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Post-trauma factors associated with Posttraumatic Stress Disorder severity in older adults: a systematic review

and

The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and Complex Posttraumatic Stress Disorder symptoms in older adults (>64 years)

Eleni Vasilopoulou

Submitted in part fulfilment of the degree of

Doctorate in Clinical Psychology

The University of Edinburgh

May 2019
DClinPsychol Declaration of Own Work

Name: Eleni Vasilopoulou

Post-trauma factors associated with Posttraumatic Stress Disorder severity in older adults: a systematic review

and

Title of Work: The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and Complex Posttraumatic Stress Disorder symptoms in older adults (>64 years)

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Acknowledgments

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Thesis Overview

This thesis is carried out in part fulfilment of the academic component of the Doctorate in Clinical Psychology at the University of Edinburgh. In line with the research portfolio format, an introduction, rationale and overview of the portfolio thesis is presented in the portfolio abstract. A lay summary of the thesis’ background, methods and results is also included. Chapter One contains a systematic review examining post-trauma factors associated with Posttraumatic Stress Disorder (PTSD) severity. Chapter Two includes an empirical study which explores the relationship between experiences of childhood trauma, Early Maladaptive Schemas (EMS) and CPTSD. Both research projects focus on older adults who tend to be under-represented in trauma research. The Systematic Review is prepared for submission to the journal Clinical Psychology Review, while the empirical study has been submitted for publication to the British Journal of Clinical Psychology (BJCP). ‘Blinded’ sections of the empirical paper made reference to the systematic review and are removed in accordance to BJCP author guidelines, in the interest of double-blind peer review. Author guidelines are included in the Appendices A and Q (for the empirical paper and the systematic review respectively).

Word Count (excluding references and appendices)
Systematic review= 14,310
Empirical study= 5,158
Total thesis portfolio=20,828
Thesis Portfolio Abstract

Background: Research in Posttraumatic Stress Disorder (PTSD) and Complex PTSD (CPTSD) has traditionally focused on either children or adults, while older adults tend to be under-represented in trauma research. This has led researchers to argue that PTSD/CPTSD is under-diagnosed and under-treated within this population. A better understanding of the presentation and correlates of posttraumatic symptoms in later life is needed in order to inform assessment and the development of targeted interventions for older adults.

Method: A systematic review was conducted to explore factors associated with PTSD/CPTSD severity in older adults. This review identified gaps in the literature, including a dearth of research exploring childhood trauma. The subsequent empirical study attempts to address this gap by investigating the link between childhood trauma, Early Maladaptive Schemas (EMS), and CPTSD symptoms.

Results: The systematic review showed that coping/response, physiological and psychopathological factors exhibited the most consistent associations with PTSD severity. The empirical study added to this literature by demonstrating that EMS mediated the relationship between childhood trauma and CPTSD symptom severity. As CPTSD is a relatively new construct, this is the first study exploring its association with EMS and offers preliminary evidence on the potential efficacy of schema informed interventions following traumatisation.

Conclusion: Both the empirical study and the systematic review highlight factors affecting posttraumatic symptom severity in older people and have important implications for PTSD/CPTSD identification and treatment.
Thesis Lay Summary

**Background:** Trauma exposure can have a negative effect on people’s wellbeing and can sometimes lead to the development of Posttraumatic or Complex Posttraumatic Stress Disorder (PTSD/CPTSD). PTSD can develop after a single traumatic event, while CPTSD is seen as a result of long-term, interpersonal trauma, particularly in childhood. These conditions include a variety of symptoms such as re-experiencing the traumatic event as if it was happening in the present, avoiding reminders of the traumatic event as well as a persistent sense of threat. People with CPTSD may also experience difficulties in managing their emotions, problems in relationships and can hold a negative view of themselves. Most people who experience traumatic events do not go on to develop posttraumatic symptoms. In order to better identify and respond to trauma exposed individuals in need of support, it is therefore important to understand which factors make people more likely to experience such symptoms. The majority of research in this topic has focused on either children or younger adults (<65), while little is known about the factors associated with the severity of these disorders in later life.

**Method:** The first part of this portfolio included systematically searching, selecting, appraising and summarising published research exploring factors occurring after the trauma, which are associated with PTSD severity in older people. The second part examined whether the degree of negative thought patterns that individuals hold about themselves, the world and the people around them (e.g. ‘I don’t fit in’) can explain the relationship between early traumatic events and CPTSD symptoms among older adults.

**Main findings:** A systematic review of the literature showed increased levels of PTSD among older people who used unhelpful coping strategies. Published research also showed that older people with additional physical or mental health difficulties experienced more severe PTSD symptoms. Our results also indicated that the degree of negative thought patterns that participants held impacted on their level of symptoms: Participants reporting more negative thought patterns suffered more severe CPTSD symptoms.

**Conclusions:** Overall, our findings suggest that promoting coping strategies and therapeutically targeting additional physical and mental health problems might help reduce PTSD symptoms among older adults. Moreover, challenging negative thought patterns may
alleviate CPTSD symptom severity in older adults who have experienced childhood trauma. These results can inform clinical assessment and may support the development of trauma interventions for older people in order to promote positive outcomes for this population.
Chapter 1: Systematic Review Journal Article

Title: Post-trauma factors associated with Posttraumatic Stress Disorder severity in older adults: A systematic review

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Abstract
Individual vulnerability factors contribute to the development and severity of posttraumatic symptoms following trauma exposure. However, a systematic understanding of those factors in later life is currently missing. This information is essential for clinical assessment and can allow the provision of targeted interventions for older adults. The aim of this study was to provide an overview of individual and contextual factors associated with the severity of either Posttraumatic Stress Disorder or Complex Posttraumatic Stress Disorder in older adults. A systematic review was undertaken in line with PRISMA guidelines. Of the 6,947 citations identified, 49 studies published between 1992 and 2017 were included. No studies assessed diagnostic criteria for CPTSD, as per ICD-11. Narrative synthesis identified six categories of posttraumatic associated factors: 1) coping and response factors; 2) personality factors; 3) neuropsychological factors; 4) physiological factors 5) psychopathological factors and 6) social factors. The strongest available evidence was for coping/response, physiological and psychopathological factors, which displayed the most consistent associations with PTSD severity. Overall, our findings suggest that promoting coping strategies and therapeutically targeting physical and mental health comorbidities might enable the reduction of PTSD symptoms among older adults. Limitations and directions for future research are discussed.
Keywords: PTSD, systematic review, older adults

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Statement 2: Contributors: Author A designed the study, wrote the protocol, conducted the search, study selection, data extraction, quality appraisal and completed the first manuscript draft, under the supervision of authors D and E. Author B independently conducted the search, selection and quality appraisal of the reviewed studies. Author C independently checked the data extraction forms for accuracy. All authors have approved the final manuscript.

Statement 3: Conflict of Interest: The authors declare no conflict of interest.

Highlights:

- Maladaptive coping strategies as well as cognitive factors such as posttraumatic cognitions and sense of coherence were associated with PTSD severity in older adults.

- A consistent association was found between PTSD and psychopathological factors, especially anxiety and depression.

- An inverse association was found between physical health and PTSD in later life.
1. Introduction

Posttraumatic stress disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) are conceptualised as two related diagnoses within the spectrum of stress and trauma disorders. PTSD can develop as a response to trauma exposure and is characterised by re-experiencing of the traumatic event, avoidance of traumatic reminders and a sense of a current threat (World Health Organisation [WHO], 2018). Diagnosis of PTSD as per ICD-11 typically requires the endorsement of three symptom clusters (re-experiencing, avoidance/numbing, and hyperarousal/hypervigilance). However, sub-threshold definitions of PTSD have also been proposed (Naylor, Dolber, Strauss, Kilts, Strauman, & Bradford). Subthreshold PTSD refers to the presence of clinically significant symptoms, which may require intervention, albeit in the absence of a full-PTSD diagnosis (McLaughlin et al., 2015).

Complex Posttraumatic Stress Disorder (CPTSD) has been included in the 11th Revision of the International Classification of Diseases (ICD-11) as a sibling condition to Posttraumatic Stress Disorder (PTSD) (WHO, 2018). CPTSD is considered a result of exposure to cumulative, interpersonal trauma, particularly in childhood. In addition to PTSD symptoms, CPTSD also comprises of symptom clusters that highlight self-organisation disturbances (affective dysregulation, negative self-concept and disturbances in relationships) (Karatzias et al., 2017).

Although exposure to a traumatic event is a prerequisite for the diagnosis of either PTSD or CPTSD, most people who experience traumatic events do not go on to develop clinical or subclinical posttraumatic symptoms. Worldwide prevalence estimates show that 70% of the population has experienced one or more traumatic events (Benjet et al., 2016). However, PTSD and CPTSD lifetime prevalence rates are estimated to be around 4.0% and 3.3% respectively (Karatzias et al., 2018). It is therefore recognised that individual vulnerability factors contribute to the development and severity of either of the two conditions following trauma exposure (Wade, Hardy, Howell, & Mythen, 2013). In this context, increasing efforts have been made to identify factors associated with posttraumatic psychopathology in order to inform assessment, prevention and early intervention initiatives (Southwick, Vythilingam, & Charney, 2005; Yehuda, Flory, Southwick, & Charney, 2006). These efforts have traditionally focused on children (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012) and young adults (Ozer, Best, Lipsey, & Weiss, 2003).
In recent years an increased number of studies have sought to examine factors associated with posttraumatic symptomatology, specifically within the older adult population (Lapp, Agbokou, & Ferreri, 2011). This is driven by research suggesting that older adults with posttraumatic symptomatology may present differently to other age groups due to age-related biological, psychological and social changes. In particular, old-age specific stressors such as decreased health, retirement, loss of a loved one and reduced financial means may interfere with individuals’ capacity to cope with previous traumatic events (Böttche, Kuwert, & Knaevelsrud, 2012; Grenade & Boldy, 2008). Age-related cognitive decline could have further implications for the emergence and profile of PTSD (Floyd, Rice, & Black, 2002; Ruzich, Looi, & Robertson, 2005). Finally, societal implications such as a historical lack of knowledge regarding posttraumatic stress might affect older adults’ adaptation to early traumatic events and reduce their opportunities to access appropriate support (Averill & Beck, 2000; Cook & Simiola, 2017). The need to focus on severity associated factors specifically in later life is further emphasised by studies demonstrating preliminary differences between older and younger adults in terms of posttraumatic symptom profiles and disorder onset (Böttche et al., 2012; Davison et al., 2006; Reynolds, Pietrzak, El-Gabalawy, Mackenzie, & Sareen, 2015; Ruzich et al., 2005).

Older adult research has identified PTSD severity associated factors, such as childhood trauma (Ogle, Rubin, & Siegler, 2013), lower social support (Acierno, Ruggiero, Kilpatrick, Resnick, & Galea, 2006; Chen, Shen, & Chen, 2012) decreased physical health (Van Zelst, de Beurs, Beekman, Deeg, & van Dyck, 2003) and cognitive deficits (Burri, Maercker, Krammer, & Simmen-Janevska, 2013). Nevertheless, the factors affecting posttraumatic severity in older adults are not fully understood. In fact, PTSD in later life has been described as an under-recognised and under-treated condition (Cook, McCarthy, & Thorp, 2017) while significant gaps in service provision for trauma exposed older people have been identified (Burri et al., 2013; Krammer, Kleim, Simmen-Janevska, & Maercker, 2016; Parker et al., 2016). This is particularly concerning especially considering the projected rise in the aging population, which signifies a heightened need for appropriate gerontological assessment and treatment (Joint Commissioning Panel for Mental Health, 2013).

In order to further our understanding of PTSD/CPTSD severity associated factors, this review aimed to systematically examine and analyse studies within the older adult population investigating (a) the relationship between PTSD or CPTSD severity and pre-trauma factors
(b) the relationship between PTSD or CPTSD severity and peri-trauma factors or (c) the relationship between PTSD or CPTSD severity and post-trauma factors. Pre-trauma factors occur prior to the traumatic event and can include age, gender, race/ethnicity, pre-trauma cognitive ability, socio-economic status and pre-trauma neurobiological factors (Brewin et al., 2000; DiGangi et al., 2013; Feder et al., 2009; Yehuda & Flory, 2007). Peri-traumatic factors are concurrent with trauma exposure and may include trauma severity, trauma duration and type of trauma exposure (Ozer et al., 2003). Post-trauma factors occur following traumatisation and can include comorbid illnesses, additional life stress, social and family support, coping strategies, cognitive schemas and physical health (Johnson & Thompson, 2008; Karatzias et al., 2016; Udwin, Boyle, Yule, Bolton, & O'Ryan, 2000).

Due to the limited number of studies examining pre- and peri-trauma factors, as well as the high variability in pre- and peri-trauma factors examined, types of trauma, inclusion criteria and recruitment methods, it was not possible to draw valid findings from this literature (Cuijpers, 2016; Sharpe, 1997). Therefore, studies measuring pre- and peri-trauma factors were not addressed in this systematic review. The decision to exclusively focus on post-trauma factors was also influenced by previous research reporting stronger effect sizes of posttraumatic factors, compared to factors operating before the trauma occurrence (Brewin, Andrews, & Valentine, 2000). Furthermore, posttraumatic factors may be particularly relevant to older people as they are directly linked to age-associated challenges which may affect older people’s mental health, including decreased physical health and functioning (Chatterji, Byles, Cutler, Seeman, & Verdes, 2015), reduced social support (Iliffe et al., 2007), increased loneliness (Theeke, 2009) and cognitive deficits (Grady, 2008).

Identifying post-trauma factors associated with PTSD severity among older adults is essential in recognising and clarifying areas in need of support within this population. Specifically, a better understanding of these factors can improve psychological assessment, prevention and treatment, thereby enabling clinicians to support traumatised individuals before their difficulties become ingrained. In addition, knowing which factors contribute to PTSD/CPTSD severity could be useful in reducing the financial and public health burden associated with these conditions, for example through the development of stepped, targeted interventions. On a theoretical level, knowledge of severity associated factors may increase our understanding of PTSD/CPTSD and help shape theoretical and treatment models for this
age group. Finally, such knowledge can identify research limitations and highlight areas for further research.

2. Methods

2.1. Search

An initial search of the Cochrane Database of Systematic Reviews (CDSR) and the Database of Abstracts of Reviews of Effects (DARE) was performed to ensure the absence of similar reviews. Following this, a systematic database search was conducted in February 2018 to identify relevant studies. The following databases were included in the search: MEDLINE, PsycINFO, Embase, CINAHL, ASSIA, PILOTS and Sociological Abstracts. A combination of different keyword searches was entered in each database. Broader terms were preferred due to the relative dearth of empirical research on this topic. The keywords referring to PTSD and CPTSD were “Post traumatic*”, “Posttraumatic*”, “Complex post trauma*” and “Complex posttrauma*”. These were combined with the keywords “older adult*”, “older people”, “geriatric”, “old age”, “aged” and “elderly”. A combination of index and MeSH terms were used according to the requirements of each database. Language (English) and publication date restrictions (later than 1980) were imposed. Reference lists of relevant articles were also reviewed.

2.2. Inclusion and exclusion criteria

The present review included quantitative studies based on the following inclusion and exclusion criteria: (a) studies had to include participants exposed to either single event trauma or cumulative trauma, as per PTSD diagnostic criterion A (APA, 2013); (b) studies were considered for inclusion if at least 50% of their sample comprised of adults older than 59 years; (c) studies had to use PTSD or CPTSD questionnaires to measure posttraumatic severity; (d) studies needed to report continuous data or PTSD/CPTSD diagnostic status; (e) research was considered for inclusion if it examined the interaction of PTSD/CPTSD with post-trauma related factors; (f) studies utilising a between groups design comparing groups
differing on PTSD/CPTSD diagnostic status or severity were also included; (g) research addressing the impact of interventions on trauma symptoms was excluded as it had a different focus; (h) the search was limited to studies published in English due to the lack of translation resources; (i) the search was also limited to studies conducted after 1980, when PTSD was first codified as a disorder in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III).

2.3.1. Data extraction

Details from eligible studies were extracted using a pre-designed data extraction form (Appendix R). The following data were extracted: (a) study design (b) total number of participants (c) type of trauma exposure; (d) associated factors measured; (e) participant characteristics, such as age, gender, PTSD/CPTSD diagnosis; (f) participant inclusion and exclusion criteria; (g) information on the measures used; (h) data collection process; (i) data analysis procedure; (j) main findings and (k) conflict of interest/source of funding. A second author independently checked the extracted data for accuracy. No discrepancies occurred between authors.

2.3.2 Quality appraisal

A quality appraisal checklist was created in order to evaluate the quality of the reviewed studies. This was created based on the ‘STROBE Statement: Checklist of items that should be included in reports of cross-sectional studies’ (Von Elm et al., 2014) and other published tools (McLean, Maxwell, Platt, Harris, & Jepson, 2008; Scottish Intercollegiate Guidelines Network, 2012). Quality factors included background information, participant selection, measures, statistical analysis and generalisability of findings. All studies were rated independently by the first and second authors of this review. To assess inter-rater reliability, Cohen’s Kappa coefficient was calculated (k=0.95). Deviating evaluations were discussed and a consensus rating was obtained.
3. Results

3.1. Database search

Database search elicited 6,947 records, of which 5,473 remained after the removal of duplicates. After screening of title and abstract, 307 studies were identified as possible relevant studies and were examined for eligibility. Of those, 49 studies fulfilled the inclusion criteria and were included in the review. At this stage the reference lists of identified papers were searched manually to identify possible omitted studies. No additional studies that met the inclusion criteria were identified. As a result, 49 studies were selected for the review. The literature search is outlined in more detail in Figure 1. The Kappa inter-rater reliability coefficient for study selection was k=0.85, indicating high agreement between raters.

Fig.1. Prisma Flow Diagram (Moher, Liberati, Tetzlaff, & Altman, 2009)
3.2. Sample size and participant characteristics

Study sample sizes ranged widely from n=14 to n=24,719 (Mean=2,578; Median=204.5). Three sets of studies (Cook, Riggs, Thompson, Coyne, & Sheikh, 2004; O'Donnell, Cook, Thompson, Riley, & Neria, 2006), (Glaesmer, Brähler, Gündel, & Riedel-Heller, 2011; Glaesmer, Kaiser, Bräehler, Freyberger, & Kuwert, 2012; Häuser, Glaesmer, Schmutzer, & Brähler, 2012), (Van Zelst et al., 2003; van Zelst, de Beurs, Beekman, van Dyck, & Deeg, 2006) used the same samples so metadata pertaining to each set of studies are only calculated once. The majority of the studies (N=30; 66.7%) had sample sizes of less than 300 and an additional ten studies (22%) had sample sizes between 301 and 2,000. Twelve studies did not report how many participants met criteria for a diagnosis of PTSD. In the remaining studies, a quarter of trauma-exposed participants fulfilled criteria for either Full (n=19,646; 22%) or sub-threshold PTSD (n=2,797; 3%). In both full and sub-threshold PTSD groups, the majority of participants were male (93% and 82% respectively), although almost half of the studies (N=24, 49%) did not provide gender information for specific diagnostic groups. Twenty studies provided information on the mean age of the overall sample which ranged from 63.4 to 83.4 (mean across studies=72.6, SD= 5.3). Twelve studies provided specific information on the means of each diagnostic group (mean across studies PTSD group: 70.3, SD=4.9; Control group: 71.4, SD=3.9). The majority of studies (N=38, 78%) included older adults recruited from the community, while eleven studies (22%) included clinical samples (table 1).

3.3. Type of trauma exposure

The majority of articles (n=29; 59%) included participants who had suffered war related trauma (veterans: n=15; prisoners of war: n=6; displacement n=3, holocaust survivors: n=3, war-stricken area: n=1; war experience: n=1). Exposure to natural disaster was the second most commonly reported traumatic experience (n=3; 6%). Other trauma types included were physical illness (stroke: n=1, myocardial infraction: n=1, spinal cord injury: n=1), fall (n=1) and spousal bereavement (n=1). Ten studies (21%) included all types of traumatic exposure and did not specify trauma type. All studies apart from two (Burri et al., 2013; Krammer et
al., 2016) included participants exposed to trauma in adulthood or later life as opposed to childhood trauma.

