatively than men, and the relationship between trauma and mental disorder symptoms is also stronger in women (Kucharska, 2017), some studies have indicated that certain forms of trauma may be more 'toxic' for men. For example, rape was found to be more strongly associated with psychosis symptoms for males compared to females in the US National Comorbidity Survey (Shevlin, Dorahy, & Adamson, 2007), despite the fact that women are more likely to experience sexual assault across the lifespan (Tolin & Foa, 2008). Importantly, no known study has attempted to examine potential gender differences in the associations between specific traumatic life events and CPTSD and psychosis symptoms while simultaneously accounting for both conditions.

Based on well-established sex differences in exposure to different traumatic life events (Benjet et al., 2016), and the potential variability in the 'toxicity' of certain traumas for males versus females (Shevlin et al., 2007), the effects of different traumatic life events on CPTSD and psychotic-like symptoms should be examined in a manner that permits gender-specific effects to be identified. Understanding gender-specific vulnerability within the context of individuals' trauma history can have important implications for screening, diagnosis, and treatment of trauma-related psychopathology in clinical settings. The present study was planned to address these issues. Our first objective was to examine if men and women differed (a) in their levels of CPTSD and psychotic-like symptoms, and (b) in their exposure to specific traumatic life events. Our second objective was to assess if there were (a) unique associations between different traumatic life events and CPTSD and psychotic-like symptoms, and (b) if any of these unique associations varied by gender. Finally, our third objective was to assess the extent to which CPTSD and psychotic-like symptoms were associated in males and females.

2. Methods

2.1. Procedures and participants

A nationally representative sample of Irish adults was recruited from existing internet research panels by the Irish-based research company, Qualtrics. Stratified, quota sampling methods were used to select a sample representative of the general population in terms of gender (male and female), age distribution, and geographical location (i.e. across the four Irish provinces of Leinster, Munster, Connaught, and Ulster). The sample characteristics therefore matched known population parameters on these three variables from the 2016 Irish census (Central Statistics Office of Ireland, 2016). Potential participants were contacted via email, text, or in-app notifications, and followed a secure weblink to read the study description, provide informed consent, and complete the survey. The median time for survey completion was 22 minutes; participants were reimbursed by the survey company for their time. The data were collected in February 2019. Ethical approval was provided by the Social Research Ethics Committee at Maynooth University.

A total of 1,020 people participated (51.0% female), and the mean age was 43.10 years (*Mdn* = 42.00, *SD* = 15.12, range 18–87). Most people were in a committed relationship (69.5%) and had children (59.4%). The highest educational attainment for most

people was completing an undergraduate or postgraduate university degree (53.7%), 39.2% completed secondary school, and 7.1% did not complete secondary school. Nearly half of participants were in full-time employment (45.8%), 17.8% were in part-time employment, 27.7% were retired, homemaking, or a student, and 8.6% were unemployed.

2.2. Measures

2.2.1. Trauma exposure

The International Trauma Exposure Measure (ITEM) (Hyland et al., 2021) was used to assess lifetime exposure to 21 potentially traumatic events (see Table 1 for a description of these events). The ITEM was developed to measure trauma exposure consistent with the definition of a traumatic event in the ICD-11. Participants were asked to indicate if each of the events occurred at any point in their lifetime on a 'Yes' or 'No' basis. An additional question identifies the event that the respondent found to be the most distressing, if exposed to multiple traumatic events. The ITEM may be freely downloaded and used by researchers from https://www.traumameasuresglobal.com/item.