3.4. PTSD assessment

Twenty-eight studies (57%) assessed full diagnostic criteria for PTSD, while eight studies included sub-threshold PTSD diagnoses (16%), utilising symptom counts, rather than a full PTSD diagnosis. Thirteen studies (27%) included both full and sub-threshold PTSD criteria. Diagnostic measures included were based on the DSM-III (n=1; 2%), the DSM-Third Edition, Revised (DSM-III-R, n=8; 16%), the DSM-Fourth Edition (DSM-IV, n=35; 71%), the DSM-Fifth Edition (DSM-5, n=1; 2%) or the ICD-Ninth Edition (ICD-9, n=4; 8%) criteria. Versions of the PTSD Checklist (n=8; 16%), Structured Clinical Interview for DSM (n=8; 16%), Clinician Administered PTSD Scale (n=7; 14%), Posttraumatic Stress Diagnostic Scale (n=7; 14%), and Impact of Event Scale-Revised (n=3; 6%) were the measures most commonly used (a list of all measures is provided in table 2). No studies assessed diagnostic criteria for CPTSD, as per ICD-11.
<table>
<thead>
<tr>
<th>Author</th>
<th>Purpose of Study</th>
<th>Assessment Schedule</th>
<th>Associated factors</th>
<th>Study design</th>
<th>Age: Mean (SD)</th>
<th>Sample Size (Overall sample or by diagnostic group)</th>
<th>Gender (Overall sample or PTSD group)</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acierno et al., (2006)</td>
<td>To identify PTSD associated factors in different age groups</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and Response; Physiological; Social</td>
<td>Cross-sectional</td>
<td>71.0 (7.9)</td>
<td>N=1,130</td>
<td>Overall sample: F:727; M=401</td>
<td>Community</td>
</tr>
<tr>
<td>Beal (1995)</td>
<td>To examine the incidence and associated factors of PTSD</td>
<td>Longitudinal (T1: post-trauma; T2: 50 years later)</td>
<td>Psychopathological, Social</td>
<td>Longitudinal, between groups (PTSD/No PTSD)</td>
<td>NR</td>
<td>N=276</td>
<td>NR</td>
<td>Community</td>
</tr>
<tr>
<td>Boals &amp; Schuettler (2011)</td>
<td>To examine the relationship between Event centrality and PTSD symptoms</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and Response</td>
<td>Cross-sectional</td>
<td>73.3 (7.3)</td>
<td>N=126</td>
<td>Overall sample: F=92; M=34</td>
<td>Community</td>
</tr>
<tr>
<td>Brodaty et al., (2004)</td>
<td>To determine factors associated with PTSD and psychological morbidity</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and Response; Physiological; Social</td>
<td>Cross-sectional, between groups (PTSD/ No PTSD)</td>
<td>PTSD 76.1 (5.6); No PTSD: 72.8 (6.5)</td>
<td>PTSD: N=39; No PTSD: N=61</td>
<td>F=25; M=14</td>
<td>Community</td>
</tr>
<tr>
<td>Study</td>
<td>Objective</td>
<td>Design Type</td>
<td>Domain</td>
<td>Sample Data</td>
<td>Gender Data</td>
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<tr>
<td>Burri et al., (2013)</td>
<td>To investigate the relationship between trauma and cognitive function</td>
<td>N/A (Cross-sectional)</td>
<td>Neuropsychological</td>
<td>Cross-sectional, between groups (PTSD/ No PTSD)</td>
<td>PTSD: N=22; No PTSD: N=74</td>
<td>Overall sample: F=41; M=55</td>
<td>Community</td>
<td></td>
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<tr>
<td>Carlson et al., (2008)</td>
<td>To examine the correlation between PTSD symptoms and cognitive function</td>
<td>N/A (Cross-sectional)</td>
<td>Neuropsychological</td>
<td>Cross-sectional</td>
<td>PTSD: N=32</td>
<td>Overall sample: M=32; F=0</td>
<td>Clinical</td>
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<tr>
<td>Chen et al., (2012)</td>
<td>To determine the prevalence and associated factors of PTSD</td>
<td>N/A (Cross-sectional)</td>
<td>Social</td>
<td>Cross-sectional</td>
<td>PTSD: N=65; No PTSD: N=222</td>
<td>F=50; M=15</td>
<td>Community</td>
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<tr>
<td>Chung, Preveza, Papandreou, &amp; Prevezas (2006)</td>
<td>To investigate PTSD and locus of control according to age</td>
<td>N/A (Cross-sectional)</td>
<td>Personality</td>
<td>Cross-sectional</td>
<td>Full PTSD: N=4; Sub PTSD: N=8; No PTSD: N=2</td>
<td>Overall sample: F=6; M=8</td>
<td>Clinical</td>
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<tr>
<td>Chung, Berger, Jones, &amp; Rudd (2008)</td>
<td>To investigate comorbidity and coping differences in different PTSD diagnostic groups</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and Response; Physical; Psychopathological; Social</td>
<td>Cross-sectional, between groups (PTSD/ Sub PTSD/ No PTSD)</td>
<td>PTSD: 69.4 (6.8); Sub PTSD: 70.3 (7.0); No PTSD: 71.3 (8.0)</td>
<td>PTSD: N= 29; Sub PTSD: N=40; No PTSD: N=27</td>
<td>Full PTSD: F=8, M=21; sub PTSD: F=5, M=35</td>
<td>Clinical</td>
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<tr>
<td>Study Authors</td>
<td>Study Title</td>
<td>Study Design</td>
<td>Study Outcomes</td>
<td>Overall Sample</td>
<td>Sample Groups</td>
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<tr>
<td>Chung et al., (2009)</td>
<td>To examine levels of PTSD and factors predictive of PTSD post-fall</td>
<td>Longitudinal: T1: immediately post trauma; T2: after 12 weeks; T3: after 24 weeks</td>
<td>Psychopathological</td>
<td>Longitudinal</td>
<td>83.4 (6.9)</td>
<td>N=195</td>
<td>Overall sample: F=167; M=28</td>
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<tr>
<td>Cook et al., (2004)</td>
<td>To examine the association of PTSD with the quality of intimate relationships</td>
<td>Cross-sectional</td>
<td>Social</td>
<td>Cross-sectional</td>
<td>80 (NR)</td>
<td>PTSD: N=120; No PTSD: N=198</td>
<td>Community</td>
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<tr>
<td>Cooper et al., (2014)</td>
<td>To assess how PTSD relates to Coronary Artery Disease and how this relationship differs by race/ethnicity.</td>
<td>N/A (Cross-sectional)</td>
<td>Physical</td>
<td>Cross-sectional, between groups (PTSD &amp; Depression)</td>
<td>White: 67.0(7.6); Black: 64.8(5.8); Hispanic: 66.2 (7.1); Asian: 66.6 (7.2) American Indian/Alaskan Native: 64.8 (5.8)</td>
<td>PTSD &amp; Depression: N=10,608; No PTSD &amp; Depression: N=14,111</td>
<td>Clinical</td>
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<tr>
<td>Durai et al., (2011)</td>
<td>To investigate the prevalence of PTSD symptomatology and its association with health characteristics</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological, Social</td>
<td>Cross-sectional, between groups (Full PTSD/ Sub PTSD/ No PTSD/ Non-Exposed)</td>
<td>NR (&gt;65)</td>
<td>Full PTSD: N=228; Sub PTSD: N=1,813; No PTSD: N=3,544; Non-exposed: N=11,620</td>
<td>Full PTSD: F=0, M=228; Sub PTSD: F=0; M=1813</td>
<td>Community</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Design</td>
<td>Scale/sampling</td>
<td>Results</td>
<td>Sample Characteristics</td>
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<td>Engdahl et al., (1997)</td>
<td>To explore psychiatric disorders and their correlates in OA with histories of trauma exposure.</td>
<td>N/A (Cross-sectional)</td>
<td>Social</td>
<td>Cross-sectional (PTSD/No PTSD), Median=71</td>
<td>PTSD: N=77; No PTSD: N=185</td>
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<td>F=0; M=77; Community</td>
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<tr>
<td>Falger et al., (1992)</td>
<td>To examine the relationships between PTSD, and cardiovascular risk factors in WWII veterans.</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological</td>
<td>Cross-sectional, between groups (PTSD/No PTSD), PTSD: 63.8 (NR)</td>
<td>PTSD: N=82; No PTSD: N=65</td>
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<td>No PTSD: 64.5 (NR)</td>
<td>F=0; M=82; Community</td>
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<tr>
<td>Favaro et al., (2006)</td>
<td>To investigate the characteristics of full and Sub PTSD in a sample of WWII prisoners of war.</td>
<td>N/A (Cross-sectional)</td>
<td>Personality factors,</td>
<td>Cross-sectional between groups (PTSD/ Sub PTSD/ No PTSD),</td>
<td>PTSD: N = 13; Overall sample:</td>
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<td>Psychopathological</td>
<td>71.6 (2.4)</td>
<td>Sub PTSD: N= 32; No PTSD: N= 21</td>
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<td>F=11; M=55; Community</td>
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<tr>
<td>Ferrajo &amp; Oliveira (2016)</td>
<td>To explore the effects of combat exposure and sense of coherence on PTSD and depression</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and Response</td>
<td>Cross-sectional, between groups (PTSD/No PTSD), Range 60-85</td>
<td>PTSD: N=67; No PTSD: N=423; Non-</td>
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<td>Exposed: N= 966</td>
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<td>F=36; M=31; Community</td>
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<tr>
<td>Study</td>
<td>Objectives</td>
<td>Design</td>
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<td>Measure</td>
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<td>N</td>
<td>Gender</td>
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<tr>
<td>Glaesmer et al., (2012)¹</td>
<td>To assess the frequency of PTSD and its association with comorbidity and psychopathology</td>
<td>N/A (Cross-sectional)</td>
<td>Psychological</td>
<td>Cross-sectional</td>
<td>Range: 60-85</td>
<td>PTSD symptoms: N=270; No PTSD symptoms: N=1,389</td>
<td>F=161; M=109</td>
<td>Community</td>
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<tr>
<td>Gluck et al., (2016)</td>
<td>To investigate how sense of coherence and mindfulness influence PTSD symptoms and cognitions</td>
<td>N/A (Cross-sectional)</td>
<td>Personality, Coping and response</td>
<td>Cross-sectional</td>
<td>73.6 (6.9)</td>
<td>N=97</td>
<td>Overall sample: F=66; M=31</td>
<td>Community</td>
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<tr>
<td>Hall et al., (2014)</td>
<td>To examine the effect of PTSD on function and physical performance</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological</td>
<td>Cross-sectional, between groups (PTSD/ No PTSD)</td>
<td>PTSD: 62.9 (3.9); No PTSD: 68.6 (6.2)</td>
<td>PTSD: N=67; No PTSD: N=235</td>
<td>F=0; M=67</td>
<td>Clinical</td>
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<tr>
<td>Hart et al., (2008)</td>
<td>To explore differences in cognitive performance between No PTSD, PTSD &amp; comorbidity, and PTSD groups</td>
<td>N/A (Cross-sectional)</td>
<td>Neuropsychological</td>
<td>Cross-sectional, between groups design (PTSD/Comorbid PTSD/No PTSD)</td>
<td>PTSD: 80.9 (2.3); Comorbid PTSD:79.3 (1.5); No PTSD:80 (2.2)</td>
<td>PTSD: N=7; No PTSD: N=11; Comorbid PTSD: N=7</td>
<td>NR</td>
<td>Community</td>
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<tr>
<td>Häuser et al., (2012)²</td>
<td>To examine the association between lifetime traumatic events, widespread pain, PTSD and depression</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological</td>
<td>Cross-sectional</td>
<td>No pain: 69.4 (6.1); Pain: 70.7 (6.8)</td>
<td>PTSD:N=112, Sub PTSD: N=224, No PTSD: N=437</td>
<td>NR</td>
<td>Community</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Design</td>
<td>Measures</td>
<td>Sample Size</td>
<td>Statistical Results</td>
<td>Location</td>
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<td>Hyer &amp; Boyd (1996)</td>
<td>To examine the association between PTSD and personality variables</td>
<td>N/A (Cross-sectional)</td>
<td>Personality</td>
<td>Cross-sectional</td>
<td>69.7 (5.1)</td>
<td>PTSD: n=40; No PTSD: n=80</td>
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<td>M=40</td>
<td>Community</td>
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<tr>
<td>Hyer et al., (1999)</td>
<td>To examine the relationship between PTSD and depression</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological; Social</td>
<td>Cross-sectional</td>
<td>68.1 (NR)</td>
<td>PTSD: N=20; No PTSD: N=24; Non-exposed: N=11</td>
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<td>Overall sample: F=14; M=6</td>
<td>Clinical</td>
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<tr>
<td>Jelinek et al., (2013)</td>
<td>To investigate neuropsychological performance in a trauma sample</td>
<td>N/A (Cross-sectional)</td>
<td>Neuropsychological</td>
<td>Cross-sectional between groups (PTSD/ No PTSD/Non-exposed)</td>
<td>PTSD: 71.0 (2.5); No PTSD: 70.9 (1.8); Non-exposed: 72.3 (2.9)</td>
<td>PTSD: N=20; No PTSD: N=24; Non-exposed: N=11</td>
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<td>Overall sample: F=0; M=6</td>
<td>Community</td>
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<tr>
<td>Kang et al., (2006)</td>
<td>To examine whether PoW status was associated with cardiovascular diseases and PTSD</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological</td>
<td>Cross-sectional between groups (PTSD/ No PTSD)</td>
<td>PoW (PTSD and No PTSD): 70.2 (NR); Non-exposed: 69.9 (NR)</td>
<td>PTSD: N=3,254; No PTSD: N=16,188</td>
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<td>Overall sample: F=0; M=3254</td>
<td>Community</td>
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<tr>
<td>Kidson et al., (1993)</td>
<td>To determine PTSD frequency and mental health differences between PTSD and no PTSD</td>
<td>N/A (Cross-sectional)</td>
<td>Psychopathological</td>
<td>Cross-sectional between groups (PTSD/ No PTSD)</td>
<td>PTSD: 70.7 (3.3); No PTSD: 72.5 (4.5)</td>
<td>PTSD: N=49; No PTSD: N=59</td>
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<td>Overall sample: F=0; M=49</td>
<td>Clinical</td>
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<td>Study</td>
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<td>Design</td>
<td>Methodology</td>
<td>Measures</td>
<td>Results</td>
<td>Sample Size</td>
<td>Gender Distribution</td>
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<tr>
<td>Kiphuth et al., (2014)</td>
<td>To assess anxiety, depression, PTSD, QoL, and coping in TIA</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and Response; Physiological; Psychological</td>
<td>Between groups (PTSD/No PTSD)</td>
<td>Median (IQR): PTSD: 64.5 (22); No PTSD: 71 (14)</td>
<td>PTSD: N=32, No PTSD: N=76</td>
<td>F=15; M=17</td>
<td>Clinical</td>
</tr>
<tr>
<td>Knight et al., (2017)</td>
<td>To examine the relationship of PTSD and depression severity/symptoms with cortical and subcortical surfaced-based morphometry</td>
<td>N/A (Cross-sectional)</td>
<td>Neuropsychological; Psychological</td>
<td>Cross-sectional</td>
<td>PTSD: 67.6 (4.0); No PTSD: 70.5 (5.0)</td>
<td>PTSD: N=35; No PTSD: N=45</td>
<td>F=0; M=35</td>
<td>Clinical</td>
</tr>
<tr>
<td>Krammer et al., (2016)</td>
<td>To investigate the association between trauma, CPTSD and mediating factors</td>
<td>N/A (Cross-sectional)</td>
<td>Social</td>
<td>Cross-sectional</td>
<td>77.0 (7.1)</td>
<td>N=116</td>
<td>Overall sample: F=46; M=70</td>
<td>Community</td>
</tr>
<tr>
<td>Kuwert et al., (2012)</td>
<td>To assess trauma, PTSD and somatisation</td>
<td>N/A (Cross-sectional)</td>
<td>Psychopathological</td>
<td>Cross-sectional between groups (PTSD/ No PTSD)</td>
<td>Range: 60-85</td>
<td>PTSD: N=67; No PTSD: N=1,590</td>
<td>Overall sample: F=887; M=770</td>
<td>Community</td>
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<tr>
<td>Leskela et al., (2002)</td>
<td>To examine the role of guilt and shame in PTSD</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and response</td>
<td>Cross-sectional (PTSD/No PTSD)</td>
<td>75.4 (3.3)</td>
<td>PTSD: N=29; No PTSD: 73</td>
<td>F=0; M=29</td>
<td>Community</td>
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<td>Study</td>
<td>Research Question</td>
<td>Design</td>
<td>Measurement</td>
<td>PTSD:</td>
<td>PTSD:</td>
<td>Sample Size</td>
<td>Gender</td>
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<td>McLeay et al., (2017)</td>
<td>To examine the impact of PTSD on health</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological</td>
<td>PTSD: 68.5 (4.1)</td>
<td>No PTSD: 69.2 (4.2)</td>
<td>N=108; No PTSD: N=106</td>
<td>F=0; M=108</td>
<td>Clinical</td>
</tr>
<tr>
<td>O’Connor (2010)</td>
<td>To investigate the frequency of PTSD and associated factors in bereaved OA</td>
<td>Longitudinal: T1: 2 months; T2: 6 months; T3: 13 months; T4: 18 months post trauma</td>
<td>Coping and Response; Personality; Social</td>
<td>Longitudinal, between groups (PTSD/ No PTSD)</td>
<td>73 (4.4)</td>
<td>PTSD: N=46; No PTSD: N=250</td>
<td>Overall sample: F=184; M=112</td>
<td>Community</td>
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<tr>
<td>O’Donnell et al., (2006)</td>
<td>To examine the relationship between PTSD and depression</td>
<td>N/A (Cross-sectional)</td>
<td>Psychopathological</td>
<td>Cross-sectional, within group</td>
<td>Range 70-100</td>
<td>N=331</td>
<td>Overall sample: F=0; M=331</td>
<td>Community</td>
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<tr>
<td>Ogle et al., (2014)</td>
<td>To examine the impact of cumulative trauma exposure on PTSD symptom severity</td>
<td>Prospective (Cross-sectional data for this question)</td>
<td>Coping and Response; Personality; Social</td>
<td>Prospective (Cross-sectional data for this question)</td>
<td>60.8 (1.6)</td>
<td>N=805</td>
<td>Overall sample: F=805; M=0</td>
<td>Community</td>
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<tr>
<td>Ogle et al., (2016)</td>
<td>To examine the factors accounting for PTSD symptom severity.</td>
<td>Prospective (Cross-sectional data for this question)</td>
<td>Coping and response; Personality; Psychopathological; Social</td>
<td>Prospective (Cross-sectional data for this question)</td>
<td>63.4 (2.8)</td>
<td>N=645</td>
<td>NR</td>
<td>Community</td>
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<td>Study (Year)</td>
<td>Objective</td>
<td>Design</td>
<td>Measures</td>
<td>Sample Sizes</td>
<td>Gender Distribution</td>
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<td>Pietrzak et al., (2012a)</td>
<td>To study the association of medical disorders, PTSD and sub PTSD</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological</td>
<td>Cross-sectional, between groups (Full PTSD/ sub PTSD/ No PTSD)</td>
<td>NR &gt;61</td>
<td>Community</td>
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<tr>
<td>Qureshi et al., (2010)</td>
<td>To explore the association between PTSD and dementia</td>
<td>N/A (Cross-sectional)</td>
<td>Neuropsychological</td>
<td>Cross-sectional</td>
<td>PTSD+/PH-: 73.9 (5.3); PTSD-/PH+: 73.7 (5.0); PTSD+/PH+: 73.3 (4.7); PTSD-/PH-: 73.8 (5.2)</td>
<td>PTSD+: N=3,660; PTSD-/PH+: N=1,503; PTSD+/PH+: N=153; PTSD-/PH-: N=5,165</td>
<td>F=0; M=3,813</td>
<td>Clinical</td>
</tr>
<tr>
<td>Ron (2011)</td>
<td>To examine PTSD symptoms in groups differing by demographic characteristics and self-esteem</td>
<td>N/A (Cross-sectional)</td>
<td>Personality</td>
<td>Cross-sectional</td>
<td>76.7 (6.7)</td>
<td>N=167</td>
<td>Community</td>
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<td>Schnurr et al., (2000)</td>
<td>To investigate PTSD and sub PTSD associated factors</td>
<td>N/A (Cross-sectional)</td>
<td>Social</td>
<td>Cross-sectional</td>
<td>71.9 (4.1).</td>
<td>PTSD: N=115; Sub PTSD: N=38; No PTSD: N=210</td>
<td>Full PTSD: F=0, M=115; Sub PTSD: F=0, M=38</td>
<td>Community</td>
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<tr>
<td>Study</td>
<td>Purpose</td>
<td>Design</td>
<td>Methods</td>
<td>Sample Size</td>
<td>Outcome Measures</td>
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<td>Spitzer et al., (2008)</td>
<td>To investigate comorbidity patterns within OA</td>
<td>N/A (Cross-sectional)</td>
<td>Psychopathological</td>
<td>PTSD: N=20; No PTSD: N=831</td>
<td>Overall sample: F=402; M=449 (Community)</td>
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<tr>
<td>van Zelst et al., (2003)</td>
<td>To examine factors associated with PTSD</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological; Personality; Social</td>
<td>PTSD: N=13; Sub PTSD: N=97; Non-Exposed: N=312</td>
<td>Reduced PTSD: F=7, M=6; Sub PTSD: F=67, M=30 (Community)</td>
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<tr>
<td>van Zelst et al., (2006)</td>
<td>To measure the impact of PTSD and sub PTSD on daily life functioning, well-being and health care use</td>
<td>N/A (Cross-sectional)</td>
<td>Physiological</td>
<td>PTSD: N=13; Sub PTSD: N=97; Non-Exposed: N=312</td>
<td>Reduced PTSD: F=7, M=6; Sub PTSD: F=67, M=31 (Community)</td>
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<tr>
<td>Wittekind et al., (2017)</td>
<td>To assess attentional biases in trauma survivors</td>
<td>N/A (Cross-sectional)</td>
<td>Neuropsychological</td>
<td>PTSD/Sub PTSD: N=20; No PTSD N=26</td>
<td>Attentional biases: F=18, M=2 (Community)</td>
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<tr>
<td>Yehuda et al., (1994)</td>
<td>To explore depressive symptoms, self-efficacy and cognitive distortion in PTSD/no PTSD survivors</td>
<td>N/A (Cross-sectional)</td>
<td>Coping and Response; Personality; Psychopathological</td>
<td>PTSD: N=11; No PTSD N=12</td>
<td>NR (Community)</td>
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<tr>
<td>Study</td>
<td>Objective</td>
<td>Design</td>
<td>Group Statistics</td>
<td>Control Group Statistics</td>
<td>Gender Distribution</td>
<td>Setting</td>
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<tr>
<td>Yehuda et al., (2004)</td>
<td>To assess learning and memory in Holocaust survivors with PTSD</td>
<td>N/A (Cross-sectional)</td>
<td>Cross-sectional, between groups (PTSD/No PTSD/Non-exposed)</td>
<td>PTSD: 68.2 (5.6); No PTSD: 68.4 (6.4); Non-exposed: 70.4 (6.8)</td>
<td>F=25, M=11</td>
<td>Community</td>
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<tr>
<td>Zhang et al., (2012)</td>
<td>To investigate the prevalence rates of PTSD, anxiety and depression and their associated factors.</td>
<td>N/A (Cross-sectional)</td>
<td>Social</td>
<td>Cross-sectional</td>
<td>68.96 (7.1)</td>
<td>F=49, M=23</td>
<td>Community</td>
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</table>

Table 1: CPTSD: Complex Posttraumatic Stress Disorder; F: Female; IQR: Interquartile Range; M=Male; NR: Not Reported; N/A: Not Applicable; OA: Older Adults; PH: Purple Heart Veterans; PoW: Prisoners of War veterans; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD; T1-T4: Assessment time 1-4; TIA: Transient Ischaemic Attack; WWII: World War II.
<table>
<thead>
<tr>
<th>Author</th>
<th>Type of trauma</th>
<th>Measure of PTSD symptoms</th>
<th>Full or Sub PTSD</th>
<th>Criteria</th>
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<tr>
<td>Boals &amp; Schuettler (2011)</td>
<td>All types of trauma exposure</td>
<td>PCL-S</td>
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<td>DSM-IV</td>
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<tr>
<td>Burri et al., (2013)</td>
<td>Childhood or Adulthood trauma</td>
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<tr>
<td>Chen et al., (2012)</td>
<td>Natural disasters</td>
<td>CAPS</td>
<td>Full</td>
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<tr>
<td>Chung et al., (2006)</td>
<td>Spinal cord injury</td>
<td>PCL</td>
<td>Full and Sub</td>
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<tr>
<td>Chung et al., (2009)</td>
<td>Fall</td>
<td>PDS</td>
<td>Full and Sub</td>
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</tr>
<tr>
<td>Cook et al., (2004)¹</td>
<td>War related trauma (veterans)</td>
<td>PCL</td>
<td>Full</td>
<td>DSM-IV</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Trauma Type</td>
<td>Diagnosis Method</td>
<td>Full/Sub</td>
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<tr>
<td>Favaro et al., (2006)</td>
<td>War related trauma (PoW)</td>
<td>SCID</td>
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<td>DSM-IV</td>
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<tr>
<td>Ferrajao &amp; Oliveira (2016)</td>
<td>War related trauma (veterans)</td>
<td>IES-R</td>
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<tr>
<td>Glaesmer et al., (2011)</td>
<td>All types of trauma exposure</td>
<td>PTDS</td>
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<tr>
<td>Glaesmer et al., (2012)</td>
<td>All types of trauma exposure</td>
<td>PTDS</td>
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<td>Gluck et al., (2016)</td>
<td>War related trauma (experience of war)</td>
<td>Essen Trauma Inventory</td>
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<tr>
<td>Authors</td>
<td>Type of Trauma Exposure</td>
<td>Assessment Tools</td>
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<tr>
<td>Hauser et al., (2012)²</td>
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<td>PTDS</td>
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<td>Jelinek et al., (2013)</td>
<td>War related trauma (displacement)</td>
<td>SCID- German version</td>
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<td>Kiphuth et al., (2014)</td>
<td>TIA</td>
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<td>Knight et al., (2017)</td>
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<td>CAPS</td>
<td>Full</td>
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<tr>
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<tr>
<td>Kuwert et al., (2012)</td>
<td>War related trauma (displacement)</td>
<td>PDS</td>
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<tr>
<td>Authors</td>
<td>Trauma Type</td>
<td>Diagnosis Instrument</td>
<td>Scale Type</td>
<td>DSM Version</td>
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<tr>
<td>O’Connor (2010)</td>
<td>Spousal bereavement</td>
<td>Harvard Trauma Questionnaire Part IV</td>
<td>Full and Sub</td>
<td>DSM-IV</td>
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<tr>
<td>Ogle et al., (2014)</td>
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<td>PCL-S</td>
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<tr>
<td>Ogle et al., (2016)</td>
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<td>PCL-S</td>
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<tr>
<td>Pietrzak et al., (2012a)</td>
<td>All types of trauma exposure</td>
<td>AUDADIS-IV</td>
<td>Full and Sub</td>
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<td>Ron (2011)</td>
<td>War related trauma (war area residents)</td>
<td>Impact of Event Scale Revised</td>
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<td>Schnurr et al., (2000)</td>
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<td>PCL</td>
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<td>Spitzer et al., (2008)</td>
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<td>van Zelst et al., (2003)</td>
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<td>Full and Sub</td>
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<td>Trauma Type</td>
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<tr>
<td>Wittekind et al. (2017)</td>
<td>War related (displacement)</td>
<td>SCID-I</td>
<td>Full and Sub</td>
<td>DSM-IV</td>
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<tr>
<td>Yehuda et al. (1994)</td>
<td>War related (Holocaust)</td>
<td>SCID</td>
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<td>DSM-III-R</td>
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<tr>
<td>Yehuda et al. (2004)</td>
<td>War related (Holocaust)</td>
<td>SCID, CAPS</td>
<td>Full</td>
<td>DSM-IV</td>
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<tr>
<td>Zhang et al. (2012)</td>
<td>Natural Disasters</td>
<td>PCL-C</td>
<td>Full</td>
<td>DSM-IV</td>
</tr>
</tbody>
</table>

3.5. Study quality

Twelve of the reviewed studies met the majority of the aforementioned quality criteria for cross-sectional studies (>80%) and were rated ‘High Quality’ (Acierno et al., 2006; Chung, Berger, Jones, & Rudd, 2008; Durai et al., 2011; Glaesmer et al., 2011; Glaesmer et al., 2012; Häuser et al., 2012; Kiphuth, Utz, Noble, Köhrmann, & Schenk, 2014; Kuwert, Braehler, Freyberger, & Glaesmer, 2012; Ogle, Rubin, & Siegler, 2014, 2016; Pietrzak, Goldstein, Southwick, & Grant, 2012a; Zhang, Shi, Wang, & Liu, 2011). The majority of remaining studies were rated “Good quality”, meeting more than 50% of the included criteria, with the exception of four studies which did not meet half or more of the criteria assessed (Beal, 1995; Carlson, Lauderdale, Hawkins, & Sheikh, 2008; Falger et al., 1992; Ron, 2011).

All reviewed studies were characterised by a well-defined research question, objectives and rationale. The majority of studies used measures with good psychometric properties. In addition, most studies included appropriate analyses to examine the relationship between posttraumatic factors and PTSD symptoms.

The main area of weakness was found in the external validity of the reviewed studies. In regard to the sampling process, all studies, with the exception of eight (Chung et al., 2008; Durai et al., 2011; Glück, Tran, Raninger, & Lueger-Schuster, 2016; Häuser et al., 2012; Kang, Bullman, & Taylor, 2006; Ogle et al., 2014, 2016; Pietrzak et al., 2012a) used convenience clinical or self-referred samples and only four studies provided power calculations on how the sample size was reached. In addition, almost half (41%) of the included studies failed to obtain an adequate response rate (>50%) which could further limit the generalisability of the findings.

Lack of verification of the PTSD diagnosis by a professional as well as unreported confounding variables, such as magnitude of trauma exposure and social support (Brewin et al., 2000), were additional quality considerations. Finally, in regard to the statistical analysis, most studies did not explain how missing data were handled in the analysis.
3.6. PTSD associated factors

A similar categorisation of PTSD associated factors to the one used by DiGangi et al., (2013) was employed. Posttraumatic associated factors fell in the following six categories: 1. Coping and Response; 2. Neuropsychological; 3. Personality; 4. Physiological; 5. Psychopathological; 6. Social. A systematic qualitative synthesis was used to summarise the results of the reviewed studies. Findings are synthesised by category of associated factor.

3.6.1. Coping and response factors

Twelve studies examined the association between PTSD and various coping and response factors. Four studies investigated the role of posttraumatic coping in PTSD severity, showing a significant association. Results indicated differences between PTSD and no-PTSD individuals in terms of coping strategies (Chung et al., 2008). Furthermore, older adults who used immature defence styles such as projection, denial and splitting, were more likely to have a diagnosis of PTSD (Brodaty, Joffe, Luscombe, & Thompson, 2004). Kiphuth et al., (2004) showed that the risk of developing PTSD was 1.2 times higher for older adults utilising maladaptive coping strategies while in O'Connor et al., (2010) appraisal and coping predicted 30% of PTSD symptoms (table 3).

Three studies examined the relationship between event centrality and PTSD, showing a positive association (Boals & Schuettler, 2011; Ogle et al., 2014, 2016). Event centrality refers to the degree to which a traumatic experience is viewed as central to one’s identity and life story (Berntsen & Rubin, 2006). Three studies examined the role of Sense of Coherence in the development of PTSD. Sense of Coherence is defined as the extent to which an individual perceives the world as comprehensible, manageable, and meaningful (Antonovsky, 1993). A negative association was found between sense of coherence and PTSD diagnosis in all studies. Furthermore, two studies explored the role of cognitions in PTSD severity. Posttraumatic cognitions mediated the relationship between mindfulness and PTSD symptoms in Glück et al., (2016) while Yehuda et al., (1994) showed increased cognitive distortions (self-criticism) in Holocaust survivors with PTSD compared to their non-PTSD counterparts. Only one study investigated the role of shame in PTSD, yielding a significant
association (Leskela, Dieperink, & Thuras, 2002). A full list of coping and response factors can be seen in table 3.

Overall, studies consistently revealed a positive association between maladaptive coping strategies and PTSD symptomatology. Furthermore, this review indicates the presence of a significant relationship between cognitive factors and PTSD, particularly in regard to posttraumatic cognitions, sense of coherence and event centrality.

3.6.2. Neuropsychological factors

Nine studies explored the association between PTSD and neuropsychological factors (table 4). Eight assessed differences in performance in standard neuropsychological assessments among groups differing in PTSD severity or diagnostic status. The majority of these studies (n=5, 62.5%) showed lower scores in one or more cognitive measures among participants with PTSD when compared to controls (Brodaty et al., 2004; Burri et al., 2013; Hart et al., 2008; Wittekind, Muhtz, Jelinek, & Moritz, 2017; Yehuda, Golier, Halligan, & Harvey, 2004). Impaired areas included premorbid intellectual functioning, executive functioning, attention and processing speed, as well as overall cognitive function as assessed by cognitive screening measures. More severe PTSD symptoms were also associated with slower reaction times for trauma-related words (but in no other word conditions) in Wittekind et al., (2017), however it is recognised that this may reflect attentional biases. Three studies (Carlson et al., 2008; Jelinek, Wittekind, Moritz, Kellner, & Muhtz, 2013; Knight, Naaz, Stoica, Depue, 2017) found no differences between groups, although one of these displayed significant methodological limitations in regard to PTSD assessment and generalisability of findings (Carlson et al., 2008). Evidence for an association between PTSD and neuropsychological factors was further supported by reviewed studies showing greater dementia prevalence (Qureshi et al., 2010) and decreased gray matter volume (Knight et al., 2017) among individuals screening positively for PTSD compared to controls.

In summary, most studies indicated decreased performance in neuropsychological assessments, greater dementia prevalence and decreased gray matter volume among participants with PTSD compared to controls.
### Table 3: Coping and Response Factors

<table>
<thead>
<tr>
<th>Author</th>
<th>Associated factor</th>
<th>Results</th>
<th>Analysis</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acierno et al., (2006)</td>
<td>Perceived positive outcomes</td>
<td>PTSD-Perceived positive outcomes B=0.07, ns</td>
<td>Regression Analysis</td>
<td>Perceived positive outcomes were not significantly associated with PTSD symptoms.</td>
</tr>
<tr>
<td>Boals &amp; Schuetter</td>
<td>Event centrality</td>
<td>Centrality of event scale-PTSD: r(125) = .36, p &lt; .001.</td>
<td>Correlation Analysis</td>
<td>The correlation between event centrality scores and PTSD scores was positive and significant for OA.</td>
</tr>
<tr>
<td>Brodaty et al., (2004)</td>
<td>Defence style</td>
<td>Immature defence style-PTSD: B=2.37; OR= 10.68, χ²=14.60, p &lt;0.001</td>
<td>Logistic Regression</td>
<td>OA who used immature defence styles such as fantasy, projection, dissociation, somatisation, denial and splitting, were more likely to have PTSD.</td>
</tr>
<tr>
<td>Chung et al., (2008)</td>
<td>Coping mechanisms</td>
<td>Suppression of competing activities F(2, 69)=7.29; p&lt;0.001, restraint coping F(2, 69)=4.12; p&lt;0.020, focusing on and venting of emotion F(2, 69)=10.85; p&lt;0.0001, behavioural disengagement F(2,69)=6.32, p=0.003 and mental disengagement F(2,69)=3.53, p=0.05</td>
<td>MANCOVA</td>
<td>Significant differences were found between groups in suppression of competing activities, restraint coping, seeking emotional social support, focusing on and venting of emotion, mental disengagement and behavioural disengagement.</td>
</tr>
<tr>
<td>Ferrajao &amp; Oliveira</td>
<td>Sense of Coherence (SOC)</td>
<td>SOCS-IES-R: -.85, p&lt;0.001</td>
<td>Logistic Regression</td>
<td>Participants who reported a strong SOC showed negative odds for exceeding clinical cut-off scores associated with a probable diagnosis of PTSD.</td>
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<tr>
<td>Study</td>
<td>Methodology</td>
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<tr>
<td>Gluck et al., (2016)</td>
<td>Mediation Analysis</td>
<td>SOC was associated with PTSD symptoms. Posttraumatic cognitions mediated the relationship between mindfulness and PTSD symptoms. The path of mindfulness to PTSD symptoms was not significant.</td>
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<tr>
<td>Kiphuth et al., (2014)</td>
<td>Logistic Regression</td>
<td>The risk to develop PTSD was 1.2 times higher for patients with TIA using maladaptive coping strategies.</td>
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<tr>
<td>Leskela et al., (2002)</td>
<td>Correlation Analysis</td>
<td>Shame was positively associated with PTSD.</td>
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<tr>
<td>O’Connor (2010)</td>
<td>ANOVA, Hierarchical Regression Analysis</td>
<td>Appraisal and coping at time 1 predicted 30% of PTSD symptoms at time 4.</td>
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<tr>
<td>Ogle et al., (2016)</td>
<td>Multiple Regression Analysis/ Correlations</td>
<td>Coping ability and event centrality were associated with PTSD symptom severity.</td>
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</tbody>
</table>
Yehuda et al., (1994) Cognitive distortions (Self-criticism) Self-Criticism: PTSD/No PTSD/Non-exposed: F = 3.7; df = 2,38; p < .035. PTSD > No PTSD and Non-Exposed One-way ANOVA (two-tailed), post-hoc testing. Newman-Keuls test. Holocaust survivors with PTSD scored significantly higher on the Self-criticism scale compared to those without PTSD and non-exposed controls.

Table 3: Df: degrees of freedom; IES-R: Impact of Event Scale-Revised; NS: Not Significant; OA: Older Adults; OR: Odds Ratio; PTSD: Posttraumatic Stress Disorder; PCL: PTSD checklist; PCL-C: PTSD Checklist-Civilian Version; SOC: Sense of Coherence.
<table>
<thead>
<tr>
<th>Author</th>
<th>Associated factor</th>
<th>Results</th>
<th>Analysis</th>
<th>Conclusions</th>
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<tbody>
<tr>
<td>Brodaty et al., (2004)</td>
<td>Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language)</td>
<td>MMSE performance: PTSD: 24.9 (1.5), No PTSD: 27.1 (1.3), t= -7.96, p &lt;0.001</td>
<td>T-tests</td>
<td>The PTSD group demonstrated lower scores on cognitive measures when compared to a trauma exposed control group.</td>
</tr>
<tr>
<td>Burri et al., (2013)</td>
<td>Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language; SISCO: overall cognitive function including: orientation, memory, intellectual ability)</td>
<td>MMSE: x² = 9.3, p&lt;0.05; SISCO: x² = 10.1, p&lt;0.05. Subdomains: cortical function (x² = 12.3, P&lt;0.001); verbal numeracy (x² = 8.8, p&lt;0.05); construction skills (x² = 6.3, p&lt;0.05).</td>
<td>Kruskal-Wallis non-parametric test</td>
<td>Individuals screening positively for PTSD symptoms performed worse on all cognitive tasks compared to controls, independent of whether they reported childhood or adulthood adversity.</td>
</tr>
<tr>
<td>Carlson et al., (2008)</td>
<td>Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language)</td>
<td>MMSE-PTSS-CI: ns</td>
<td>Correlation Analysis</td>
<td>PTSD symptoms were not associated with performance on the MMSE.</td>
</tr>
<tr>
<td>Hart et al., (2008)</td>
<td>Neuropsychological performance (NAART: premorbid functioning; Symbol Digit Modalities test: attention, processing speed; COWAT: verbal fluency; Animal Fluency; JLO: visuospatial skills; LMR: logical memory recognition; LMT: logical memory; Trails A,B: processing speed. executive functioning; BNT: naming ability; DSF, DSB: working memory; RAVLT: verbal memory; WRMT: reading ability)</td>
<td>NAART: PTSD: 104.7 (9.0); Comorbid PTSD: 104.6 (9.0); No PTSD: 115.9 (6.9), p=0.02 CAPS Total-NAART: r=-0.45, p&lt;0.01. Symbol Digit: PTSD: 28.0 (7.5), No PTSD: 41.0 (6.7), p&lt;0.05; Trails B: PTSD: 147.2 (36.7); No PTSD: 94.3 (30.3), p&lt;0.05 All other differences between PTSD/ No PTSD:ns</td>
<td>Two-tailed t test, Correlation Analysis, Logistic Regression Analysis</td>
<td>Participants without PTSD demonstrated higher IQ compared to the other groups (PTSD, Comorbid PTSD). PTSD severity correlated with IQ. Participants with PTSD performed worse than those without PTSD in the majority of neuropsychological assessments (apart from Trails A) but not all differences reached statistical significance.</td>
</tr>
<tr>
<td>Authors</td>
<td>Study Details</td>
<td>Findings</td>
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<tr>
<td>Jelinek et al., (2013)</td>
<td>Neuropsychological performance (PWMT: verbal memory; Digit Span: working memory; Corsi Block Tapping: visuo-spatial memory; Trail Making Test: processing speed. executive functioning)</td>
<td>Ns differences between PTSD, No-PTSD and Non-Exposed groups in all administered assessments. PTSD severity did not correlate with any of the OA neuropsychological test scores (PDS: r=0.22, p&lt;0.15).</td>
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<tr>
<td>Knight et al., (2017)</td>
<td>Neuropsychological performance (MMSE: overall cognitive function including tests of orientation, attention, memory, language); Subcortical surfaced brain morphometry</td>
<td>MMSE: (PTSD/No PTSD) ns; Increased CAPS scores were related to decreased gray matter volume in a more rostral and inferior left dorsomedial prefrontal cortex region (p &lt; 0.001).</td>
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<tr>
<td>Qureshi et al., (2010)</td>
<td>Dementia diagnosis</td>
<td>The odds of a dementia diagnosis were two times as high in the PTSD+/PH- group as in the PTSD-/PH+ group (OR=2.0, 95% CI=1.6–2.5, P&lt;.001) or the comparison group (OR=2.3, 95% CI=2.0–2.7, p&lt;.001).</td>
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<tr>
<td>Wittekind et al., (2017)</td>
<td>Neuropsychological performance (Emotional Stroop task: interference effects of emotional material on cognitive processing)</td>
<td>PTSD symptoms-Reaction time for trauma-related words: r=0.41, p=0.005. PTSD symptoms- Reaction time for depression-related, anxiety-related or neutral words: ns. For Trauma related words: PTSD group reaction time-no PTSD reaction time: ns but at trend level p=0.061 (d=0.73).</td>
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</tbody>
</table>

No evidence for cognitive differences was found between individuals with PTSD and those without PTSD and non-exposed OA. Test performance did not correlate with PTSD.

PTSD symptom severity was associated with decreased gray matter volume in the left dorsomedial prefrontal cortex.

The incidence and prevalence of dementia was greater in veterans with PTSD compared to controls.

Participants with PTSD symptoms were significantly slower to colour name trauma-related words than non-traumatized participants, and, at trend level, than non-PTSD participants. More severe PTSD symptoms were associated with slower reaction times for trauma-related words (but in no other word conditions).
Neuropsychological performance (CVLT: verbal learning, memory)  

| CVLT Learning (Trials 1–5): PTSD: 39.7 (13.6), No PTSD: 47.2 (10.7) ANOVA F(2,99)=13.8, p<0.001; All other CVLT domains (free recall, cued recall, recognition) ns | ANOVA, Pairwise Comparisons | The PTSD group performed more poorly than the no PTSD group only on total learning, while the no PTSD group and nonexposed group did not differ on any measure. |

Table 4. BNT: Boston Naming Test; California Verbal Learning Test; CAPS = Clinician Administered PTSD Scale; DSF: Digit Span Forward Total Score; DSB: Digit Span Backward Total Score; IQ: Intelligence Quotient; JLO: Judgement of Line Orientation; LMR: Logical Memory Recall score from Weschler Memory Scale-3rd edition; LMT: Logical Memory Thematic score from Weschler Memory Scale-3rd edition; MMSE: Mini Mental State. Examination; OA: Older Adults; PWMT: Penn Word Memory Test; PH: Purple Heart Veterans; PTSS-CI: Posttraumatic Stress Screen for the Cognitively Impaired; PTSS-CI-OV: Posttraumatic Stress Screen for the Cognitively Impaired- Observer version; RAVLT: Rey Auditory Verbal Learning Test; Sisco = Sidam score; WRMT: Warrington Recognition Memory Test (faces subtest).
3.6.3. Personality factors

Personality factor categorisation was based on the five-factor (Big Five) model of personality which includes neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (Mount, Barrick, & Stewart, 1998). Mindfulness, attachment, self-efficacy, locus of control and self-esteem were also added under this category as per previous research (DiGangi et al., 2013; Eschleman & Bowling, 2009; Gardini, Cloninger, & Venneri, 2009; Giluk, 2009; Hough, 1992) and because of their significant association with the five personality traits (Bohlin, 2003; Giluk, 2009; Nofile & Shaver, 2006; von Collani, 2002).

Personality factors were examined in 10 studies. The most commonly studied personality factors were neuroticism (n=3) and self-efficacy (n=2). Neuroticism refers to a trait disposition to experiencing a number of negative emotions, which include anger, anxiety, irritability and low mood (Widiger & Oltmanns, 2017). Self-efficacy is defined as the degree of belief in one’s ability to influence events that affect their lives (Bandura, 2010). Other factors examined once included self-esteem, mindfulness, inhibited/sensitive personality, attachment style and locus of control. Locus of control is defined as the degree to which people consider outcomes in their lives to be under personal control, or controlled by outside forces (Rotter, 1966). Both studies that examined neuroticism found a significant association with PTSD diagnosis or symptom severity. Mixed results were observed with regards to self-efficacy: In Van Zelst et al., (2003) lack of self-efficacy was associated with increased risk of sub-threshold, but not full, PTSD, while Yehuda et al., (1994) found no significant differences between PTSD and control groups. However, the absence of an association may be due to the small sample size reported in this study (PTSD: N=11; No PTSD N=12), rather to a lack of association per se. For the remaining personality factors, significant relationships were noted between PTSD symptoms and locus of control, attachment style, inhibited and sensitive personality as well as self-esteem (table 5).

Taken together, these findings provide preliminary evidence for an association between personality styles and PTSD symptom severity. Nevertheless, it is important to note that research in this area remains limited as the majority of factors were investigated in single studies.
3.6.4. Physiological factors

Sixteen studies assessed the link between posttraumatic physiological factors and PTSD symptomatology. Seven assessed either subjective health status or functioning, while nine examined the association between the presence of physical problems and PTSD (e.g. cardiovascular disease, pain). The majority of studies assessing subjective health status or functioning (n=5; 71%) showed that these were rated more poorly among older adults with either sub-threshold or full PTSD, compared to control groups.