2.2.2. CPTSD

The International Trauma Questionnaire (ITQ: Cloitre et al., 2018) is a self-report measure of the 12 symptoms of ICD-11 CPTSD. It too may be freely downloaded and used by researchers from https://www.traumameasuresglobal.com/itq. The ITQ contains six items that measure each PTSD symptom and six items that measure each DSO symptom. All items are answered in relation to the respondent's most distressing traumatic event; the PTSD items are answered in terms of how much the respondent has been bothered by each symptom in the past month; and the DSO items are answered in terms of how the respondent typically feels, thinks about oneself, and relates to others. All items are answered using a 5-point Likert scale that ranges from 0 (*Not at all*) to 4 (*Extremely*), yielding a possible range of scores from 0 to 48, with higher scores reflecting greater CPTSD symptomatology. CPTSD caseness was identified if the respondent endorses at least one of two symptoms from each symptoms cluster and at least one indicator of functional impairment associated with these symptoms (i.e. score ≥2). The reliability and validity of the ITQ scale scores have been evidenced in multiple studies with general population (Ben-Ezra et al., 2018; Cloitre et al., 2019), clinical (Hyland et al., 2017), and refugee (Vallières et al., 2018) samples. The internal reliability of the ITQ scale scores in this sample was excellent (α = .93).

2.2.3. Psychotic-like symptoms

A modified version of the Adolescent Psychotic-like Symptom Screener (APSS) (Kelleher, Harley, Murtagh, & Cannon, 2011) was used to measure symptoms of psychosis. This is a seven item self-report questionnaire measuring the following experiences: (1) Some people believe that their thoughts can be read by another person. Have other people ever read your mind? (mind reading), (2) Have you ever had messages sent just to you through the TV or radio? (special messages), (3) Have you ever thought that people are following or spying on you? (spying on you), (4) Have you ever heard voices or sounds that no one else can hear? (auditory hallucinations), (5) Have you ever felt you were under the control of some special power? (under control), (6) Have you ever seen things that other people could not see? (visual hallucinations), and (7) Have you ever felt like you had extra-special powers? (special powers). Participants were first asked to indicate how often they had each experience on a four-point Likert scale ('Never', 'Sometimes', 'Often', and 'Nearly Always'), and then how distressed they were by each experience, also on a four-point Likert scale ('Not distressed', 'A bit distressed', 'Quite distressed', and 'Very distressed'). A 'symptom' of psychosis was deemed to be present if (a) the frequency of each experience was indicated as 'Sometimes', 'Often', and 'Nearly Always', and (b) the distress related to the experience was rated as 'A bit distressed', 'Quite distressed', or 'Very distressed'. Thus, psychotic-like symptoms can range in score from 0–7 with higher scores reflecting greater symptomatology. Kelleher et al. (2011) reported that APSS scores detected those with clinical interview verified psychotic experiences with a sensitivity of 70% and a specificity of 83%. The APSS frequency and distress scores also differentiated participants with and without a history of sexual trauma, and those with and without serious mental health problems (Nolan et al., 2018). The internal reliability of the seven psychosis symptoms in this sample was good (α = .88).

2.3. Data analysis

The analytic plan for this study included two elements. First, we assessed if males and females significantly differed in their mean levels of CPTSD and psychotic-like symptoms using independent samples t-tests. The magnitude of these differences was described in relation to *Cohen's d* effect sizes where values <.40 indicate small differences, values between .40 and .80 indicate medium differences, and values >.80 indicate large differences (Cohen, 2013). We also assessed if males and females significantly differed in their exposure to the 21 traumatic life events and CPTSD caseness using chi-square (χ^2) tests of independence. Odds ratios (OR) were produced to quantify the magnitude of these differences.

Table 1. Sex differences in CPTSD, psychosis, and traumatic life events.