All studies indicated an association between PTSD and health problems. Participants with full or sub-threshold PTSD experienced more physical problems and being more likely to suffer from specific medical conditions compared to the trauma exposed control groups. It is important to note that in one study (Cooper et al., 2014), the relationship between PTSD and health problems was only positive and significant for specific ethnic populations. However, in this study, the control group comprised of older adults with a diagnosis of depression which is known to affect physical health (Moussavi et al., 2007) and may have accounted for the reported absence of an association.
<table>
<thead>
<tr>
<th>Author</th>
<th>Associated factor</th>
<th>Results</th>
<th>Analysis</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chung et al., (2006)</td>
<td>Locus of control</td>
<td>Internal Health Locus of Control-Avoidance symptoms: ( r=-0.55, \ p&lt;0.05 ); Powerful other Locus of Control- Avoidance symptoms: ( r=0.65, \ p&lt;0.05 )</td>
<td>Correlation Analysis</td>
<td>Internal Health Locus of Control was negatively correlated with PTSD avoidance symptoms. Powerful Other Locus of Control was positively correlated with PTSD avoidance symptoms.</td>
</tr>
<tr>
<td>Favaro et al., (2006)</td>
<td>Interpersonal Sensitivity</td>
<td>Interpersonal Sensitivity: ns</td>
<td>One-way ANOVA and Chi square</td>
<td>No differences in interpersonal sensitivity observed in full PTSD, sub PTSD and no PTSD participants.</td>
</tr>
<tr>
<td>Gluck et al., (2016)</td>
<td>Mindfulness</td>
<td>Mindfulness-PTSD: ns</td>
<td>Mediation Analysis</td>
<td>The mediation path between mindfulness and PTSD symptoms was not significant.</td>
</tr>
<tr>
<td>Hyer et al., (1996)</td>
<td>Personality styles</td>
<td>Inhibited Personality Scale: PTSD: ( M=64.8, \ SD=11.8 ), No PTSD: ( M=49.9, \ SD= 12.7 ); ( t=4.6, \ p&lt;.0001 ). Sensitive Personality Scale: PTSD M=62.2, SD= 12.3, No PTSD M=50.1, SD= 11.9; ( t=4.6, \ p&lt;.0001 ).</td>
<td>T-tests</td>
<td>The PTSD group demonstrated more Inhibited and Sensitive personality styles compared to the no PTSD group.</td>
</tr>
<tr>
<td>Author(s) &amp; Year</td>
<td>Variable(s)</td>
<td>Description and Methodology</td>
<td>Findings</td>
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<tr>
<td>O'Connor (2010)</td>
<td>Neuroticism</td>
<td>PTSD-Neuroticism: F=10.53, η=476.25 p=0.001; ANOVA, Hierarchical Regression Analysis</td>
<td>Participants with PTSD experienced more neuroticism two months following trauma than those without PTSD.</td>
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<tr>
<td>Ogle et al., (2016)</td>
<td>Neuroticism, Adult attachment</td>
<td>Neuroticism/PTSD r= .31, p&lt;0.001; Adult Attachment Anxiety/PTSD: r= .39, p&lt;0.001; Attachment avoidance/PTSD: r=.19, p&lt;0.001</td>
<td>Both neuroticism and insecure attachment styles (anxious/avoidant) were associated with PTSD symptom severity.</td>
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<tr>
<td>Ron (2011)</td>
<td>Self-esteem</td>
<td>PTSD/Self-esteem: r= –0.42, p &lt; 0.001.</td>
<td>Negative association between self-esteem and PTSD symptoms emerged.</td>
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</tr>
<tr>
<td>van Zelst et al., (2003)</td>
<td>Neuroticism, Self-efficacy</td>
<td>Neuroticism Sub PTSD: OR= 2.5; Full PTSD: OR=14.9; Lack of self-efficacy: Sub: OR=2.2</td>
<td>Neuroticism was associated with an increase in the risk of PTSD or sub PTSD. Lack of self-efficacy was associated with increased risk of sub PTSD.</td>
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<tr>
<td>Yehuda et al., (1994)</td>
<td>Self-efficacy</td>
<td>No significant differences were observed on the self-efficacy scales (F = 0.89; df= 2.38; ns).</td>
<td>No significant differences were observed on the self-efficacy scales between Holocaust survivors with PTSD and Holocaust survivors without PTSD.</td>
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</table>

Table 5. Df: Degrees of freedom; M: Mean; ns: Not significant; OA: Older Adults; OR: Odds Ratio; PTSD: Posttraumatic Stress Disorder; Sub: Sub-threshold PTSD.
### Table 6: Physiological factors

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<tr>
<th>Author</th>
<th>Associated factor</th>
<th>Results</th>
<th>Analysis</th>
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<tbody>
<tr>
<td>Acierno et al., (2006)</td>
<td>Self-rated health problems.</td>
<td>PTSD-Health problems ($\rho=0.24$, $p&lt;0.01$)</td>
<td>Regression Analysis</td>
<td>Health problems were associated with PTSD symptoms.</td>
</tr>
<tr>
<td>Brodaty et al., (2004)</td>
<td>Self-rated physical health</td>
<td>PTSD/No PTSD: $\chi^2=39.04$, $p&lt;0.001$</td>
<td>Chi square</td>
<td>Participants with PTSD rated their general health more poorly compared to the no PTSD group.</td>
</tr>
<tr>
<td>Chung et al., (2008)</td>
<td>Physical Problems</td>
<td>MANOVA (PTSD/Sub PTSD/No PTSD) Physical problems: [F(2, 75)=5.64; $p&lt;0.005$]. Pairwise comparisons: PTSD&gt; no-PTSD and sub PTSD (no-PTSD, $p&lt;0.001$; sub PTSD, $p&lt;0.012$)</td>
<td>MANOVA, Pairwise Comparison</td>
<td>Patients with partial and full-PTSD experienced significantly more physical problems than the trauma exposed control group.</td>
</tr>
<tr>
<td>Cooper et al., (2014)</td>
<td>Coronary Artery Disease (CAD)</td>
<td>White: PTSD/CAD: OR=0.90 (0.84, 0.98), $p&lt;0.05$</td>
<td>Logistic Regression</td>
<td>The association of PTSD with CAD varied by race/ethnicity. PTSD was associated with a higher likelihood of CAD, but only among Black people.</td>
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<td>Black PTSD/CAD: OR=1.29 (1.01, 1.66), $p&lt;0.05$</td>
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<td>Hispanic PTSD/CAD: OR=0.65 (0.44, 0.94), $p&lt;0.05$</td>
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<td>Asian PTSD/CAD: ns</td>
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<td>American Indian/Alaskan Native PTSD/CAD: ns</td>
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<td>Study</td>
<td>Health Area</td>
<td>Methodology</td>
<td>Findings</td>
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<tr>
<td>Durai et al., (2011)</td>
<td>General health</td>
<td>Cochran Armitage Trend test: General Health: Full PTSD=73.3; Sub PTSD=56.9, No PTSD=40.5, non-Exposed=43.2 (z=1.510, p&lt;0.001). Logistic Regression: Sub PTSD-Health: OR=1.8 (95% CI=1.7-2.0); Full PTSD-Health: OR=3.6 (95% CI=2.7-4.9)</td>
<td>Veterans with PTSD symptoms were more likely to report poor general health than those with no trauma history or those with history of trauma but no symptoms. Full PTSD was associated with poorer health outcomes than Sub PTSD.</td>
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<tr>
<td>Falger et al., (1992)</td>
<td>Cardiovascular risk</td>
<td>Differences between groups (PTSD/No PTSD): Hypertension, Prior MI: ns.</td>
<td>Increased prevalence of some cardiovascular risk factors (angina pectoris) but not others (MI, hypertension) was found in veterans with PTSD compared to the no PTSD group.</td>
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<tr>
<td>Glaesmer et al., (2011)</td>
<td>Physical mobility. Health care utilisation</td>
<td>Asthma (PTSD/No PTSD) OR=2.54 (1.23-5.26), p&lt;0.05; Back pain OR=2.20 (1.29-3.76), p&lt;0.01; Bronchitis or COPD OR=2.25 (0.99-4.64), p&lt;0.01; Cancer (within the last 5 y) OR=3.61 (1.59-8.18), p&lt;0.01; Elevated Cholesterol level OR=3.76 (2.11-6.70), p&lt;0.001; Congestive heart failure OR=2.94 (1.67-5.17), p&lt;0.001; Hard of hearing OR=2.18 (1.25-3.81), p&lt;0.01; Hypertension OR=3.53 (1.89-6.89), p&lt;0.001; Osteoporosis 2.29 (1.24-4.23), p&lt;0.01; Poor circulation 1.94 (1.14-3.31) p&lt;0.05; Rheumatic disease and others 1.41 (0.67-2.95), p&lt;0.01; Stomach problems 2.51 (1.41-4.47), p&lt;0.01; Thyroid disorder 2.96 (1.54-5.68), p&lt;0.01 Ns: Vision problems, Colon problems; Stroke, Diabetes, Osteoarthritis, Overweight.</td>
<td>The PTSD group demonstrated an increased risk for the majority of the medical conditions under study compared with the no PTSD and non-exposed groups. Number of conditions was also associated with PTSD.</td>
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Number of conditions: Non-exposed: 3.2 (2.7); No PTSD: 5.0 (3.6), PTSD: 7.8 (4.2) β (logistic regression) =1.58, p<0.001, β (linear regression) =2.84, p<0.001
<table>
<thead>
<tr>
<th>Study</th>
<th>Methodology</th>
<th>Findings</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hall (2014)</td>
<td>MANOVA: Physical function: estimate=-8.96, SE=3.30, p=0.01; Role Physical: estimate=-22.28, SE (5.62); p&lt;0.01; General Health: estimate=-9.01, SE=2.89, p&lt;0.01; Bodily pain: ns.</td>
<td>Significant differences between groups (PTSD/No PTSD) on Physical Function, Role-Physical, Bodily Pain, General Health and Physical Performance, p&lt;0.001</td>
<td>PTSD was negatively associated with self-reported physical function, functioning in daily activities, and general health. Participants with PTSD rated aspects of their general health more poorly, compared to the no PTSD group. Veterans with PTSD demonstrated poorer physical performance than those without PTSD.</td>
</tr>
<tr>
<td>Hauser et al., (2012)</td>
<td>PTSD-Pain OR=3.43; C.I. 1.88–6.26; B=1.23; p&lt;0.0001</td>
<td>PTSD was a significant predictor of widespread pain</td>
<td>PTSD was negatively associated with self-reported physical function, functioning in daily activities, and general health. Participants with PTSD rated aspects of their general health more poorly, compared to the no PTSD group. Veterans with PTSD demonstrated poorer physical performance than those without PTSD.</td>
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<tr>
<td>Hyer et al., (1999)</td>
<td>PTSD-Health Status: $R^2=0.35$, Adjusted $R^2=0.34$, $F=1.02$, ns</td>
<td>PTSD was not associated with health status</td>
<td>PTSD was negatively associated with self-reported physical function, functioning in daily activities, and general health. Participants with PTSD rated aspects of their general health more poorly, compared to the no PTSD group. Veterans with PTSD demonstrated poorer physical performance than those without PTSD.</td>
</tr>
<tr>
<td>Kang et al., (2006)</td>
<td>Hypertension-PTSD: OR, 1.25; 95% CI=1.16–1.35</td>
<td>POWs diagnosed with PTSD had increased risk of all circulatory diseases, CIHD, and hypertension compared to POWs with no diagnosis of PTSD.</td>
<td>PTSD was negatively associated with self-reported physical function, functioning in daily activities, and general health. Participants with PTSD rated aspects of their general health more poorly, compared to the no PTSD group. Veterans with PTSD demonstrated poorer physical performance than those without PTSD.</td>
</tr>
<tr>
<td>Kipphuth et al., (2014)</td>
<td>Differences between PTSD and No PTSD groups in terms of physical QoL ns</td>
<td>PTSD group did not differ from no PTSD group in terms of Physical QoL</td>
<td>PTSD was negatively associated with self-reported physical function, functioning in daily activities, and general health. Participants with PTSD rated aspects of their general health more poorly, compared to the no PTSD group. Veterans with PTSD demonstrated poorer physical performance than those without PTSD.</td>
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<tr>
<td>Study</td>
<td>Conditions</td>
<td>Physical Health</td>
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<tr>
<td>Mc Leay et al., (2017)</td>
<td>Number of comorbidities: PTSD (17.7; SD=6.1); No PTSD (14.1; SD=5.2; p &lt; 0.001)</td>
<td>Myocardial infarction: OR=4.43, p=0.006; Fatty liver OR=4.1, p=0.01; Gastroesophageal reflux OR=2.53, p=0.001; Irritable bowel syndrome OR=2.48, p=0.015; Obstructive sleep apnoea OR=2.83, p&lt;0.001; Obstructive sleep apnoea, high risk Berlin category OR=2.82, p&lt;0.001</td>
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<tr>
<td>Pietrzak et al., (2012a)</td>
<td>Subjective Health: PTSD&lt;No PTSD, Chi square: 18.91 (2,65), p&lt;0.001; PTSD vs No PTSD: Arteriosclerosis OR=1.1 (0.66–1.79); Hypertension OR=1.3 (1.03–1.70); Diabetes mellitus OR=1.1 (0.86–1.46); Cirrhosis OR=0.2 (0.03–1.73); Noncirrhotic liver disease OR=1.1 (0.46–2.64); Angina pectoris OR=1.5 (1.11–2.10); Tachycardia OR=1.6 (1.11–2.21); Myocardial OR=1.2 (0.62–2.48); Hypercholesterolemia OR=0.9 (0.76–1.18); Other heart disease OR=1.5 (1.06–2.18); Stomach ulcer OR=1.8 (1.12–2.97); Gastritis OR=1.8 (1.27–2.66); Arthritis OR=1.4 (1.09–1.84); Stroke OR=1.2 (0.56–2.51). In all analyses p&lt;0.05</td>
<td>PTSD was associated with greater odds of hypertension, angina pectoris, tachycardia, other heart disease, stomach ulcer, gastritis, and arthritis.</td>
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<tr>
<td>van Zelst et al., (2003)</td>
<td>Poor subjective health- Sub PTSD OR=2.2 (1.3–3.6), p&lt;0.05</td>
<td>Poor subjective health was associated with an increase in the risk of sub-threshold PTSD.</td>
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</table>
van Zelst et al., (2006)  

Physical health  

PTSD symptoms - Perceived health: OR = 2.3 (1.4-3.9), p < 0.05. 

Adjusted for age, sex, marital status, education, urbanization, chronic diseases, functional limitations, social network size, and cognitive functioning.

Odds Ratio

Perceived health was associated with PTSD symptoms, even when adjusted for chronic diseases, functional limitations and other covariates.

Table 6. CAD: Coronary artery disease; CIHD: Chronic Ischemic Heart Disease; COPD: Chronic Obstructive Pulmonary Disorder; Df: Degrees of freedom; NS: Not significant; OA: Older Adults; OR: Odds Ratio; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD.
In summary, most reviewed studies showed a relationship between posttraumatic physiological factors and PTSD symptom severity, with older adults with full or sub-threshold PTSD experiencing worse subjective health, more physical problems and being more likely to have specific medical conditions compared to the trauma exposed control groups (table 6).

3.6.5. Psychopathological factors

The relationship between PTSD symptomatology and concurrent psychopathological factors was examined in twelve studies. Eleven studies included data on depression, seven on anxiety, one on OCD, while four investigated the relationship between somatoform symptoms and PTSD. All reviewed studies indicated an association between PTSD and comorbid depression or anxiety. Participants with PTSD experienced significantly more anxiety and depression symptoms when compared to either the sub-threshold PTSD or to the control groups. Even though differences emerged in regard to the measurement of the comorbid conditions, this did not affect the observed relationships. Only half of the studies investigating somatoform symptoms yielded a significant association (Glaesmer et al., 2012; Kuwert et al., 2012), however a failure to observe this relationship in the remaining studies (Favaro, Tenconi, Colombo, & Santonastaso, 2006; Spitzer et al., 2008) may have been due to the studies being underpowered (PTSD sample sizes ranged from n=13 to n=20), rather than due to an absence of the association itself.

Overall, the relationship between PTSD and concurrent psychopathological factors was documented fairly consistently in the majority of included research. Further information on this relationship can be found in table 7.

3.6.6. Social factors

The association between PTSD and social factors was examined in 17 studies. More than half of these (n=10; 59%) investigated the association between social or emotional support and
PTSD severity. Other social factors included were loneliness (n=4; 24%), the degree of social activity (n=2; 12%), and quality of social disclosure (n=2; 12%). Further variables explored by a single study were network size, satisfaction with social life, social dysfunction and relationship satisfaction. The majority of studies (n=13; 76%) supported a negative association between social variables and PTSD (Acierno et al., 2006; Beal, 1995; Brodaty et al., 2004; Chen et al., 2012; Chung et al., 2004; Cook et al., 2004; Durai et al., 2011; Krammer et al., 2016; Ogle et al., 2014, 2016; O’Connor, 2010; Schnurr et al., 2000). Participants with PTSD tended to rate areas associated with social life, support and activity more poorly when compared to those without PTSD (Brodaty et al., 2004; Durai et al., 2011). In addition, lower levels of social support were noted by participants with full PTSD compared to those with sub-threshold PTSD (Durai et al., 2011). Older adults with PTSD were also more likely to report greater degree of social dysfunction, marital distress, relationship dissatisfaction and dysfunctional disclosure (Cook et al., 2004; Krammer et al., 2016; Schnurr, Spiro, & Paris, 2000). Finally, loneliness was associated with an increased risk of PTSD symptoms (van Zelst et al., 2006) and sub-threshold PTSD (Van Zelst et al., 2003; van Zelst et al., 2006).
Table 7: Psychopathological Factors

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<th>Conclusions</th>
</tr>
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<tbody>
<tr>
<td>Beal (1995)</td>
<td>Anxiety, Depression</td>
<td>Depression: T1: PTSD=83.2, No PTSD: 46.6, $\chi^2$(df)=28.71 (1), p&lt;0.001</td>
<td>Chi square</td>
<td>Significant differences in anxiety and depression rates were observed between the PoW PTSD and no PTSD groups at times 1 and 2.</td>
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<td>T2: PTSD=86.0, No PTSD: 47.3, $\chi^2$(df)=31.72 (1), p&lt;0.001</td>
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<td>Anxiety: T1: PTSD= 76.8, No PTSD:53.4, $\chi^2$(df)=11.88 (1), p&lt;0.001</td>
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<tr>
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<td></td>
<td>T2: PTSD= 77.9, No PTSD:54.5, $\chi^2$(df)=11.70 (1), p&lt;0.001</td>
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<tr>
<td>Chung et al., (2008)</td>
<td>Anxiety, Depression</td>
<td>MANOVA: Significant differences between groups were found in anxiety [F(2, 75)=9.28; p&lt;0.001] and depression [F(2, 75)=7.56; p&lt;0.001].</td>
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<td>Pairwise comparisons: Anxiety: PTSD&gt;No PTSD, sub PTSD</td>
<td>MANOVA, Pairwise Comparison</td>
<td>Patients with subthreshold and full-PTSD experienced significantly more anxiety and depression than the trauma exposed control group.</td>
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<td></td>
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<td>(no-PTSD: p&lt;0.001; Sub PTSD: p&lt;0.016), Depression: PTSD&gt;No PTSD, Sub PTSD</td>
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<tr>
<td></td>
<td></td>
<td>(no-PTSD, p&lt;0.001; sub PTSD, p&lt;0.003).</td>
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<tr>
<td>Chung et al., (2009)</td>
<td>Anxiety, Depression</td>
<td>PTSD (t1) was associated with Anxiety (t1) ($\tau$=0.61, p&lt;0.01) and Depression (t1) ($\tau$=0.27, p&lt;0.05). PTSD diagnosis (t2) was associated with Anxiety (t2) ($\tau$=0.36, p&lt;0.01) and Depression (t2) ($\tau$=0.30, p&lt;0.01). PTSD diagnosis (t3) was associated with Anxiety (t3) ($\tau$=0.30, p&lt;0.01) and Depression (t3) ($\tau$=0.28, p&lt;0.01).</td>
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<td>Bivariate Association</td>
<td></td>
<td>Anxiety and depression were associated with PTSD diagnosis at each assessment measurement (t1, t2, t3)</td>
</tr>
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<table>
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<th>Study</th>
<th>Diagnosis</th>
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<td>Depression $\chi^2$=11.11; df = 2; $p&lt;0.005$; Somatisation: ns; Depression $F(2,63)=10.13$ $p&lt;0.0003$, PTSD &gt; Sub PTSD, No PTSD; OCD: $F(2,63)=7.49$, $p=0.002$ PTSD &gt; Sub PTSD, No PTSD; Anxiety $F(2,63)=6.52$ 0.003 PTSD &gt; Sub PTSD, No PTSD</td>
<td>One-way ANOVA, Chi square</td>
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<td>Knight et al., (2017)</td>
<td>Depression</td>
<td>Depressive symptoms-PTSD severity: $r = 0.341$, $p = 0.044$.</td>
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Current major depression and anxiety were significantly more frequent in full PTSD subjects than among those with subthreshold PTSD and those without.

PTSD symptoms were significantly associated with comorbid conditions. Strongest association was found for somatoform syndrome.

The PTSD group exhibited significantly higher levels of anxiety and depression when compared to the no PTSD group.

TIA patients with PTSD were more likely to show signs of anxiety and depression.

PTSD symptomatology positively correlated with depression severity.
<table>
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<td>Correlation Analysis</td>
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<td>One-way ANOVA (two-tailed)</td>
<td>The mean score on the depressive subscale was significantly higher for Holocaust survivors with PTSD compared to Holocaust survivors without PTSD.</td>
</tr>
</tbody>
</table>

Depressive symptoms: PTSD:19.45 (9.65); No PTSD: 7.90 (8.14), F = 14.4; df =2.38; p < .0001

Table 7: CI: Confidence Intervals; Df: Degrees of freedom; NS: Not significant; OA: Older Adults; OCD: Obsessive Compulsive Disorder; OR: Odds Ratio; PoW: Prisoners of War; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD; T1-T3: Assessment time.
<table>
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<th>Author</th>
<th>Associated factor</th>
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<td>Acierno et al., (2006)</td>
<td>Social support</td>
<td>PTSD-Social support ($\rho=-0.19$, $p&lt;0.01$)</td>
<td>Regression Analysis</td>
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<td>Beal (1995)</td>
<td>Loneliness</td>
<td>T1: PTSD: 69.5, No PTSD: 42.7, $\chi^2=14.33$, $p&lt;0.001$</td>
<td>Chi square</td>
<td>Significant differences in loneliness rates were observed between the PoW PTSD and no PTSD groups at times 1 and 2.</td>
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<td>Brodaty et al., (2004)</td>
<td>Social Activity, Satisfaction with social life</td>
<td>PTSD/No PTSD: Social activity $t=9.16$, $p&lt;0.001$; Satisfaction with social life: $\chi^2=41.66$, $p&lt;0.001$ Marital status: ns; Living arrangements: ns;</td>
<td>Chi square, T-tests</td>
<td>Significant differences between the PTSD and No PTSD groups emerged in terms of social activity and social life, with the PTSD group rating these areas more poorly.</td>
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<tr>
<td>Chen et al., (2012)</td>
<td>Social support</td>
<td>Multivariate logistic regression: Low social support $b=0.60$, $p=0.02$; Bivariate logistic regression: OR=2.691 (1.027 to 7.048), $p=0.03$</td>
<td>Multivariate and Bivariate Logistic Regression</td>
<td>Low social support was associated with PTSD. Participants with low social support were almost 2.5 times more likely to have a diagnosis of PTSD.</td>
</tr>
</tbody>
</table>
Chung et al., (2008)  Social dysfunction

MANOVA: Social dysfunction \[F(2, 75)=9.17; p<0.001]\.
Pairwise comparisons: Significant differences in social dysfunction (PTSD/ No PTSD, \(p<0.001\); PTSD/Sub PTSD, \(p<0.007\)).

Cook et al., (2004)  Relationship functioning

Marital distress: \(\chi^2(1,N=386)=19.65, p<0.001\); Relationship satisfaction: \(t(309)=5.94, p<0.001\); Intimacy: \(t(305)=6.81, p<0.001\); Demand–withdraw communication: \(t(307)=5.08, p<0.001\); Constructive communication: \(t(316)=3.66, p<0.001\).

T-test, Chi squared

Ex-POWs with PTSD were more likely to experience marital distress. They also scored significantly lower on all measures of relationship satisfaction compared to the no PTSD group.

Durai et al., (2011)  Social support

Cochran Armitage Trend test: Low Social Support: PTSD= 22.9; Sub PTSD= 8.6, No PTSD=2.9, non-exposed=4.2 (\(z=1.139, p<0.001\)).
Logistic Regression: Sub PTSD-Low Social Support: OR=2.5 (2.1–3.0), \(p<.05\);
PTSD-Low Social Support: OR=7.1 (5.1–9.9), \(p<.05\).

Cochran Armitage Logistic Regression

Veterans with sub-threshold or full PTSD were significantly more likely to report low social support than those with no trauma history or those exposed but with no PTSD. Full PTSD was associated with poorer social support compared to Sub PTSD.


Multiple Regression: PTSD-Social Support \(R=0.14, p<0.01\)

Multiple Regression

Regression analyses indicated that postmilitary social support was associated with PTSD.

Hyer et al., (1999)  Social support

Ns association between PTSD and Social support

Regression Analysis

Social support from family and friends was not associated with PTSD.
Social acknowledgement as mediator between severity of childhood trauma and CPTSD symptoms Path c’/b1:
- Anxious arousal: $\beta = .28$, $p < .05$, $r^2 = .08$
- Anger/Irritability: $\beta = .17$, $p < .01$, $r^2 = .12$
- Intrusive experiences: $\beta = -.27$, $p < .01$, $r^2 = .08$
- Defensive avoidance: $\beta = .21$, $p < .05$, $r^2 = .15$
- Dissociation: $\beta = .22$, $p < .05$, $r^2 = .11$
- Impaired self-reference: $\beta = .17$, $p < .01$, $r^2 = .10$

Dysfunctional disclosure as mediator between severity of childhood trauma and CPTSD symptoms Path c’/b1:
- Anxious arousal: $\beta = .24$, $p < .01$, $r^2 = .17$
- Anger/Irritability: $\beta = .17$, $p < .01$, $r^2 = .08$
- Intrusive experiences: $\beta = -.27$, $p < .01$, $r^2 = .08$
- Defensive avoidance: $\beta = .19$, $p < .05$, $r^2 = .28$
- Dissociation: $\beta = .24$, $p < .05$, $r^2 = .19$
- Impaired self-reference: $\beta = .15$, $p < .01$, $r^2 = .12$

There was evidence for mediation in each mediation model, whereby the critical path c’ became nonsignificant or the association was reduced following the insertion of one of the two mediators. Social acknowledgement partially mediated the relationship between trauma and anger/irritability, and impaired self-reference; Analogous results were obtained for dysfunctional disclosure.
Ogle et al., (2014)  
Social support  
Hierarchical regression: Social support explained 17% of symptom variance, $R^2=0.17$

Ogle et al., (2016)  
Social support  
Social support/PTSD r= -.25, p<0.001

Schnurr et al., (2000)  
Disclosure  
Prohibited disclosure: PTSD/No PTSD: OR= 4.38, p<0.001;  
Sub PTSD/ No PTSD: OR=2.42, p<0.05

Social factors  
Network size: Sub PTSD OR(CI)=1.6 (1.0–2.7) ns, PTSD OR(CI)=0.9(0.3–2.9) ns  
Emotional support: Sub PTSD OR(CI)=0.6 (0.4–1.1), PTSD OR(CI)= 1.2(0.4–4.0) ns  
Loneliness: Sub PTSD OR(CI)=3.6 (2.1–6.1), p<0.05; PTSD OR(CI)=1.9(0.6–6.1), p<0.05

van Zelst et al.,  
Social inactivity,  
Social Inactivity: PTSD symptoms OR(CI)= 1.7 0.9–3.2 ns  
Loneliness: PTSD OR (CI)= 3.2 (0.7–14.6) ns; Sub PTSD OR(CI)=3.2 (1.7–
Loneliness, (2006) 5.7), p<0.05;

PTSD symptoms OR=2.8 1.5–5, p<0.05

Regression associated with almost 3 times higher risk of both sub-threshold PTSD and PTSD symptoms.

Zhang et al., (2012) Social support Social support: PTSD/No PTSD OR ns

Bivariate Logistic Regression

The interaction between social support and PTSD was not significant.

<table>
<thead>
<tr>
<th>(2006)</th>
<th>Loneliness.</th>
<th>5.7), p&lt;0.05; Regression associated with almost 3 times higher risk of both sub-threshold PTSD and PTSD symptoms.</th>
</tr>
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<tbody>
<tr>
<td>Zhang et al., (2012)</td>
<td>Social support Social support: PTSD/No PTSD OR ns</td>
<td>Bivariate Logistic Regression The interaction between social support and PTSD was not significant.</td>
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</tbody>
</table>

Table 8: CI: Confidence Intervals; Df: Degrees of freedom; HTQ: Harvard Trauma Questionnaire; NS: Not significant; OA: Older Adults; OR: Odds Ratio; PoW: Prisoners of War; PTSD: Posttraumatic Stress Disorder; QoL: Quality of Life; Sub: Sub-threshold PTSD; T1-T3: Assessment time.
Four studies did not show an association between PTSD and social variables (Hyer, Stanger, & Boudewyns, 1999; Van Zelst et al., 2003; van Zelst et al., 2006; Zhang, Shi, Wang, & Liu, 2012). Differences in the assessment of social support as well as methodological limitations could account for these differences. In particular, sample size limitations in Van Zelst et al., (2003, 2006) may have rendered the study underpowered to yield an association. In addition, in contrast to the majority of studies (Acierno et al., 2006; Chung et al., 2004; Cook et al., 2004; Durai et al., 2011; Krammer et al., 2016; Ogle et al., 2014, 2016; O’Connor, 2010; Schnurr et al., 2000) Zhang et al., (2012) and Hyer et al., (1999) provided a narrower definition of social support. In both these studies social support was defined as exclusively coming from family and friends and may not have been indicative of support from the broader community. Finally, Engdahl et al., (1997) showed a significant, positive association between social support and PTSD symptom severity. However, the authors included the Social Reintegration scale (Laufer, Yager, Frey-Wouters, & Donnellan, 1981) as a measure of social support. This scale assesses veterans' difficulties in readjustment following homecoming and comprises of two indices: a) Feelings of alienation at homecoming and b) Belief that people and government support veterans. The authors do not specify which of the two indices were used in the analysis, thereby making it difficult to draw conclusions regarding the direction of the relationship between PTSD and social support.

In conclusion, all but four studies supported a negative association between social factors and PTSD severity. Participants with PTSD tended to rate their social life more poorly and noted decreased support and activity compared to those without PTSD. Similarly, PTSD diagnosis was associated with greater degree of social dysfunction, marital distress, relationship dissatisfaction and dysfunctional disclosure.

4. Discussion

We systematically reviewed PTSD and CPTSD studies in later life to determine how posttraumatic factors affected the severity of PTSD symptomatology. Forty-nine studies were identified. PTSD associated factors were categorised as follows: 1. Coping and Response Styles; 2. Neuropsychological factors; 3. Personality factors; 4. Physiological factors; 5.
Psychopathological factors; and 6. Social factors. The main findings are discussed in detail below, along with practice implications and recommendations for future research.

4.1. Key findings

Of the factors reviewed, coping/response, physiological and psychopathological factors displayed the most consistent associations with PTSD severity. In regard to the first factor, this review indicated that both maladaptive coping and posttraumatic cognitions were significantly associated with PTSD symptomatology, yielding findings similar to those reported in younger populations (Boals & Schuettler, 2011; Engelhard, van den Hout, & Vlaeyen, 2003; Koo, Nguyen, Gilmore, Blayney, & Kaysen, 2014). Furthermore, a consistent inverse association was observed between physical health and PTSD symptom severity. This is in line with research demonstrating that PTSD-related, biological changes in the hypothalamic-pituitary-adrenal axis and sympathetic-adrenal-medullary system functions influence the development or exacerbation of medical conditions (Gill, Vythilingam, & Page, 2008; Southwick et al., 2005; Yehuda, 2009). Immune changes in PTSD, increasing the risk for peripheral inflammation, as well as behavioural and psychological correlates of PTSD such as poor sleep or substance abuse could also account for this association (Ayaydin et al., 2016; Baker, Nievergelt, & O'Connor, 2012; Elenkov, Iezzoni, Daly, Harris, & Chrousos, 2005). In addition, review findings suggested a link between PTSD and other types of concurrent psychopathology, especially depression and anxiety. This is supported by studies arguing for similar genetic underpinnings for the three disorders (Smoller, 2015) and is consistent with research linking comorbid PTSD to increased illness burden, delayed response to treatment and a poorer prognosis (Campbell et al., 2007; Hegel et al., 2005).

Some evidence was found for relationships between neuropsychological factors and PTSD. Prospective research in younger adults suggests that structural pre-trauma vulnerability and post-trauma neurotoxicity may both account for the neurocognitive deficits observed in individuals suffering from PTSD (Sekiguchi et al., 2013). However, the relationship between PTSD and neuropsychological factors within the older adult population remains unclear. Research in this field is complicated by the wide variation in cognitive performance
independent of PTSD, due to the cognitive deficits associated with healthy aging and/or the presence of neurodegenerative diseases. For example, post-trauma cognitive deficits may be attributed to the presence of dementia/mild cognitive impairment and could explain the failure to observe differences in participants’ performance in some of the included studies (Carlson et al., 2008; Jelinek et al., 2013; Knight et al., 2017). Furthermore, it is important to note that all included studies with the exception of Qureshi et al., (2010) compared groups with small sample sizes (n<39), thereby limiting the generalisability of these findings.

Although the majority of reviewed studies demonstrated an association between PTSD and personality or social factors, these areas would benefit from further investigation. For example, even though personality variables were fairly consistently associated with PTSD, the majority of these variables was examined once, offering limited insight into the nature and underlying mechanisms of this association. In addition, the negative association between social factors and PTSD was not consistent across studies. This, combined with the heterogeneity of reviewed factors and significant differences in measurement of social support, poses further challenges when attempting to draw conclusions.

4.2. Clinical implications of key findings

4.2.1. Coping strategies and cognitive factors

Strong evidence was found for the role of maladaptive coping and posttraumatic cognitive factors in PTSD severity. Prospective research in adult trauma survivors suggests that maladaptive coping styles are present prior to the traumatic experience (Gil & Caspi, 2006). Since approximately 90% of older adults are likely to experience a traumatic event during their lifetime (Glaesmer et al., 2012; Pietrzak, Goldstein, Southwick, & Grant, 2012b), identifying maladaptive coping strategies may be beneficial in recognising those at risk of developing posttraumatic symptoms. Furthermore, adopting a preventative approach, which focuses on promoting positive coping strategies may be helpful in safeguarding older adults against the development of PTSD. PTSD interventions targeting maladaptive coping strategies could be particularly useful in facilitating recovery.
Given the association between PTSD severity and cognitive factors, interventions with a particular focus on event centrality and sense of coherence could be efficacious in the treatment of PTSD in older adults. These findings may inform the limited but growing literature on the efficacy of cognitive interventions for PTSD in later life (for a review, see Dinnen, Simiola, & Cook, 2015) and could support the development of gerontological treatment models.

4.2.2 Comorbidity considerations

Consistent evidence was found of an inverse relationship between PTSD symptom severity and individuals’ health, either mental or physical. These results are particularly concerning as it is known that the consequences of trauma can interfere with people's ability to successfully access the care they require in both physical and mental health settings (NHS Education for Scotland, 2017). Indeed, a recent systematic review showed increased barriers in health utilisation among trauma survivors (Kantor, Knefel, & Lueger-Schuster, 2017). Therefore, adaptations in health services to address barriers to health care access e.g. by reducing mental health stigma, providing information on how to access help and offering support with logistic barriers may be beneficial (Ouimette et al., 2011; Pietrzak, Johnson, Goldstein, Malley, & Southwick, 2009). In addition, it is important that service users’ health difficulties are taken into account in psychological assessment, formulation and intervention. For example, gerontological treatment models, which incorporate physical health considerations, similar to the Comprehensive Cognitive Formulation for CBT (Kishita, Laidlaw, Wuthrich, Egan, & Chellingsworth, 2016; Laidlaw & Thompson, 2008; Laidlaw, Thompson, Gallagher-Thompson, & Dick-Siskin, 2003) albeit specific to PTSD, may be particularly helpful. In regard to mental health comorbidity, the adaptation and evaluation of already existing evidence-based interventions for comorbid PTSD (e.g. Walter et al., 2018) within the older adult population would be an appropriate future step in order to offer tailored posttraumatic support.
4.2.3. Neuropsychological considerations

Review findings indicate a possible association between PTSD and neuropsychological factors in older adults. These results call for increased sensitivity to the cognitive needs of individuals with PTSD. Treatment adaptations such as repetition, a slower therapeutic pace or the provision of information in smaller chunks might enhance clinical outcomes (Brenes, Wagener, & Stanley, 2008; Fisher, Drossel, Ferguson, Cherup, & Sylvester, 2008). Clinicians working with trauma exposed older adults may also consider using a cognitive screening measure in the initial stages of therapy to help determine strengths and difficulties. Health promotion interventions aimed at reducing chronic stress may be helpful and could have a positive effect on cognition, although the magnitude of this effect remains unknown.

4.3. Factors with limited evidence base

4.3.1. Complex Posttraumatic Stress Disorder

Of the studies reviewed, only two specifically explored childhood trauma in older adults and none examined CPTSD symptoms, as described in ICD-11 (WHO, 2018). Prevalence rates of childhood abuse among adults are noted to range between 12.7% (for sexual abuse) and 36.3% (for emotional abuse) (Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2015) and these rates seem to increase with age (Office of National Statistics, 2018). CPTSD is considered a chronic condition with debilitating impact on individuals’ quality of life, relationships and everyday functioning (Palic et al., 2016; Stadtmann, Maercker, Binder, & Schnepf, 2018a, 2018b). In addition, research findings indicate more severe PTSD symptoms in older adults traumatised in childhood, compared to those exposed to adulthood trauma (Böttche et al., 2012). Thus, failure to assess CPTSD correlates in older adults constitutes a significant limitation and highlights gaps in both research and service provision.
4.3.2. Psychosocial correlates of PTSD

Despite the large number of studies included in the review, some psychosocial PTSD correlates received less attention. For example, only one study investigated the relationship between shame and PTSD in older adults, showing a significant association. The central role of shame in PTSD has been extensively documented in younger adults (Beck et al., 2011; Wright, Crawford, & Del Castillo, 2009) and has led to the development of specific interventions which deal directly with shame reduction, such as Compassion Focused Therapy (Gilbert, 2011). Self-Compassion has also been considered a useful treatment target for CPTSD in younger adults, particularly for symptoms of negative self-concept and affect dysregulation (Karatzias et al., 2019). Review findings suggest that compassion focused interventions may potentially be effective with older people experiencing posttraumatic symptoms, although these findings require further empirical confirmation.

In addition, only one study measured the interaction between PTSD and mindfulness. Contrary to research in younger adults (Kratzer et al., 2018; Martin, Bartlett, Reddy, Gonzalez, & Vujanovic, 2018), Glück et al., (2016) did not find a direct, significant association between mindfulness and PTSD. However, mindfulness had an indirect effect on PTSD via its effects on posttraumatic cognitions. These results, although preliminary, are promising and suggest that the incorporation of mindfulness techniques in PTSD interventions for older adults may indirectly influence a reduction in PTSD symptoms. Future research could seek to further explore this relationship and assess the efficacy of mindfulness-based approaches for this population.

Finally, no included studies investigated the interaction between Early Maladaptive Schemas (EMS, Young, Klosko, & Weishaar, 2003) and PTSD symptomatology in older adults. EMS have been considered a significant predictor of PTSD in younger populations, irrespective of trauma type (Karatzias, Jowett, Begley, & Deas, 2016; Tapia, 2018). A better understanding of the role of EMS in the development and maintenance of PTSD/CPTSD within older adults can inform future interventions for this population.
4.4 Review limitations and recommendations for future research

A number of limitations need to be considered when interpreting the review findings. First, the majority of included studies were cross-sectional, generating an association and not a causal relationship (Sedgwick, 2014). Second, due to the limited research on PTSD in later life, we opted to include a wide range of PTSD studies, with differences in type of trauma exposure, sampling and measurement methods, which may render cross-study comparison difficult. Differences in the definition of PTSD case status or a failure to distinguish between full and sub-threshold PTSD across studies were additional methodological considerations. Fourth, study weaknesses, such as the presence of underpowered or convenience samples, poor case/control differentiation, lack of assessment of confounding variables as well as limited data on diagnostic comorbidity are likely to have affected the internal and external validity of the included studies, thereby impacting on the review findings. Moreover, even though the factor categories were generated based on previous research (DiGangi et al., 2013), it is recognised that they represent broad clusters and may benefit from further operationalisation in order to offer more specific insights into PTSD correlates.

Despite the study limitations, the present investigation is the first to offer a systematic and comprehensive assessment of posttraumatic factors associated with PTSD severity in older adults. Through highlighting some of the domains within the existing literature, which could influence PTSD severity, this review can inform the identification, assessment and treatment of older people in the aftermath of trauma. Specifically, our findings suggest potential treatment modifications such as promoting coping strategies and therapeutically targeting physical and mental health comorbidities which may lead to the reduction of PTSD symptoms among older adults. Future gerontological research may seek to incorporate these adaptations into treatment and investigate whether they lead to alleviation of PTSD symptoms. Further, it may be helpful to examine the relative efficacy of different treatment components for PTSD in order to maximise posttraumatic support.

Research including larger cohorts and powered sample sizes may help to obtain more reliable results on PTSD correlates. Similarly, the inclusion of confounding variables could help tease out the relative contribution of different factors on posttraumatic severity. In addition, since variability in the developmental timing or subtype of traumatic exposure has been linked to
differences in PTSD severity among younger populations (Cloitre et al., 2009; Kelley, Weathers, McDevitt-Murphy, Eakin, & Flood, 2009; Sullivan, Fehon, Andres-Hyman, Lipschitz, & Grilo, 2006), it may be particularly interesting to investigate the differential effects of trauma subtypes and timing in posttraumatic symptoms among older adults (e.g., childhood versus adulthood; abuse versus neglect). Future research may also wish to explore the prevalence, correlates and burden of CPTSD in older adults in order to address the needs of this population. Future research may also seek to disambiguate the relationship between PTSD and neurocognitive deficits in later life. The association between posttraumatic psychopathology and psychosocial correlates such as shame, mindfulness or EMS in later life would also benefit from further research. Finally, this review did not address studies focusing on pre- or peri-traumatic factors due to the limited number and high heterogeneity of such studies. Therefore, studies exploring the role of pre- or peri-traumatic factors (e.g. pre-trauma psychopathology, severity of exposure, peritraumatic dissociation) in posttraumatic symptom severity in older adults may be helpful in order to gain a more comprehensive understanding of PTSD and CPTSD correlates.

5. Conclusions

This is the first systematic review to summarise the posttraumatic correlates of PTSD in older adults. While there remains research to be done on PTSD in later life, this study provides recommendations on areas where future interventions and policy decisions could focus on. This includes an emphasis on the treatment needs of individuals with comorbid PTSD (in relation to both physical and mental health), an increased consideration of the cognitive needs of older adults with PTSD as well as a heightened focus on enhancing coping within this population.
6. Journal Appendix A: References to articles included in the systematic review in accordance to author instructions.


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Chapter 2: Original Research Journal Article

Title: The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and complex posttraumatic stress disorder symptoms in older adults (>64 years)

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Hospital

Abstract

Objectives: Complex PTSD (CPTSD) has recently been included in ICD-11 and can result
from prolonged exposure to interpersonal trauma, particularly in childhood. Early
Maladaptive Schemas (EMS) have been strongly linked to the development and maintenance
of PTSD symptoms. However, the relationship between EMS and CPTSD is unknown,
especially in later life. Investigation of the psychological factors that may be associated with
CPTSD symptoms, such as EMS, is an important first step in developing effective treatments
for this new condition. The purpose of the current study was to investigate the mediating role
of EMS in the association between childhood trauma and CPTSD symptom severity in a
clinical sample of older adults (>64 years).

Methods: A cross-sectional study was undertaken with 42 individuals, currently seen for
psychological treatment within NHS Scotland Older Adult Services. Participants completed
measures of Childhood trauma, EMS and ICD-11 CPTSD. A mediation analysis was
conducted to examine whether EMS mediated the relationship between experiences of
childhood trauma and CPTSD symptom severity.

Results: It was found that EMS total score mediated the relationship between childhood
trauma and CPTSD symptom severity. Two second order schema factors (Disconnection;
Impaired Autonomy) also played a mediating role in this relationship.