	Full (n = 1020)	Males (n = 500)	Females (n = 520)		
	Mean (SD)	Mean (SD)	Mean (SD)	p	d
Complex PTSD	13.47 (10.80)	11.50 (10.15)	15.37 (11.09)	**<.001**	**.36**
Psychosis	0.81 (1.69)	0.82 (1.76)	0.80 (1.62)	.849	.01
Traumatic life events	***N* (%)**	***N* (%)**	***N* (%)**	***p***	**OR (95% CI)**
1. Life-threatening illness – self	144 (14.1)	81 (16.2)	63 (12.1)	.061	0.71 (0.50, 1.02)
2. Someone close died in an awful manner	395 (38.7)	187 (37.4)	208 (40.0)	.394	1.12 (0.87, 1.44)
3. Life threatening illness/accident – someone close	529 (51.9)	249 (49.8)	280 (53.8)	.196	1.18 (0.92, 1.50)
4. Life threatened with a weapon	211 (20.7)	129 (25.8)	82 (15.8)	**<.001**	**0.58 (0.40, 0.73)**
5. Physical assault by parent/guardian	316 (31.0)	142 (28.4)	174 (33.5)	.081	1.27 (0.97, 1.66)
6. Physical assault by someone else	401 (39.3)	234 (46.8)	167 (32.1)	**<.001**	**0.54 (0.42, 0.69)**
7. Sexual assault by parent/guardian	47 (4.6)	23 (4.6)	24 (4.6)	.991	1.00 (0.60, 1.80)
8. Sexual assault by someone else	141 (13.8)	44 (8.8)	97 (18.6)	**<.001**	**2.34 (1.63, 3.48)**
9. Sexual harassment	317 (31.1)	82 (16.4)	235 (45.2)	**<.001**	**4.20 (3.14, 5.63)**
10. War/combat	74 (7.3)	48 (9.6)	26 (5.0)	**.005**	**0.50 (0.30, 0.81)**
11. Held captive/tortured	58 (5.7)	34 (6.8)	24 (4.6)	.132	0.66 (0.39, 1.14)
12. Caused extreme suffering/death	46 (4.5)	32 (6.4)	14 (2.7)	**.004**	**0.41 (0.21, 0.77)**
13. Witnessed extreme suffering/death	251 (24.6)	125 (25.0)	126 (24.2)	.776	0.96 (0.72, 1.28)
14. Life threatening accident	231 (22.6)	138 (27.6)	93 (17.9)	**<.001**	**0.57 (0.42, 0.77)**
15. Life threatening natural disaster	82 (8.0)	48 (9.6)	34 (6.5)	.072	0.66 (0.42, 1.04)
16. Life threatening human-made disaster	86 (8.4)	53 (10.6)	33 (6.4)	**.015**	**0.57 (0.36, 0.90)**
17. Stalked	187 (18.3)	73 (14.6)	114 (21.9)	**.003**	**1.64 (1.19, 2.27)**
18. Bullied	387 (37.9)	184 (36.8)	203 (39.0)	.461	1.10 (0.85, 1.42)
19. Humiliated/emotional abuse	616 (60.4)	278 (55.6)	338 (65.0)	**.002**	**1.48 (1.15, 1.91)**
20. Unloved/emotional rejection	491 (48.1)	197 (39.4)	294 (56.5)	**<.001**	**2.00 (1.56, 2.57)**
21. Physical/emotional neglect	402 (39.4)	172 (34.4)	230 (44.2)	**.001**	**1.51 (1.17, 1.95)**

SD = standard deviation; d = Cohen's d; OR = odds ratio; p = statistical significance value; statistically significant effects are highlighted in bold.

Next, we used structural equation modelling (SEM) to determine if there were unique associations between the 21 traumatic life events and CPTSD and psychotic-like symptoms, and if there were any gender-specific associations between the trauma types and CPTSD and psychotic-like symptoms. To do this, we established a SEM model with two latent criterion variables representing 'CPTSD' (measured via the total scores for PTSD and DSO symptoms from the ITQ) and 'Psychosis' (measured via the seven psychotic-like symptoms from the APSS). These latent variables were allowed to correlate and were simultaneously regressed on to the 21 traumatic life events which were modelled as observed variables and were also free to correlate with one another. The model was estimated in a multi-group model for males and females with all paths from the traumatic events to each criterion variables constrained to be equal. This tests the assumption that there are no gender-specific effects between the traumas and CPTSD and Psychosis, respectively. To determine if there were any gender-specific effects, modification indices (MIs) were inspected. An MI value of 3.84 or greater indicates that a path from a trauma to either CPTSD or Psychosis should be freely estimated for males and females as this is the critical χ^2 value for one degree of freedom. This process of freely estimating paths from a given traumatic event to CPTSD or Psychosis proceeds iteratively until there is no evidence that a path should be freely estimated.