Conclusions: Results provide preliminary support for the utility of interventions targeting
EMS, particularly in the domains of Disconnection and Impaired Autonomy, in order to
alleviate CPTSD symptoms. Future research is required to replicate these results within larger
samples and to examine the efficacy of schema and cognitive interventions within trauma
exposed older adults.

Keywords: Childhood trauma; schemas; CPTSD; older adults
Practitioner Points:

- EMS total score significantly mediated the relationship between childhood trauma and CPTSD symptom severity.

- In separate analyses, the relationship between childhood trauma and CPTSD symptom severity was mediated by the EMS domains Impaired Autonomy and Disconnection.

- Targeting EMS seems a promising avenue for the treatment of CPTSD symptoms in older people.

Cautions or limitations:

- This study utilised a Cross-sectional design and therefore cannot make assertions about causalitity in the observed relationships.

- Another study limitation included a relatively small sample size, which may prohibit the generalisation of our findings.

Acknowledgements: The authors would like to thank Mr Sandy McAfee, former Consultant Clinical Psychologist in NHS Lothian for his support in the initial stages of the research.
1. Introduction

Complex Posttraumatic Stress Disorder (CPTSD) has recently been included in the 11th Revision of the International Classification of Diseases (ICD-11) as a sibling condition to Posttraumatic Stress Disorder (PTSD) (World Health Organisation, 2018). In contrast to PTSD which can be triggered by a single event, CPTSD is viewed as a result of exposure to cumulative trauma, particularly in childhood (Cloitre, Garvert, Brewin, Bryant, & Maercker, 2013; Elklit, Hyland, & Shevlin, 2014; Hyland et al., 2017; Karatzias et al., 2017). CPTSD symptoms reflect self-organisation disturbances (affective dysregulation, negative self-concept and disturbances in relationships) in addition to the three PTSD symptom clusters (re-experiencing, avoidance/numbing, and hyperarousal/hypervigilance).

Lifetime population prevalence of CPTSD is estimated around 3.3% (Karatzias et al., 2018). Although this rate is lower than that typically reported for PTSD (4%), CPTSD constitutes a more common disorder among clinical samples (Karatzias et al., 2018). In addition, due to the greater diversity of symptoms, CPTSD can have a more pervasive impact on individuals’ lives and has been associated with more severe functional impairment compared to PTSD (Karatzias et al., 2017; Hyland et al., 2017). The high clinical occurrence and debilitating impact of CPTSD emphasise the need for early identification of the disorder and for the development of targeted treatments in order to improve service users’ prognosis and functioning.

In recent years, there has been a rise in publications on the presentation and correlates of posttraumatic symptoms among older adults. The need for this is highlighted by an increasing aging population (Dall et al., 2013), as well as by research arguing for the unique features of PTSD in later life, particularly in regard to symptom profiles (Goenjian et al., 1994), onset (Hiskey, Luckie, Davies, & Brewin, 2008) and severity (Parker et al., 2016). However, despite the recent rise in interest, the majority of older adult studies have focused on either middle or later life traumatisation, particularly combat exposure, natural disasters and physical illness [BLINDED]. Meanwhile, there is a dearth of research on the impact of exposure to childhood trauma and, to our knowledge, no studies have examined the factors affecting CPTSD symptom severity as per ICD 11 in later life. This constitutes a significant limitation as prevalence rates suggest that more than one third of adults have experienced
trauma in childhood (Stoltenborgh, Bakermans-Kranenburg, Alink, & van Ijzendoorn, 2015). A better understanding of the factors associated with CPTSD symptoms following early life traumatisation is paramount to adequately address the support needs of this population.

Research in younger adults has demonstrated the role of Early Maladaptive Schemas (EMS) in predicting the emergence and severity of PTSD following traumatisation (Ahmadian, Mirzaee, Omidbeygi, Holsboer-Trachsler, & Brand, 2015; Price, 2007; Tapia, 2018). EMS are defined as themes regarding oneself and one’s relationship with others, which develop during childhood, can have a long-lasting impact and interfere with how people view themselves and their interaction with others (Young, Klosko, & Weishaar, 2003). Eighteen EMS have been proposed and are subsequently categorised in four secondary schema factors: Disconnection; Impaired Autonomy; Exaggerated Standards and Impaired Limits (Hoffart, et al., 2005). Schemas within the first two domains have been more strongly associated with PTSD (Harding, Burns, & Jackson, 2012; Karatzias, Jowett, Begley, & Deas, 2016; Price, 2007). Although the relationship between EMS and PTSD has been researched in the adult population (Karatzias, et al., 2016), no studies have investigated the role of EMS in the development of CPTSD symptoms in older adults (>64).

The current study aimed to address this gap by examining whether EMS mediate the relationship between early traumatic events and CPTSD symptoms in a clinical sample of older adults. The study also sought to investigate the mediating role of the second order schema factors in this association. First, it was hypothesized that the degree of childhood trauma would exert its influence on CPTSD severity through EMS. In addition, based on previous research (Harding et al., 2012; Karatzias et al., 2016; Price, 2007) it was hypothesized that the second order schema factors of Disconnection and Impaired Autonomy would have a mediatory role in this association.

A better understanding of the factors associated with the severity of CPTSD symptoms within older adults is important when considering the assessment and early identification of traumatised individuals. Such an understanding could increase our knowledge of how to support and respond to older people who have experienced trauma. In particular, if a positive mediating relationship is established, this study could offer preliminary results on the
usefulness of cognitive or schema based interventions with older people. Furthermore, by specifying which schema domains need to be targeted in order to alleviate distress in older people with CPTSD symptoms, this study could guide the focus of future complex trauma interventions within this population. This is paramount in the development of accessible services appropriate to the needs of older people and is in line with UK policies aiming to reduce health inequalities and promote wellbeing across the lifespan (The Scottish Government, 2017).

2. Method

2.1. Participants and Procedure

Participants in this study were individuals who were seen for psychological therapy by psychologists, psychiatrists or community mental health clinicians within the National Health Service (NHS) Older Adult services. Older adults (>64) with a history of childhood trauma (physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect) were eligible for participation. In order to participate in the study, service users required to be willing to participate voluntarily and to be able to give written informed consent. Older adults with a diagnosis of Mild Cognitive Impairment or Dementia were excluded from the study. Older adults who lacked fluency in English were also excluded. For ethical reasons and to ensure individuals’ safety, this study excluded older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves as well as individuals who lacked capacity to consent to research.

The researcher contacted Older People’s Community Mental Health Teams in Scotland explaining the purpose of the study, study rationale and recruitment process. NHS staff were asked to identify potential participants from their caseloads who met inclusion and exclusion criteria. Clinicians were given information sheets to disseminate to identified service users outlining research aims, overview and procedure. Clinicians were asked to request service users’ verbal consent for the researcher to contact them in order to provide them with more information about the study. Following a period of at least 24 hours, the first author telephoned potential participants who gave their permission to be contacted. If individuals
were still interested in taking part, a meeting was arranged to obtain informed consent and to complete study measures. This study received ethical approval from the North of Scotland Research Ethics Service (Reference: 17/NS/0117).

2.2. Measures

2.2.1. Childhood Trauma Questionnaire (Bernstein & Fink, 1998): Exposure to childhood traumatic events was measured by the Childhood Trauma Questionnaire. The CTQ is a 28-item retrospective self-report questionnaire which includes five subscales: Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, and Physical Neglect. Example items include “There was always someone to take me to the doctor when I needed it” or “I believe I was emotionally abused”. In addition, the questionnaire includes a Minimization/Denial scale in order to identify the underreporting of traumatic events and to assess recall and reporting biases. Participants are asked to respond to each question on a 5-point scale ranging from “never true” (1) to “very often true” (5). The CTQ has demonstrated strong psychometric properties when used both in clinical and community settings (Bernstein, Ahluvalia, Pogge, & Handelsman, 1997; Scher, Stein, Asmundson, McCreary, & Forde, 2001), as well as when used with older adults (Inammarati et al., 2016).

2.2.2. Young Schema Questionnaire – Short Form, 3rd Edition (Young, 2014): The Young Schema Questionnaire – Short Form, 3rd Edition (YSQ-S3) was used to measure EMS. The YSQ-S3 is a self-report measure assessing 18 EMS. The items are categorized in four schema factors which replaced Young’s previous five schema domains (Young, 2003): Disconnection, Impaired Autonomy, Exaggerated Standards, and Impaired Limits (Hoffart, et al., 2005). Participants are asked to rate descriptive statements on a 6-step Likert-scale which ranges from “completely untrue of me” to “describes me perfectly”. The YSQ-S3 provides a total score and higher values are associated with a stronger presence of EMS. This measure has demonstrated good psychometric properties and has shown age neutrality when administered across the lifespan (Oei & Baranoff, 2007; Pauwels et al., 2014). Example items include “I find myself clinging to people I’m close to because I’m afraid they’ll leave me”, and “I think that if I do what I want, I’m only asking for trouble”.

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2.2.3. International Trauma Questionnaire (ITQ) (Cloitre et al., 2018): The ITQ is a 12-item self-report measure of PTSD and CPTSD severity, which assesses the following symptom areas: re-experiencing, avoidance, sense of threat, affective dysregulation, negative self-concept and disturbances in relationships. Participants are asked to select on a Likert scale how much a symptom has been bothersome in the past month, with scores ranging from 0 (not at all) to 4 (extremely). Example items include “having upsetting dreams that replay part of the experience or are clearly related to the experience”, “avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)” and “Being super-alert, watchful, or on guard”. Participants are also asked to rate how true certain statements are of them. These include “When I am upset, it takes me a long time to calm down” or “I feel like a failure”. Diagnosis of PTSD requires the endorsement of one of two symptoms from each PTSD cluster (re-experiencing, avoidance, sense of threat), while CPTSD diagnosis requires the endorsement of one of two symptoms from both PTSD and DSO clusters (affective dysregulation, negative self-concept, and disturbances in relationships). Endorsement is indicated by a score of 2 (moderately) or higher. Both diagnoses require the presence of functional impairment associated with these symptoms. The ICD-11 taxonomic structure allows either for a diagnosis of PTSD or CPTSD to be given to an individual, but not both. ITQ is the only validated measure for ICD-11 PTSD and CPTSD, and its validity has been confirmed with adult and older adult samples (Hyland et al., 2017b).

3. Analysis

Descriptive analyses were performed using the Statistical Package for Social Science (SPSS version 23.0). Means and standard deviations (SDs) were calculated for continuous variables and frequencies (%) for categorical variables. Mediation analysis (Hayes, 2013) was implemented to answer the primary research question. Hayes PROCESS macro Model 4 (Hayes, 2013) for SPSS was be used to analyse the data. As suggested by Hayes (2013) direct and indirect effects were calculated together with the constituent components of the indirect effect (i.e. the effect of early traumatic events on EMS and the effect of EMS on CPTSD symptoms).
Bootstrapped sampling distribution was used to estimate the indirect effect, the standard error and 95% confidence intervals for the population value of ‘ab’ (Preacher & Hayes, 2004). Bootstrapping does not assume normality in the distributions of the variables or the sampling distribution of the statistic and can therefore be applied to small samples with more confidence (Preacher & Hayes, 2004).

The CTQ minimising response bias was entered in the analysis as a covariate, as research has suggested a significant effect of this subscale in the CTQ’s discriminative validity (MacDonald, Thomas, MacDonald, & Sciolla, 2014; MacDonald et al., 2016). In fact, researchers have warned against using the CTQ without assessing and controlling for its effects on outcomes or dependent variables (MacDonald et al., 2016).

Sample size calculations were based upon the primary research question. Fritz & MacKinnon (2007) have published guidelines in regard to obtaining an adequate sample size for mediation analysis. The authors proposed a minimum number of participants to achieve 0.8 power depending on the magnitude of the estimated effect sizes for the ‘a’ and ‘b’ mediation pathways. Previous research (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Karatzias et al., 2016; Wright, Crawford, & Del Castillo, 2009) has indicated large effect sizes for the ‘a’ and ‘b’ pathways. Based on these findings, a sample size of 34 was deemed appropriate.

4. Results

4.1 Descriptive statistics

A total of 59 eligible patients were identified by clinicians and were given information about the study during the recruitment period. Of those, 42 agreed to participate (71%). The main reason for non-participation was service users’ fear of becoming distressed by discussing their traumatic experiences. Participant demographic and population characteristics are summarised in table 1.

CTQ trauma scores ranged from 30 to 108, with a mean of 62.2 (15.8). Trauma exposure frequencies by type of trauma can be seen in table 2. The majority of participants (N=38, 90.5%) reported having experienced some degree of emotional abuse. The most frequently
reported severe traumatic experience was emotional neglect with 57.1% of participants scoring in the ‘severe to extreme’ range of the CTQ scale. This was followed by emotional abuse (40.5%), physical abuse (33.3%), sexual abuse (26.2%) and physical neglect (21.4%). Participants reported CPTSD severity scores ranging from 4 to 44 (Mean=23.8, SD=11.7) (Table 3). Thirteen participants (30.9%) met criteria for a diagnosis of CPTSD, while three participants (7.1%) met criteria for PTSD. The most frequently endorsed PTSD symptom was from the re-experiencing of threat symptom cluster, with 76.2% of participants noting having had images or memories in which they felt that the experience is happening again in the here and now. The most commonly reported CPTSD symptom was in the affective dysregulation domain: The majority of participants (90.5%) endorsed the item ‘When I am upset, it takes me a long time to calm down’. Means and standard deviations of CPTSD symptom clusters can be seen in Table 3.

4.2 Correlations

Correlations between childhood traumatic experiences, complex trauma symptoms, proposed mediators and relevant demographic variables are shown in table 4.
**Table 1: Participant Characteristics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>M (SD) or n (%) n=42</th>
</tr>
</thead>
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<tr>
<td>Age mean (SD)</td>
<td>71.5 (4.6)</td>
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<tr>
<td>Gender %</td>
<td></td>
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<tr>
<td>Male</td>
<td>11 (26.2%)</td>
</tr>
<tr>
<td>Female</td>
<td>31 (73.8%)</td>
</tr>
<tr>
<td>Education mean (SD)</td>
<td>13 (3.6)</td>
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<tr>
<td>Relationship status</td>
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<tr>
<td>Single</td>
<td>9 (21.4%)</td>
</tr>
<tr>
<td>Married</td>
<td>17 (40.5%)</td>
</tr>
<tr>
<td>Divorced</td>
<td>10 (23.8%)</td>
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<tr>
<td>Widowed</td>
<td>6 (14.3%)</td>
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<tr>
<td>Employment status</td>
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<tr>
<td>Employed</td>
<td>4 (9.5%)</td>
</tr>
<tr>
<td>Retired</td>
<td>38 (90.5%)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White British</td>
<td>22 (52.4%)</td>
</tr>
<tr>
<td>White Scottish</td>
<td>19 (45.2%)</td>
</tr>
<tr>
<td>White Other</td>
<td>1 (2.4%)</td>
</tr>
<tr>
<td>Income</td>
<td></td>
</tr>
<tr>
<td>Less than 14,999</td>
<td>17 (40.5%)</td>
</tr>
<tr>
<td>15,000 to 19,999</td>
<td>8 (19.0%)</td>
</tr>
<tr>
<td>20,000 to 29,000</td>
<td>10 (23.8%)</td>
</tr>
<tr>
<td>30,000 to 39,000</td>
<td>3 (7.1%)</td>
</tr>
<tr>
<td>50,000 to 59,000</td>
<td>2 (4.8%)</td>
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<tr>
<td>60,000 to 69,000</td>
<td>2 (4.8%)</td>
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<tr>
<td>Medical conditions</td>
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<tr>
<td>Depression</td>
<td>13 (30.9%)</td>
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<tr>
<td>Arthritis</td>
<td>11 (26.1%)</td>
</tr>
<tr>
<td>COPD</td>
<td>10 (23.8%)</td>
</tr>
<tr>
<td>Cancer</td>
<td>6 (14.2%)</td>
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</table>
Table 2: Trauma Characteristics

<table>
<thead>
<tr>
<th>Trauma frequencies</th>
<th>N (%)</th>
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</thead>
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<td>Emotional abuse</td>
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<tr>
<td>Yes</td>
<td>38 (90.5)</td>
</tr>
<tr>
<td>No</td>
<td>4 (9.5)</td>
</tr>
<tr>
<td>Physical abuse</td>
<td></td>
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<tr>
<td>Yes</td>
<td>26 (61.9)</td>
</tr>
<tr>
<td>No</td>
<td>16 (38.1)</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>24 (57.1)</td>
</tr>
<tr>
<td>No</td>
<td>18 (42.9)</td>
</tr>
<tr>
<td>Emotional neglect</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37 (78.1)</td>
</tr>
<tr>
<td>No</td>
<td>5 (11.9)</td>
</tr>
<tr>
<td>Physical neglect</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>25 (59.5)</td>
</tr>
<tr>
<td>No</td>
<td>17 (40.5)</td>
</tr>
<tr>
<td>Minimisation/Denial</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>32 (76.2)</td>
</tr>
<tr>
<td>1</td>
<td>9 (21.4)</td>
</tr>
<tr>
<td>3</td>
<td>1 (2.4)</td>
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</table>

Table 3: CPTSD Symptom Clusters

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<th>CPTSD symptoms</th>
<th>Range</th>
<th>Mean (SD)</th>
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<td>Re-experiencing</td>
<td>0-7</td>
<td>2.67 (2.40)</td>
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<tr>
<td>Avoidance</td>
<td>0-8</td>
<td>3.81 (2.80)</td>
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<tr>
<td>Sense of threat</td>
<td>0-8</td>
<td>4.62 (2.37)</td>
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<tr>
<td>Affective Dysregulation</td>
<td>1-8</td>
<td>4.74 (2.10)</td>
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<tr>
<td>Negative Self-Concept</td>
<td>0-8</td>
<td>3.79 (3.19)</td>
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<tr>
<td>Disturbances in Relationships</td>
<td>0-8</td>
<td>4.21 (2.67)</td>
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<tr>
<td>PTSD</td>
<td>1-23</td>
<td>11.10 (6.00)</td>
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<tr>
<td>DSO</td>
<td>2-24</td>
<td>12.74 (6.98)</td>
</tr>
<tr>
<td>CPTSD Total score</td>
<td>4-44</td>
<td>23.83 (11.78)</td>
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Table 4. Bivariate Correlations between Demographic Characteristics and Study Variables.

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<th>5</th>
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<th>7</th>
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<td>-.098</td>
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<td>.940**</td>
<td>.702**</td>
<td>.627**</td>
<td>.784**</td>
<td>.247</td>
<td>.190</td>
<td>.336*</td>
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<td>.251</td>
<td>.352*</td>
<td>.212</td>
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<td>.407**</td>
<td>.388*</td>
<td>.785**</td>
<td>.246</td>
<td>.175</td>
<td>.314*</td>
<td>.014</td>
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<td>.166</td>
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<td>.565**</td>
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CPTSD: Complex Posttraumatic Stress Disorder Severity; EA: Emotional Abuse; EN: Emotional Neglect; PA: Physical Abuse; PN: Physical Neglect; SA: Sexual Abuse; CTQ TS: Childhood Trauma Questionnaire Total Score; YSQ TS: Young Schema Questionnaire Short Form Total Score; *p<.05, **p<.001.
4.3 Mediation Analyses

First, simple mediation analysis was conducted to examine any mediating effects of EMS on the relationship between childhood trauma and CPTSD severity (Figure 1). Results indicated that after controlling for minimisation/denial of childhood trauma, EMS total score significantly mediated the relationship between experiences of childhood trauma and CPTSD severity ($\beta=.39$; BootSE=.15, BootLLCI=.08, BootULCI=0.67). Childhood trauma significantly predicted EMS total score (B=.6, p=.001), which in turn significantly predicted CPTSD symptom severity (B=.5, p=.001). The mediation model accounted for 65% of the amount of variance in CPTSD severity ($R^2 = .65$; $F(3,38)=24.02$; p=.000). In order to estimate the magnitude of the indirect effect, the $k^2$ co-efficient was calculated based on Preacher and Kelly’s (2011) guidelines, suggesting a large effect size ($k^2= 0.48$).

Three additional, exploratory mediation analyses were conducted to examine whether specific second order schemas (Disconnection; Impaired Autonomy; Exaggerated standards) mediated the relationship between childhood trauma and CPTSD severity. Impaired Limits was not entered into the analysis due to the absence of an association in our Bivariate analysis. Of the three second order schema domains, only the first two mediated this relationship and are presented below (Figures 2 and 3). The indirect effect for the remaining mediation model (Exaggerated Standards) was not significant (Supplementary figure 1).
The second mediation model explored the pathway from childhood trauma to CPTSD severity through Disconnection (Figure 2). This model explained 67% of the variance in CPTSD scores (F(3,38)=26.16, p=.000) with a significant indirect effect (β=.37, BootSE=.14, BootLLCI=.09; Boot ULCI=.63). Similarly, to the first mediation model, k² (Preacher & Kelley, 2011) indicated a large effect size (k²=0.46).

Figure 2: Second mediation model and associated p-values (* p < 0.05, ** p < 0.01, *** p < 0.001) of the pathway between childhood trauma, Disconnection and CPTSD symptom severity. Covariates: Minimisation/Denial scale. c’ = direct effects of independent variable on dependent variable.

To test the effect of Impaired Autonomy as a mediator in the relationship between childhood trauma and CPTSD symptom severity, a third simple mediation analysis was conducted. Findings indicated significant relationships for both a and b pathways, as well as for the indirect effect ab (β=.32, BootSE=.11, BootLLCI=.07, Boot ULCI=.52). This model accounted for 60% of the variance in CPTSD scores. k² indicated the presence of a large mediating effect (k² = 0.38).

Figure 3: Mediation model and associated p-values (* p < 0.05, ** p < 0.01, *** p < 0.001) of the pathway between childhood trauma, Impaired Autonomy and CPTSD symptom severity. Covariates: Minimisation/Denial scale. c’ = direct effects of independent variable on dependent variable.
5. Discussion

The aim of the current study was to examine the relationship between childhood trauma, Early Maladaptive Schemas (EMS) and CPTSD severity within an older adult clinical sample. In line with our hypotheses, our study found that EMS mediated the relationship between childhood trauma and CPTSD. This effect persisted when we separately examined the mediatory role of the second order schema domains of Disconnection and Impaired Autonomy.

Our results provide preliminary support for the Schema Therapy model (Young, 2003), specifically in regard to its principle that EMS develop in response to adverse childhood experiences. In our study, participants who reported greater degree of traumatisation in childhood were more likely to display elevated levels of EMS. This is not surprising given that early experiences shape expectations regarding the degree of support from one’s environment, and can elicit beliefs around the reliability, predictability or emotional availability of others (Pynoos, Steinberg, & Wraith, 1995). Adverse childhood experiences such as physical abuse, physical neglect and sexual abuse, can disrupt this process and have been shown to have a potentially detrimental impact on how individuals conceptualise themselves and others around them (Estévez, Jauregui, Ozerinjauregi, & Herrero-Fernández, 2017; Roemmele & Messman-Moore, 2011). Consistent with previous research (Rezaei, Ghazanfari, & rezaee, 2016), our study linked trauma experiences to schemas specifically within the Disconnection and Impaired Autonomy domains. Disconnection schemas include beliefs around others being emotionally unresponsive, hurtful, or manipulative. Participants with elevated Disconnection schemas may see themselves as inadequate, defective and socially isolated. Impaired Autonomy includes schemas relating to abandonment, dependence and vulnerability to harm. People with Impaired Autonomy schemas may have difficulties achieving their goals, separating from others and are more likely to relate to others in a subjugative manner. Such relational patterns are not uncommon among trauma survivors, and can be adaptive, depending on the context (Creech, Benzer, Liebsack, Proctor, & Taft, 2013). For example, avoidance oriented schemas (e.g. social isolation, subjugation) may be protective in the short term, as they can allow trauma survivors to prevent re-traumatisation and cope with an unpredictable or stressful environment (Thomson & Jaque, 2019).
Perhaps, it may feel counterintuitive that the link between EMS and child adversity remained as strong in later life, as that reported in adult or child research (Lumley & Harkness, 2007; Wright, Crawford, & Del Castillo, 2009), especially when taking into account gerontological findings on the successful processing of past experiences among older adults (Neupert, Almeida, & Charles, 2007). A possible explanation for this finding lies in the pervasiveness of EMS: EMS are thought to significantly interfere with the completion of a range of developmental tasks, which may lead to a continuation of negative experiences across the lifespan (Gay, Harding, Jackson, Burns, & Baker, 2013). Such experiences can provide little opportunity to challenge established maladaptive cognitions and can therefore enhance schema rigidity (Atmaca & Gençöz, 2016; Gay et al., 2013; van Genderen et al., 2012). In that sense it is not surprising that, within our sample, EMS were associated with early adverse experiences despite the passage of time.

Furthermore, results from our study supported the relationship between EMS and CPTSD symptoms, by showing that higher levels of EMS (total score) were associated with increased CPTSD severity. Exploratory analyses also demonstrated that the association between childhood trauma and CPTSD severity was mediated by schemas within the Impaired Autonomy and Disconnection domains. These findings are consistent with cognitive models of PTSD, which highlight the role of cognitions in the development and maintenance of posttraumatic symptoms (Ehlers & Clark, 2000; Foa et al., 1999). Our results are also in line with existing research and guidelines on the treatment of CPTSD, which emphasise the importance of challenging unhelpful appraisals in order to promote a positive sense of self and healthier relationships with others (Cloitre et al., 2011; Maercker, Brewin, Bryant, Cloitre, Reed, et al., 2013). Finally, our results are consistent with previous research on the specific contribution of Disconnection and Impaired Autonomy domains to psychopathology following interpersonal trauma (Karatzias et al., 2016).

These findings add to existing research on the link between EMS and psychopathology by showing that EMS constitute a potent vulnerability factor for complex posttraumatic symptoms. These results hold significant implications for the identification of trauma exposed individuals in need of support as well for CPTSD prevention and treatment.
Considering these outcomes, the inclusion of routine EMS assessment in clinical practice, may be particularly helpful in order to identify trauma exposed service users at risk of developing CPTSD. Similarly, a preventative approach which includes the promotion of positive reappraisal following childhood traumatisation, may be beneficial in safeguarding individuals across the lifespan against the development of posttraumatic symptoms. More importantly, our results provide preliminary, empirical support for the utility of cognitive-behavioural interventions among traumatised older adults. Specifically, our findings suggest that Schema therapy, with a particular focus on EMS within the Disconnection and Impaired Autonomy domains, may be a useful treatment in order to modify existing core beliefs and reduce CPTSD symptoms within this population. These results can inform the very limited research on the efficacy of Schema therapy in later life (Kindynis, Burlacu, Louville, & Limosin, 2013; Videler, Rossi, Schoevaars, Van der Feltz-Cornelis, & Van Alphen, 2014).

5.1 Strengths and Limitations

A number of limitations need to be considered when interpreting the above research findings. First, our study utilised a Cross-sectional design, therefore we cannot make assertions about causality in the observed relationships. Prospective, longitudinal studies are required to examine the specific roles that childhood trauma and EMS may play in the development and maintenance of CPTSD symptoms. Second, our study included a relatively small sample size, which increases the risk for Type I and Type II errors and, as such, may prohibit the replicability and generalisation of the above findings. A further limitation has to do with an inherent methodological issue in trauma research: As avoidance is a core symptom of posttraumatic symptomatology, this study may have precluded older people suffering from more severe CPTSD from participating, thereby leading to a biased sample. In addition, the majority of our sample comprised of female participants which may further limit the generalisability of findings to the wider trauma population. ‘Oldest old’ (aged 80+) participants were also underrepresented in our sample. Finally, due to sample size limitations our study did not explore potentially confounding variables, such as adult traumatic exposure, health difficulties and coping mechanisms within our sample.

Notwithstanding these limitations, this is the first study to examine the relationship between EMS and CPTSD within an older adult, clinical sample and provides novel evidence for the
role of EMS in CPTSD symptom severity. This study can further our understanding of maladaptive and enduring cognitive schemas in older adults with childhood traumatic experiences and attempts to address a significant gap in research (Videler, van Royen & van Alphen, 2012). Further strengths of this study include the robustness and completeness of collected information as the first author supported participants in filling out the study questionnaires. Since our study included a clinical sample receiving support from NHS services, our results may be particularly relevant for clinicians working with service users with complex and enduring mental health difficulties.

Future work should focus on the exploration of the causal relationships between childhood trauma, EMS and CPTSD utilising longitudinal or prospective designs. The inclusion of larger sample sizes will be helpful in exploring the relative contribution of each schema domain in CPTSD severity. In addition, given that individuals who have suffered childhood trauma are more likely to be subsequently exposed to traumatic events in adulthood and to develop posttraumatic symptoms (Classen, Palesh, & Aggarwal, 2005), studies controlling for adult or later life traumatisation would be particularly interesting in order to better understand the relative contribution of each trauma type in the development of CPTSD in this population. Further, studies addressing confounding factors affecting posttraumatic symptom severity specifically in regard to the older adult population, such as mental and physical health difficulties, maladaptive coping strategies and neuropsychological factors [BLINDED] may also be helpful in further disentangling the relationship between trauma, EMS and CPTSD.

6. Conclusions

The results of the present study suggest that early maladaptive schemas mediate the relationship between childhood traumatic experiences and CPTSD. Disconnection and Impaired Autonomy domains may play a particularly important role in CPTSD symptom severity. These findings provide support for the theoretical underpinnings of the Schema
Therapy model and suggest the potential utility of cognitive interventions in reducing CPTSD severity in older people.

7. References


Psychological Sciences and Social Sciences, 62(4), P216-P225.  

doi:10.1080/00049530601148397

doi:10.1017/s1041610215001210


doi:10.3758/BF03206553

doi:10.1037/a0022658


doi:https://doi.org/10.1016/j.psychres.2016.10.037


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[BLINDED]


Supplementary Figure 1: Fourth mediation model and associated p-values (* p < 0.05, ** p < 0.01, ***p<0.001) of the pathway between childhood trauma, Exaggerated Standards and CPTSD symptom severity. Covariates: Minimisation/Denial scale. c’ = direct effects of independent variable on dependent variable.
Chapter 3: Thesis portfolio appendices
Appendix A. Empirical Research: Author Guidelines for the British Journal of Clinical Psychology

Author Guidelines

The British Journal of Clinical Psychology publishes original contributions to scientific knowledge in clinical psychology and [Registered Reports](#). This includes descriptive comparisons, as well as studies of the assessment, aetiology and treatment of people with a wide range of psychological problems in all age groups and settings. The level of analysis of studies ranges from biological influences on individual behaviour through to studies of psychological interventions and treatments on individuals, dyads, families and groups, to investigations of the relationships between explicitly social and psychological levels of analysis.

All papers published in The British Journal of Clinical Psychology are eligible for Panel A: Psychology, Psychiatry and Neuroscience in the Research Excellence Framework (REF).

The following types of paper are invited:

- Papers reporting original empirical investigations
- Theoretical papers, provided that these are sufficiently related to the empirical data
- Review articles which need not be exhaustive but which should give an interpretation of the state of the research in a given field and, where appropriate, identify its clinical implications
- Brief reports and comments

1. Circulation

The circulation of the Journal is worldwide. Papers are invited and encouraged from authors throughout the world.

2. Length

The word limit for papers submitted for consideration to BJCP is 5000 words and any papers that are over this word limit will be returned to the authors. The word limit does not include the abstract, reference list, figures, or tables. Appendices however are included in the word limit. The Editors retain discretion to publish papers beyond this length in cases where the clear and concise expression of the scientific content requires greater length. In such a case, the authors should contact the Editors before submission of the paper.

3. Submission and reviewing

All manuscripts must be submitted via Editorial Manager. The Journal operates a policy of anonymous (double blind) peer review. We also operate a triage process in which submissions that are out of scope or otherwise inappropriate will be rejected by the editors without external peer review to avoid unnecessary delays. Before submitting, please read the terms and conditions of submission and the declaration of competing interests. You may also like to use the Submission Checklist to help you prepare your paper.

By submitting a manuscript to or reviewing for this publication, your name, email address, and affiliation, and other contact details the publication might require, will be used for the regular operations of the publication, including, when necessary, sharing with the publisher (Wiley) and partners for production and publication. The publication and the publisher recognize the importance of protecting the personal information collected from users in the operation of these services, and have practices in place to ensure that steps are taken to maintain the security,
4. Manuscript requirements

• Contributions must be typed in double spacing with wide margins. All sheets must be numbered.

• Manuscripts should be preceded by a title page which includes a full list of authors and their affiliations, as well as the corresponding author's contact details. You may like to use this template. When entering the author names into Editorial Manager, the corresponding author will be asked to provide a CRediT contributor role to classify the role that each author played in creating the manuscript. Please see the Project CRediT website for a list of roles.

• The main document must be anonymous. Please do not mention the authors’ names or affiliations (including in the Method section) and refer to any previous work in the third person.

• Tables should be typed in double spacing, each on a separate page with a self-explanatory title. Tables should be comprehensible without reference to the text. They should be placed at the end of the manuscript but they must be mentioned in the text.

• Figures can be included at the end of the document or attached as separate files, carefully labelled in initial capital/lower case lettering with symbols in a form consistent with text use. Unnecessary background patterns, lines and shading should be avoided. Captions should be listed on a separate sheet. The resolution of digital images must be at least 300 dpi. All figures must be mentioned in the text.

• All papers must include a structured abstract of up to 250 words under the headings: Objectives, Methods, Results, Conclusions. Articles which report original scientific research should also include a heading 'Design' before 'Methods'. The 'Methods' section for systematic reviews and theoretical papers should include, as a minimum, a description of the methods the author(s) used to access the literature they drew upon. That is, the abstract should summarize the databases that were consulted and the search terms that were used.

• All Articles must include Practitioner Points – these are 2–4 bullet points to detail the positive clinical implications of the work, with a further 2–4 bullet points outlining cautions or limitations of the study. They should be placed below the abstract, with the heading ‘Practitioner Points’.

• For reference citations, please use APA style. Particular care should be taken to ensure that references are accurate and complete. Give all journal titles in full and provide DOI numbers where possible for journal articles.

• SI units must be used for all measurements, rounded off to practical values if appropriate, with the imperial equivalent in parentheses.

• In normal circumstances, effect size should be incorporated.

• Authors are requested to avoid the use of sexist language.

• Authors are responsible for acquiring written permission to publish lengthy quotations, illustrations, etc. for which they do not own copyright. For guidelines on editorial style, please consult the APA Publication Manual published by the American Psychological Association.

If you need more information about submitting your manuscript for publication, please email Vicki Pang, Editorial Assistant (bjc@wiley.com) or phone +44 (0) 1243 770 410.

5. Brief reports and comments

These allow publication of research studies and theoretical, critical or review comments with an essential contribution to make. They should be limited to 2000 words, including references. The abstract should not exceed 120 words and should be structured under these headings:
Objective, Method, Results, Conclusions. There should be no more than one table or figure, which should only be included if it conveys information more efficiently than the text. Title, author name and address are not included in the word limit.

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Further information about the process of peer review and production can be found in this document: What happens to my paper? Appeals are handled according to the procedure recommended by COPE.
Appendix B: Empirical Research: Confirmation of ethical approval

North of Scotland Research Ethics Committee (1)
Summerfield House
2 Eday Road
Aberdeen
AB15 6RE
Telephone: 01224 558458
Facsimile: 01224 558009
Email: nosres@nhs.net

22 February 2018

Ms Eleni Vasilopoulou
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EDINBURGH
EH8 9AG

Dear Ms Vasilopoulou

Study title: The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years), A mediation analysis

REC reference: 17/NS/0117
IRAS project ID: 232957

Thank you for your letter of 18 December 2017, responding to the Committee's request for further information on the above research and e-submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact hra.studyregistration@nhs.net outlining the reasons for your request.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

1
Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).


Where a NHS organisation’s role in the study is limited to identifying and referring potential participants to research sites (“participant identification centre”), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publicly accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).
### Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

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<th>Version</th>
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Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document “After ethical review – guidance for researchers” gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:
http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

17/NS/0117 Please quote this number on all correspondence

With the Committee’s best wishes for the success of this project.
Yours sincerely

[Signature]

Professor Nigel Webster
Chair

Enclosures: “After ethical review – guidance for researchers’ SL-AR2

Copy to: Ms Charlotte Smith
Miss Melissa Taylor, NHS Lothian Research & Development Office
15 June 2018

Ms Eleni Vasilopoulos
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EH8 9AG

Dear Ms Vasilopoulos

Study title: The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (&gt;64 years). A mediation analysis

REC reference: 17/NS/0117
Amendment number: 1 (Study Ref) AM01 (REC Ref)
Amendment date: 03 June 2018
IRAS project ID: 232957

Approval was sought for the MoCA cut-off score to be reduced from 26 to 21.

The above amendment was reviewed by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

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<td>03 June 2018</td>
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<td>v3</td>
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<td>GP Template MoCA scores - tracked changes</td>
<td>v3</td>
<td>03 June 2018</td>
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</table>
Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

Working with NHS Care Organisations

Sponsors should ensure that they notify the R&D office for the relevant NHS care organisation of this amendment in line with the terms detailed in the categorisation email issued by the lead nation for the study.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our Research Ethics Committee members' training days – see details at http://www.hra.nhs.uk/hra-training/

Please quote this number on all correspondence

Yours sincerely

[Signature]

Professor Nigel Webster
Chair

Enclosures: List of names and professions of members who took part in the review

Copy to: Miss Melissa Taylor, NHS Lothian Research & Development Office
Appendix D: Empirical Research: Confirmation of ethical approval, Amendment 2

North of Scotland Research Ethics Service
Summerfield House
2 Eday Road
Aberdeen
AB15 8RE

Telephone: 01224 556458
Facsimile: 01224 558659
Email: nosres@rhee.net

4 September 2018

Ms Eleni Vasiopoulou
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
EDINBURGH
EH8 9AG

Dear Ms Vasiopoulou

Study title: The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis

REC reference: 17/NS0117
Amendment number: 2
Amendment date: 30 August 2018
IRAS project ID: 222957

The above amendment was reviewed by the Sub-Committee in correspondence.

Ethical opinion

The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents

The documents reviewed and approved at the meeting were:

<table>
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<tr>
<th>Document</th>
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<tr>
<td>GP/consultant information sheets or letters: Clinician Information Sheet</td>
<td>4</td>
<td>30 August 2018</td>
</tr>
<tr>
<td>GP/consultant information sheets or letters: GP Template - Research Participation</td>
<td>3</td>
<td>26 August 2018</td>
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<td>2</td>
<td>30 August 2018</td>
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<td>Participant Information Sheet (PIS)</td>
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<tr>
<td>Summary, synopsis or diagram (flowchart) of protocol in non-technical language</td>
<td>5</td>
<td>30 August 2018</td>
</tr>
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</table>
Membership of the Committee

The members of the Committee who took part in the review are listed on the attached sheet.

Working with NHS Care Organisations

Sponsors should ensure that they notify the R&D office for the relevant NHS care organisation of this amendment in line with the terms detailed in the categorisation email issued by the lead nation for the study.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

We are pleased to welcome researchers and R & D staff at our Research Ethics Committee members’ training days – see details at http://www.hra.nhs.uk/hra-training/

| 17/NS/0117: | Please quote this number on all correspondence |

Yours sincerely

[Signature]

Professor Nigel Webster
Chair

Enclosures: List of names and professions of members who took part in the review

Copy to: Miss Melissa Taylor, NHS Lothian Research & Development Office

Appendix E: Confirmation of local approval (most recent amendment): NHS Lothian
Dear Ms Vasilopoulou

REC No: 17/NS/0117
R&D Project ID No: 20180005
Amendment: Substantial amendment No 2 dated 30 August 2018
Title of Research: The relationship between childhood traumatic events, early maladaptive schemas and comorbid post-traumatic stress disorder symptoms among older adults (>64 years). A mediation analysis

I am writing in reply to recent correspondence in relation to an amendment(s) to the above project and the subsequent updated documents as follows:

- Flowchart Version 5, dated 30 August 2018
- GP Lottery Version 3, dated 26 August 2018
- Participant Information Sheet (Clinician) Version 4, dated 30 August 2018
- Participant Information Sheet Version 4, dated 26 August 2018
- Protocol Version 5, dated 30 August 2018

We have now assessed any consequential changes and can confirm that NHS Lothian management approval is extended to cover the specific changes intimated.

Yours sincerely,

Mr Kenneth Scott
NHS Lothian Generic Review Manager
Appendix F: Confirmation of local approval (most recent amendment): NHS Fife

Dear Ms Vasilopoulou,

Project Title: The relationship between childhood traumatic events, early maladaptive schemas and complex post-traumatic stress disorder symptoms among older adults (≥64 years). A mediation analysis

Amendment No 2 dated 30 August 2018

Thank you for submitting a copy of the following documents in relation to the above study currently being conducted within NHS Fife:

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<td>Protocol</td>
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<td>REC favourable opinion letter for amendment</td>
<td></td>
<td>4 September 2018</td>
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</table>

Following review, NHS Fife has decided that they can accommodate this amendment. The amendment may therefore be immediately implemented at this site under the existing NHS permission, subject to resource/capacity. Please note that you may only implement changes that were described in the amendment documentation detailed above.

Yours sincerely,

DR FRANCES ELLIOT
Medical Director
NHS Fife

Cc: Aileen Yell, R&D Research Coordinator, NHS Fife, Queen Margaret Hospital, Dunfermline
Appendix G: Confirmation of local approval (most recent amendment): NHS Forth Valley

Mr. Eleftherios Vasilopoulos
School of Health in Social Science
The University of Edinburgh Medical School
Teviot Place
Edinburgh
EH9 9AG

NHS Forth Valley
Cathkin House
Castle Business Park
Pik 13
Telephone: 0345

Date: 24 October 2018

Dear Mr. Vasilopoulos,

Study title: The relationship between childhood traumatic events, early maladaptive schema and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis

REC reference: 17/NS/0117
Amendment number: 2
Amendment date: 30 August 2018

Further to R&D management approval of this study on 14 March 2018, I am writing to confirm that NHS Forth Valley will accept the Amendment(s) detailed above as given a favourable opinion by the North of Scotland Research Ethics Committee on 4 September 2018.

Yours sincerely,

[Signature]

MR. ANDREW MURRAY
Medical Director

CC: Andreas.ryan@ed.ac.uk

List of documents approved

<table>
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Appendix H: Confirmation of local approval (most recent amendment): NHS Lanarkshire

NHS Lanarkshire R&D Amendment Approval: Childhood traumatic events, schemas and complex trauma symptoms- V2 (L18019)

Ms Eleni Vasilopoulou  
Royal Edinburgh Hospital  
NHS Lothian  
Psychology Department  
Mackinnon House  
Edinburgh  
EH10 0DF  
evelin.vasilopoulou@nhso alcanç.nhs.uk

Dear Ms Vasilopoulou

Childhood traumatic events, schemas and complex trauma symptoms- V2  
Full title: The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years). A mediation analysis

Project ID: L18019  
IRAS No: 222067  
NRS ID: NRS18/232067

Investigator  
Dr Susan Ross  
NHS Lanarkshire site  
NHS Lanarkshire

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<td>04/09/2018</td>
<td>01/10/2019</td>
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I am writing to you as Chief Investigator of the above study in reference to the above listed Amendment(s).

I confirm that your original R&D Management Approval has not been affected by this Amendment, and it can therefore be implemented within NHS Lanarkshire as detailed above, subject to all regulatory approvals. NHS Lanarkshire reserves the right to revoke Management Approval should any unfavourable opinions be received.

I note that it is the responsibility of the Principal Investigator(s) to carry out any changes to be made to the project as a result.

Any documents approved are listed in Table 1, overleaf.

PLEASE NOTE: It is the responsibility of the Principal Investigator to inform the R&D Department of any significant findings identified as a result of a Monitoring Visit.

L18019_SA02_30.08.18_CaTA_ManagementApproval

141
I trust these conditions are acceptable to you.

Raymond Hamill, Senior R&D Manager, NHS Lanarkshire

c.e.