The SEM model was estimated using the weighted least squares mean- and variance-adjusted estimator due to use of categorical measured variables for the Psychosis latent variable (Flora & Curran, 2004). There were no missing data, and standard recommendations for determining model fit were followed where acceptable model fit was indicated by a non-significant χ^2 value, CFI and TLI values ≥.90, and RMSEA and SRMR values ≤.06 (Hu & Bentler, 1999).

3. Results

3.1. Gender differences in CPTSD, psychotic-like symptoms, and traumatic life events

Females had significantly higher mean levels of CPTSD than males (t (1018) = 5.81, p < .001, d = .36), but no significant differences in CPTSD caseness was observed (6.8% in males versus 9.4% in females; χ^2 (1) = 2.35, p = .13). There was also no significant difference between mean levels of psychotic-like symptoms in males versus females (t (1018) = 0.19, p = .849, d = .01). Table 1 provides full details.

Males and females significantly differed in their exposure to 12 traumatic life events. Females were significantly more likely to have been 'sexually assaulted by someone other than a parent/guardian' (χ^2 (1) = 20.78, p < .001); 'sexually harassed' (χ^2 (1) = 98.65, p < .001); 'stalked' (χ^2 (1) = 9.13, p = .003); 'humiliated/emotional abused' (χ^2 (1) = 9.42, p = .002); 'made to feel unloved/emotionally rejected' (χ^2 (1) = 29.99, p < .001); and 'physically/emotionally neglected' (χ^2 (1) = 10.32, p = .001). Males were significantly more likely to have had their 'life threatened with a weapon' (χ^2 (1) = 15.63, p < .001); 'physically assaulted by someone other than a parent/guardian' (χ^2 (1) = 23.04, p < .001); involved in 'war or combat' (χ^2 (1) = 8.02, p = .005); 'caused extreme suffering or death to another person' (χ^2 (df) = 8.14, p = .004);

involved in 'a life threatening accident' (χ^2 (1) = 13.73, p < .001); and involved in a 'life threatening human-made disaster' (χ^2 (1) = 5.97, p = .015).

3.2. Unique associations between CPTSD, Psychosis, and traumatic life events by gender

The initial SEM model with the paths from the 21 traumatic events to CPTSD and Psychosis constrained to be equal for males and females provided a very close fit to the sample data (χ^2 (395) = 365.49, p = .854; CFI = 1.00; TLI = 1.01; RMSEA = 0.00 (90% CI = 0.00, 0.01; SRMR = .08). Inspection of the MIs showed that the path from 'sexual assault by a parent/guardian' to Psychosis should be freely estimated (MI = 4.93). The model was re-estimated and there was evidence that the path from 'being held captive or tortured' to CPTSD should also be freely estimated (MI = 4.94). When the model was re-estimated, there was no evidence that any other path should be freely estimated. The final model also provided an extremely close fit to the sample data (χ^2 (393) = 357.02, p = .903; CFI = 1.00; TLI = 1.01; RMSEA = 0.00 (90% CI = 0.00, 0.01; SRMR = .08). The standardized regression coefficients for the final model are presented in Table 2.

Seven traumatic events were positively associated with CPTSD in males and females: 'knowing someone who died in an awful manner' (β = .08, p = .011), 'sexual assault by a parent/guardian' (β = .09, p = .021), 'sexual harassment' (β = .08, p = .026), 'bullied' (β = .11, p = .001), 'humiliation/ emotional abuse' (β = .09, p = .009), 'made to feel unloved/emotional rejection' (β = .20, p < .001), and 'physical/emotional neglect' (β = .23, p < .001). In the case of 'being held captive or tortured', this event was negatively associated with CPTSD in males (β = −.14, p = .013), but not in females (β = .06, p = .312).

Two traumatic events were positively associated with Psychosis in males and females: exposure to a 'life threatening natural disaster' (β = .14, p = .006), and 'physical/emotional neglect' (β = .27, p < .001). 'Sexual assault by a parent/guardian' was positively associated with Psychosis in males (β = .20, p = .008), but not in females (β = .06, p = .334).

The CPTSD and Psychosis factors were positively and moderately correlated in males (r = .46, S.E. = .05, p < .001) and females (r = .44, S.E. = .05, p < .001). Among males, the traumatic events accounted for 44.9% (p < .001) of variance in CPTSD and 45.7% (p < .001) of variance in Psychosis. Among females, the traumatic events accounted for 45.7% (p < .001) of variance in CPTSD and 27.5% (p < .001) of variance in Psychosis.

4. Discussion

The goal of this study was to conduct a gender-specific assessment of the relationships between different types of traumatic life events, CPTSD, and psychotic-like symptoms in a nationally representative sample of Irish adults. Our first objective was to assess if men and women differed in their mean levels of CPTSD and psychotic-like symptoms, and in their likelihood of experiencing different traumatic life events. Consistent with prior findings (Hyland et al., 2017; Karatzias et al., 2019), our results showed that women had higher levels of CPTSD than men, but the magnitude of this difference was small and there was no significant difference at the diagnostic level. Therefore, it is possible that women, on average, experience more symptoms of CPTSD than men, but the gender difference at the symptom level does not necessarily translate into a higher risk of meeting diagnostic criteria for CPTSD in women. The similar levels of psychotic-like symptoms for men and women found in this study is also consistent with population-based data showing that men and women do not vary in their levels of psychosis (Caspi et al., 2014). Last, in-line with a large body of empirical evidence (Benjet et al., 2016; Tolin & Foa, 2008), we found that women were substantially more likely to be exposed to traumatic events involving sexual and emotional abuse, whereas men were substantially more likely to be exposed to traumatic events involving physical violence and life-threatening accidents and disasters. Overall, the pattern of gender differences in CPTSD, psychotic-like symptoms, and traumatic life events observed in this sample was reasonably consistent with the existing literature.

Our second objective was to examine the unique associations between different traumatic life events and CPTSD and Psychosis, and to determine if any of these associations differed by gender. Three relevant major findings emerged from the SEM analyses. First, the different traumatic life events explained a considerable proportion of variance in CPTSD and Psychosis for both men and women. Although symptoms of psychosis are not technically classified as a response to trauma, our results showed that these symptoms are, to a con-siderable degree, explained by trauma exposure. Of particular interest is that for men, the amount of variance explained for CPTSD and Psychosis appeared to be high and equal for both conditions (44.9% and 45.7%, respectively), whereas the variance explained for Psychosis (27.5%) was comparatively lower than CPTSD (45.7%) in women. Clearly, more research is needed to replicate and explain these findings to ascertain the unique gender-specific contributions of trauma on CPTSD and Psychosis. Importantly, our findings underscore the need to perform detailed trauma history taking for clients presenting with symptoms of CPTSD, psychosis, or both.

Second, of the 21 traumatic life events included in the analyses, physical/emotional neglect was the only event that significantly predicted both CPTSD and

Table 2. Standardized regression coefficients from structural equation modelling.

	Complex PTSD		Psychosis	
	β	*p*	β	*p*
1. Life-threatening illness	.048	.096	.079	.096
2. Someone close died in an awful manner	**.082**	**.011**	.077	.142
3. Life threatening illness/accident – someone close	.019	.555	.005	.926
4. Life threatened with a weapon	.044	.129	−.005	.914
5. Physical assault by parent/guardian	.018	.576	.044	.388
6. Physical assault by someone else	.009	.783	−.018	.752
7. Sexual assault by parent/guardian	**.091**	**.021**	–	–
•Males	–	–	**.203**	**.008**
•Females	–	–	.063	.334
8. Sexual assault by someone else	.061	.097	.032	.547
9. Sexual harassment	**.084**	**.026**	−.067	.260
10. War/combat	.002	.946	.009	.859
11. Held captive/tortured	–	–	.040	.468
•Males	**−.138**	**.013**	–	–
•Females	.055	.312	–	–
12. Caused extreme suffering/death	−.012	.712	.059	.237
13. Witnessed extreme suffering/death	−.048	.160	−.096	.069
14. Life threatening accident	.052	.068	.031	.503
15. Life threatening natural disaster	.013	.658	**.143**	**.006**
16. Life threatening human-made disaster	−.034	.332	.063	.167
17. Stalked	.045	.187	.062	.246
18. Bullied	**.108**	**.001**	.065	.217
19. Humiliated/emotional abuse	**.094**	**.009**	−.113	.071
20. Unloved/emotional rejection	**.201**	**<.001**	.085	.169
21. Physical/emotional neglect	**.227**	**<.001**	**.267**	**<.001**

Statistically significant effects are highlighted in bold.

Psychosis, and was most strongly associated with both conditions. Indeed, the psychological consequences of neglect have been well documented, and include problems with emotional regulation, behavioural control, coping with stressful life events, poor intellectual development, and interpersonal problems (Hildyard & Wolfe, 2002). Num-erous studies also showed that deprivation, especially in the context of early development, can adversely impact the developing brain and potentiate risks for psychopathology (De Bellis, 2005; McLaughlin, Sheridan, & Nelson, 2017). For these reasons, neglect has been proposed to represent a transdiagnostic risk factor for multiple psychiatric disorders (Kumari, 2020), and prior investigations support neglect as a significant predictor of psychosis (Bailey et al., 2018; Read, Fink, Rudegeair, Felitti, & Whitfield, 2008; Van Dam et al., 2015) and CPTSD (Ho et al., 2021; Karatzias et al., 2017). Therefore, although neglect is more often considered to be an adverse childhood experience and not technically defined as a traumatic event within the ICD-11, it should be carefully screened and assessed for as part of history-taking for clients presenting with symptoms of CPTSD or psychosis.

A third major finding was that the gender of the respondents had very little influence on associations between traumatic life events and both CPTSD and Psychosis. It was noteworthy that the baseline model, which assumed no gender-specific effects, already provided an extremely close fit to the sample data. Unsurprisingly then, only two gender-specific associations were identified out of the 42 possible effects modelled, and the remainder of the significant effects (seven events on CPTSD and two on Psychosis) were equal for men and women. One of the gender-specific effects was that sexual assault by a parent/guardian was positively associated with Psychosis for men but not women; a finding consistent with previous data from the US National Comorbidity Survey data (Shevlin et al., 2007). Shevlin et al. (2007) suggested that the subversion of biological and cultural roles experienced by men who are raped might contribute to a more extreme response. Additionally, studies suggest male victims of sexual assault rarely disclose or seek help (Masho & Alvanzo, 2010; Walker, Archer, & Davies, 2005) and when they do, it is usually decades after the assault took place (King & Woollett, 1997). It is possible that nondisclosure, delayed help seeking, and the stigma associated with sexual violence perpetrated against men, especially in childhood, preclude male victims from receiving timely and adequate healthcare, thus leading to more severe mental health problems as a trauma sequela compared with women.

The other gender-specific effect was that being held captive or tortured was negatively associated with CPTSD for men. This effect was surprising given that CPTSD is expected to be more common following sustained or repeated interpersonal forms of trauma that are difficult or impossible to escape from (Maercker et al., 2013). As such, we conducted supplementary post-hoc analyses to assess the associations between this particular traumatic life even with CPTSD and other traumas commonly experienced by men. We found a positive *bivariate* association between being held captive or tortured and CPTSD in men ($r = .28$). Additionally, men who had been held captive or tortured were also very likely to have a history of causing extreme suffering or death to another person (OR = 106.17), to have had their own life threatened with a weapon (OR = 60.87), to have been involved in war/combat (OR = 44.20), and to have been physically assaulted (OR = 13.39). Based on these findings, two plausible explanations are offered. First, it is possible that the high degree of co-occurrence between being held captive or tortured with these other traumatic events resulted in its *unique* association with CPTSD. In other words, this unique association may be a spurious effect and can be disregarded. Alternatively, surviving captivity and torture may, in its essence, confer some protection against posttraumatic distress. Indeed, some argue that facing

and escaping mortality can have a paradoxical effect on mental health (Tedeschi, Calhoun, & Groleau, 2015). More research is needed to delineate the *independent* effect of traumatic entrapment or torture after accounting for other forms of trauma that tend to co-occur (e.g. physical assault, threatened with a weapon).

Last, to address our third study objective, we found a moderate correlation between CPTSD and Psychosis, and the magnitude of this correlation was similar for men and women. This represents the first piece of evidence showing that CPTSD and psychosis are robustly correlated constructs in the general population, and adds to previous data demonstrating that CPTSD and psychosis symptoms can co-occur for some people (Frost et al., 2019). This finding also supports conceptualizing CPTSD and psychosis as trauma-related responses that falls within an underlying continuum (Morrison et al., 2003). It is very likely that this association will translate into a reasonably high degree of comorbidity between CPTSD and various psychotic disorders, however future research employing clinical assessments will be needed to test this assumption.

Our findings should be interpreted considering several limitations. First, although the sample was constructed to represent the adult population on several major demographic variables, this was not a probability-based nationally representative sample and therefore these findings may not generalize to the entire adult population. Likewise, these findings may not generalize to clinical populations with higher rates of trauma exposure and more severe symptoms of CPTSD and psychosis. Second, our assessment of psychotic-like symptoms was based on a self-report assessment of 'positive' symptoms. Despite demonstrating good internal consistency (α = .88) in this study sample, the measure employed was also originally designed to assess psychosis among adolescents. Assessing 'negative', 'manic', and 'disorganised' psychosis symptoms using self-report measures is challenging, therefore future research with clinician-administered assessments of the full spectrum of psychosis symptoms could help to further illuminate the nature of the association between CPTSD and psychosis. Inclusion of other potential confounders associated with psychosis, such as cannabis use (Shevlin, Murphy, Houston, & Adamson, 2009), is also warranted. Third, the cross-sectional design of the study means that we cannot draw any conclusions about the direction of association between the traumatic events and CPTSD and Psychosis. Respondents' self-report of their trauma history was also susceptible to recall bias.

Despite these limitations, the present investigation provides initial evidence that CPTSD and psychotic-like symptoms are moderately correlated constructs in the general population. Furthermore, despite considerable differences between men and women in their likelihood of experiencing different traumatic events, the relationship between these events and CPTSD and psychotic-like symptoms are generally not moderated by gender, except in the case of elevated levels of psychosis in men victimized by sexual abuse by a parent or guardian. The negative association found between CPTSD and captivity/torture in men require more explication. Overall, more research is needed to disentangle the relationships between trauma, CPTSD, and psychosis, and their co-occurrence, particularly in the clinical population. A detailed assessment of trauma history, especially for neglect, should be conducted for all clients presenting with symptoms of CPTSD, psychosis, or both.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Grace W. K. Ho http://orcid.org/0000-0003-4703-5430
Philip Hyland http://orcid.org/0000-0002-9574-7128
Thanos Karatzias http://orcid.org/0000-0002-3002-0630
Daniel Bressington http://orcid.org/0000-0003-0951-2208
Mark Shevlin http://orcid.org/0000-0001-6262-5223

Data availability statement

The data that support the findings of this study are available upon reasonable request from the corresponding author, GWKH. The data are not publicly available as study participant only consented to their information being published as an aggregate and did not agree for their individual data points to be shared publicly.

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