<table>
<thead>
<tr>
<th>NAME</th>
<th>ROLE</th>
<th>EMAIL</th>
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<tbody>
<tr>
<td>Derek Esson</td>
<td>Trial Nurse</td>
<td><a href="mailto:Derek.Esson@lanarkshire.scot.nhs.uk">Derek.Esson@lanarkshire.scot.nhs.uk</a></td>
</tr>
<tr>
<td>Dr Susan Ross</td>
<td>PI for N-IQ Lanarkshire</td>
<td><a href="mailto:Susan.Ross@nhs.net">Susan.Ross@nhs.net</a></td>
</tr>
<tr>
<td>Ma Chardell Smith</td>
<td>Sponsor contact</td>
<td><a href="mailto:charlott.smith@nhs.net">charlott.smith@nhs.net</a></td>
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Appendix I: Empirical Research documents: Study protocol (latest version: 30.08.18)

**Study Protocol:** The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

**Protocol Author:** Eleni Vasilopoulou

**List of Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tr>
<td>CBT</td>
<td>Cognitive Behavioural Therapy</td>
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<tr>
<td>CTQ</td>
<td>The Childhood Trauma Questionnaire</td>
</tr>
<tr>
<td>CPTSD</td>
<td>Complex Post Traumatic Stress Disorder</td>
</tr>
<tr>
<td>EMS</td>
<td>Early Maladaptive Schema</td>
</tr>
<tr>
<td>ICD-11</td>
<td>11th Revision of the International Classification of Diseases</td>
</tr>
<tr>
<td>MHAS</td>
<td>Mental Health Assessment Service</td>
</tr>
<tr>
<td>NHS</td>
<td>National Health Service</td>
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<td>OA</td>
<td>Older Adults</td>
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<tr>
<td>PTSD</td>
<td>Post Traumatic Stress Disorder</td>
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**Background**

**Complex Post-traumatic symptoms in Older Adults**

Complex Posttraumatic Stress Disorder (CPTSD) has been proposed for inclusion in the 11th Revision of the International Classification of Diseases (ICD-11) as a sibling condition to Posttraumatic Stress Disorder (PTSD) (Maercker et al., 2013). In contrast to PTSD which can be triggered by a single event, CPTSD is viewed as a result of exposure to cumulative trauma, particularly in childhood. In addition to PTSD symptoms (re-experiencing,
avoidance/numbing, and hyperarousal/hypervigilance), CPTSD also includes symptom clusters that highlight self-organisation disturbances (affective dysregulation, negative self-concept and disturbances in relationships) (Karatzias et al., 2017).

The conceptualisation of PTSD and CPTSD, as distinct symptom entities, related to the nature of the trauma exposure, has been supported by a number of studies (Cloitre et al., 2013; Cloitre et al., 2014; Elklit et al., 2014; Hyland et al., 2017; Karatzias et al., 2017; Knefel et al., 2015; Murphy et al., 2016; Perkonigg et al., 2016). Results have indicated that the symptoms of adults who have experienced trauma form classes consistent with the diagnostic criteria of PTSD and CPTSD as per ICD-11. Specifically, findings have revealed (a) a CPTSD class characterised both by PTSD symptoms and disturbances in the three self-organization domains (b) a PTSD class characterised by elevated PTSD symptoms but low scores on the self-organisation domains. In addition, findings have shown a stronger association between early cumulative trauma and complex PTSD symptomatology while single-event trauma was more strongly associated with PTSD (Cloitre et al., 2013; Elklit et al., 2014; Hyland et al., 2017; Karatzias et al., 2017). CPTSD was also associated with more severe functional impairment when compared to PTSD (Cloitre et al., 2013; Elklit et al., 2014; Karatzias et al., 2017; Perkonigg et al., 2016).

Unfortunately, there is a dearth of research regarding how complex post-traumatic symptoms manifest themselves in later life. Previous research on PTSD suggests that older adults who have experienced trauma may present differently to other age groups due to the biological, psychological and social changes that are associated with aging. Specifically, a proposed decrease in physical resilience as individuals age, may compromise older adults’ ability to manage trauma-related memories and feelings (Op den Velde et al., 1996). Health difficulties such as cancer, stroke, delirium, or falls, more strongly associated with the older adult population, have been found to trigger or exacerbate PTSD symptoms (Jayasinghe et al., 2014; Moye & Rouse, 2014). In addition, PTSD has been associated with structural and functional changes in brain regions, such as decreased hippocampal gray matter (Gianaros et al., 2007). It is possible that cognitive decline observed in healthy aging may aggravate some of the cognitive deficits associated with chronic stress exposure, leading to poorer functioning and more severe trauma symptomatology among older adults (Cook & Simiola, 2017; Solomon et al., 2009; van Zelst et al., 2006).

Furthermore, societal implications such as a historical lack of knowledge regarding post-traumatic stress among older adults or the misattribution of distress-related symptoms to physical conditions may also impose some differences in how older adults cope with early traumatic events (Averill & Beck, 2000). Indeed, it has been suggested that older adults may not recognise the potential negative effects of trauma and may fail to disclose those to healthcare providers. This could result in older adults having limited access to appropriate support (Cook & Simiola, 2017).

On the other hand, social and emotional processes of aging may positively affect adaptation to trauma (Charles & Carstensen, 2010). For example, according to the theory of socio-emotional selectivity older adults tend to experience higher degree of satisfaction with their social networks, compared to other age groups (Carstensen et al., 2003; Carstensen et al.,
Perceived social support has been identified as a significant protective factor in the development and maintenance of PTSD among adults (Boscarino, 1995; Brewin et al., 2000; Ozbay et al., 2007; Southwick et al., 2005). Therefore, older adults’ increased capacity to form and maintain meaningful relationships may enhance their capacity to cope with trauma.

Finally, research has suggested a tendency among older adults to show emotionally rewarding memory distortion for past experiences compared to younger adults (Mather & Carstensen, 2005). This is also true for stressful events with older adults appraising and remembering such events less negatively with age (Neupert et al., 2007). The development and maintenance of PTSD symptomatology is strongly influenced by the person’s posttraumatic appraisals (Ehlers & Clark, 2000). It is therefore possible that older adults’ tendency to appraise events more positively may allow them to better adapt to earlier life experiences, thereby alleviating some of the negative consequences of trauma.

Some differences between older adults and adults with PTSD have been observed in terms of symptom profiles (Goenjian et al., 1994) and symptom severity (Acierno et al., 2006). Research has supported the notion of a protective effect of age in post-traumatic symptoms (Norris et al., 2002) with older adults reporting fewer symptoms of PTSD when compared to younger populations (Acierno et al., 2006). However, these results are not consistent across studies (Parker et al., 2016), which may be due to the fact that older adults are a heterogeneous group with varying experiences, needs and coping skills. In addition, there is limited information about how individual factors within the older adult group impact on trauma presentation and severity.

**Risk factors for the development of post-traumatic symptoms: Early Maladaptive Schemas**

Exposure to traumatic events is not always sufficient to explain the emergence of PTSD or CPTSD symptomatology. Indeed, only a small percentage of people experiencing childhood traumatic events will go on to develop trauma symptoms (A. Perkonigg et al., 2000). Thus, there is growing acceptance of the role that individual vulnerability factors play in the emergence of these conditions (Southwick et al., 2005; Yehuda et al., 2006).

Cognitive schemas are defined as subjective patterns consisting of memories, emotions, and cognitions which guide behaviour (Young 1990, 1999). Young (1990, 1999) proposed a subset of schemas concerning oneself and one’s relationships with others which develop in response to childhood adversity. These schemas were labelled as Early Maladaptive Schemas (EMS) and were defined as ‘extremely stable and enduring themes, comprised of memories, emotions, cognitions, and bodily sensations, regarding oneself and one’s relationship with others, that develop during childhood and are elaborated upon throughout the individual’s life-time, and that are dysfunctional to a significant degree’ (Young et al., 2003, p. 7). EMS can have a long-lasting impact on individuals interfering with how they view themselves and their interaction with others (Young et al., 2003). EMS can lead to the development of psychopathology if activated by situations relevant to a particular schema.
Research has demonstrated the role of EMS in mediating the link between childhood abuse and psychopathology (Calvete et al., 2007; Lumley & Harkness, 2007; Wright et al., 2009). In regard to post-traumatic stress, EMS have been shown to be significant predictors of PTSD, among adults who have experienced traumatic events (Ahmadian et al., 2015; Price, 2007). Schemas within the “Disconnection and Rejection” and the “Impaired autonomy” domains have been more strongly associated with PTSD (Harding et al., 2012; Thanos Karatzias et al., 2016; Price, 2007). To our knowledge no studies have investigated the role of EMS in the development of CPTSD symptoms within the older adult population.

Limitations of previous research

Although the risk and protective factors for the development of PTSD have been extensively researched in the adult population (Brewin et al., 2000), there is limited research about the factors affecting CPTSD symptoms in older adults (age 64> years). To our knowledge only one study has sought to examine mediators between experiencing potentially traumatic events and complex post traumatic symptomatology in older adults. Krammer et al. (2016) examined the association between traumatic events in childhood and complex posttraumatic stress symptoms in older adults. The authors investigated the mediation of this association by two social-interpersonal factors: social acknowledgment as a survivor and dysfunctional disclosure.

Participants completed the TSI scale (Briere, 1995) which assessed a broader spectrum of post-traumatic symptoms, such as anxious arousal, depression, anger/irritability, intrusive experiences, defensive avoidance, dissociation, sexual concerns, dysfunctional sexual behaviour, impaired self-reference, and tension reduction behaviour. Exposure to childhood traumatic events was found to be significantly associated with PTSD symptoms and this relationship was partially mediated by social acknowledgment and dysfunctional disclosure. In addition, childhood trauma was associated with impaired self-reference. However, this scale failed to measure the two remaining core clusters of CPTSD symptoms as per ICD-11 (affective dysregulation, and disturbances in relationships) providing limited results about CPTSD symptoms within this age group. Moreover, this study failed to examine the role of cognitive processes which may mediate the adverse effects of early trauma.

The current study aims to address these limitations by examining whether specific EMS mediate the relationship between early traumatic events and trauma symptoms in a clinical sample of older adults. The study will first investigate which specific schema domains are more strongly associated with CPTSD symptom severity, while controlling for the effect of early traumatic events. Schema more strongly associated with CPTSD symptoms will then be entered into a mediation analysis to assess whether they mediate the relationship between early traumatic events and trauma symptom severity.

A better understanding of the risk factors in the development of trauma symptomatology within OA is important when considering the assessment and early identification of traumatised OA. In addition, such an understanding could increase our knowledge of how to respond to and support older people with trauma. In particular, if a positive mediating relationship is established, this study could guide the focus of future complex trauma.
interventions (e.g. CBT) by specifying which schema domains need to be targeted in order to alleviate distress in older people with CPTSD symptoms. This is paramount in the development of accessible services appropriate to the needs of OA and is in line with UK policies aiming to reduce health inequalities and promote wellbeing across the lifespan (The Scottish Government, 2011)

**Principal Research Question**

Do Early Maladaptive Schema mediate the relationship between childhood traumatic events and complex post traumatic symptoms in older adults?

**Secondary research question**

Which second order Schema factor (domain) is a stronger mediator of the relationship between childhood trauma and post-traumatic symptoms in older adults?

**Methodology**

**Design**

The study will use a cross-sectional, quantitative design. Older adults (age> 64 years) who have experienced childhood traumatic events will be invited to complete four questionnaires, measuring childhood trauma, early maladaptive schema (EMS), CPTSD symptoms as well as a demographic questionnaire. A series of mediation analyses will be utilised in order to answer the research questions associated with the current study.

**Participants**

Inclusion criteria: Older adults (>64) with a history of childhood trauma (physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect) will be eligible for participation. In order to participate in the study service users would need to be willing to participate voluntarily and to be able to give written informed consent.

Exclusion criteria: Older adults with a diagnosis of Mild Cognitive Impairment or Dementia will be excluded from the study as this may influence the accuracy of the findings. Older adults who lack fluency in English will also be excluded. Finally, for ethical reasons and to ensure individuals’ safety, older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves will also be excluded from this study. The study will also exclude individuals who lack capacity to consent to research.

<table>
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<tr>
<th>Inclusion Criteria</th>
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<td>• Older adults (&gt;64)</td>
<td>• Older adults with a diagnosis of Dementia or Mild Cognitive Impairment.</td>
</tr>
<tr>
<td>• Individuals with a history of childhood trauma (such as physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect)</td>
<td>• Older adults who lack</td>
</tr>
<tr>
<td>• Individuals willing to participate voluntarily</td>
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</table>

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- Individuals able to give written informed consent.
- fluency in English
- Older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves
- Individuals lacking capacity to consent to research.

**Procedure**

There will be two recruitment pathways to this study: 1. Through NHS Older People’s Community Mental Health Teams and 2. Through Day Hospitals

The researcher will present the study protocol to Older People’s Community Mental Health Teams meetings explaining the purpose of the study, study rationale and recruitment process. The researcher will also contact Day Hospitals across the four NHS boards to ask for support with the recruitment process. Following this, NHS staff will be encouraged to identify potential participants from their caseloads who meet inclusion and exclusion criteria. Individuals at any stage of therapy could participate. Clinicians will have access to service users’ records and will be aware of a diagnosis of MCI or Dementia. The researcher will not access these records.

Clinicians will be given information sheets to pass on to service users. The information sheet will outline the following: (a) study aims, (b) participant involvement and opportunity to withdraw from research, (c) confidentiality and anonymity, (d) data storage (e) data dissemination (f) complaints procedure and (g) support resources and available services. Potential participants will also be made aware that the study will include a screening measure to exclude individuals with cognitive impairment, as well as the steps that the researcher would undertake if there was an indication of cognitive impairment: (1) discuss with participants (2) contact participant’s GP and (3) contact participants’ clinician. In addition, the information sheets would state that the participants’ GP would be made aware of their participation in the study, as recommended by the NHS Health Research Authority (Health Research Authority, 2017). The information sheet will also state that involvement in the study will not affect the healthcare participants receive and that they will be free to withdraw at any time without giving reason.

Clinicians will be asked to request service users’ verbal consent for the researcher to contact them in order to provide them with more information about the study. Clinicians will then be asked to telephone the researcher with the potential participant’s details.

Following a period of at least 24 hours, the researcher will telephone potential participants who expressed an interest in the study and who gave their permission to be contacted. During
this contact, the researcher will briefly confirm that individuals meet inclusion criteria. Potential participants will have the opportunity to ask any questions.

If individuals are still interested in taking part, a meeting will be arranged in which they will have further opportunity to ask questions and provide written consent to participate. An effort to provide flexibility as to the time, date and venue of their meeting will be made. The meeting will be conducted in NHS premises. If participants have been referred by clinicians in Older Adult teams, the possibility of a home visit will be discussed with the clinician. If no risk is identified, the option to complete the measures at the participant’s home will be offered. The researcher will be accompanied by another member of staff as outlined in the NHS Lone Worker policy.

The researcher will not conduct a formal assessment of participants’ capacity to consent to research. However, upon meeting the researcher potential participants will be asked questions regarding their understanding of (a) the aims of the study; (b) what they will be asked to do and (c) the potential benefits/risks of participating. The Adults with Incapacity (Scotland) Act 2000 defines incapacity as being incapable of:

a) acting; or
b) making decisions; or
c) communicating decisions; or
d) understanding decisions; or
e) retaining the memory of decisions

If, during the study, the researcher becomes concerned that the participant might be incapable or acting on, making decisions, communication decisions, understanding decisions, or retaining the memory of decisions, participant involvement will be immediately terminated and all study documentation relating to that participant will be deleted.

If potential participants are considered to have capacity they will be asked to sign the written informed consent form in order to be considered for inclusion in the study. Participants who agree to participate will be given a copy of the consent form. Only individuals who provide written consent will be included in the study.

During contact, the researcher will ask respondents to provide the following details: Name, Address, DOB, GP Name and GP practice in order to notify the GP of their participation.

Following this, participants will be asked to complete the demographic questionnaires as well as the battery of measures outlined below, lasting in total approximately 55 minutes.

If participants display distress during this process, follow-up support would be provided: At first instance, the researcher would manage the participants’ distress in session. If additional support is needed, then the researcher will sign-post the participants to helpline numbers and available services. However, if the researcher became concerned of risk of harm to the participant or others they will be obliged to share this information and follow service protocols. This may include contacting crisis centres (MHAS), the participants’ GP or
clinician. The researcher’s Clinical Supervisor who has experience working with older adults will oversee this process. For further information please refer to the study’s Care Protocol.

**Data Collection**

Participants will be invited to complete questionnaires measuring CPTSD symptoms, childhood traumatic events and early maladaptive schemas. Participants will also complete a demographic questionnaire enquiring about gender, age, marital status, occupational status, socioeconomics status, current living situation and co-existing medical conditions. The above demographic data will be collected in order to provide information about the sample of respondents and are relevant when conducting trauma research in older adults (Acierno et al., 2006; Norris et al., 2002; Ogle et al., 2013; Ross & Van Willigen, 1997). Therefore, a battery of four questionnaires will be completed on one occasion. The measures will be completed in the following order: 1. Demographic Questionnaire; 2. Childhood Trauma Questionnaire; 3. Young Schema Questionnaire; 4. ICD-11 Trauma Questionnaire. Measure completion is likely to last approximately 55 minutes. Participants will be advised that appointments will last approximately one hour. They will be advised that they have to option to take breaks if necessary.

**Study Measures:**

**Childhood Trauma Questionnaire** (Bernstein & Fink, 1998): Exposure to childhood traumatic events will be measured by the Childhood Trauma Questionnaire. The CTQ is a 28-item retrospective self-report questionnaire which includes five subscales: Emotional Abuse, Physical Abuse, Sexual Abuse, Emotional Neglect, and Physical Neglect. In addition, the questionnaire includes a Minimization/Denial scale in order to identify the underreporting of traumatic events. Participants will be asked to respond to each question on a 5-point scale ranging from “never true” (1) to “very often true” (5). The CTQ has demonstrated strong psychometric properties when used both in clinical and community settings (Bernstein et al., 1997; Scher et al., 2001).

**Young Schema Questionnaire – Short Form, 3rd Edition** (Young, 2014): The Young Schema Questionnaire – Short Form, 3rd Edition (YSQ-S3) will be used to measure Early Maladaptive Schemas (EMS). The YSQ-S3 is a self-report measure assessing 18 EMS. Each EMS consists of five items, resulting in 90 items in total. The items are categorized in four schema factors which replaced Young’s previous five schema domains (Young, 2003): Disconnection, Impaired Autonomy, Exaggerated Standards, and Impaired Limits (Hoffart, et al., 2006). Participants will be asked to rate descriptive statements on a 6-step Likert-scale which ranges from “completely untrue of me” to “describes me perfectly”. The YSQ-S3 provides a total score. Higher values are associated with a stronger presence of EMS. This measure has demonstrated good psychometric properties and has shown age neutrality when administered across the lifespan (Oei & Baranoff, 2007; Pauwels et al., 2014).

**ICD 11 Trauma Questionnaire** (ITQ; Version 1.2) (Cloitre et al., 2014): PTSD and CPTSD symptoms will be measured by the ITQ. The ITQ is a 23-item self-report measure which assesses the following symptoms areas: Re-experiencing, Avoidance, Sense of Threat as well
as affective dysregulation, negative self-concept and disturbances in relationships. Participants are asked to select on a Likert scale how much a symptom has been bothersome in the past month, with scores ranging from 0 (not at all) to 4 (extremely). A recent psychometric evaluation of the ITQ has indicated good psychometric properties for this measure (Karatzias et al., 2016).

Total Time to Complete Measures: Approximately 55 minutes

ITQ: 5 minutes (additional time for OA: 10 minutes)
CTQ: 5 minutes (Additional time for OA: 10 minutes)
Young Schema Questionnaire: 15 minutes (+10 minutes)
Demographic Questionnaire: 5 minutes

Sample Size

Sample size calculations were based upon the primary research question. (Fritz & MacKinnon, 2007) have published guidelines in regard to obtaining an adequate sample size for mediation analysis. The authors proposed a minimum number of participants to achieve 0.8 power depending on the magnitude of the estimated effect sizes for the ‘a’ and ‘b’ mediation pathways. Previous research (Anilmis et al., 2015) has indicated large effect sizes for the ‘a’ pathway (the relationship between Childhood traumatic events and cognitive beliefs). (Foa et al., 1999) have also indicated large effect sizes for the ‘b’ pathway (the relationship between cognitive schemas and post-traumatic symptoms). Based on these findings Fritz and MacKinnon (2007) suggest a sample size of 34 in order for this study to be adequately powered. The researcher will seek to recruit a sample size of 71 participants as this would also allow for the detection of moderate effects for the ‘a’ and ‘b’ pathways.

The secondary question will be examined using parallel mediation analyses. In order to calculate the sample size needed to answer this question, Monte-Carlo simulations were performed using the “Shiny” programme, written in R statistical computing language (R Core Team, 2016) and according to published guidelines (Alexander et al., 2017). These showed that the aforementioned sample size (71) would not provide sufficient power to answer this question. Given the time-limitations of this project, it would not be possible to increase the sample size. Therefore, these analyses will be regarded as exploratory and will only aim at providing preliminary data to inform the planning of future studies. The focus of these analyses will be on quantifying the magnitude of any relationships and their 95% confidence intervals.

The researcher’s academic and clinical supervisors have previous experience in supervising studies in OA and have stated that it should be feasible to recruit this sample size across NHS Lothian, NHS Fife, NHS Forth Valley and NHS Lanarkshire.

Analysis
Mediation analysis (Hayes, 2013) will be implemented to answer the primary research question. Hayes PROCESS macro Model 4 (Hayes, 2013) for SPSS will be used to analyse the data. As suggested by Hayes (2013) direct and indirect effects will be calculated together with the constituent components of the indirect effect (i.e. the effect of early traumatic events on cognitive schema and the effect of cognitive schema on complex trauma symptoms).

Bootstrapped sampling distribution will be used to estimate the indirect effect, the standard error and 95% confidence intervals for the population value of ‘ab’ (Preacher & Hayes, 2004). Bootstrapping does not assume normality in the distributions of the variables or the sampling distribution of the statistic, and can therefore be applied to small samples with more confidence (Preacher & Hayes, 2004).

Effect sizes will be reported and interpreted according to Preacher and Kelley’s (2011) guidelines. The authors recommend a new standardised value to express effect size for mediation effects, denoted as kappa-squared ($k^2$). $k^2$ is defined as “the magnitude of the indirect effect relative to the maximum possible indirect effect” (Preacher and Kelley, 2011, p.27). This coefficient is independent of the scale of the variables and sample size and can convey the full meaning of an indirect effect (Preacher & Kelley, 2011). A parallel mediation model will be used to answer the secondary research question (PROCESS macro Model 4- 4 mediators; Hayes, 2013)

**Academic Supervisor 1**

Dr Azucena Guzman  
Lecturer of Health and Aging  
University of Edinburgh  
Doorway 6, Old Medical School  
Teviot Place  
Edinburgh  
EH8 9AG  
Tel: +44 (0)131 651 5162  
Email: Azucena.Guzman@ed.ac.uk

**Clinical Supervisor 1**

Prof Thanos Karatzias  
Professor of Mental Health  
Edinburgh Napier University  
9 Sighthill Court  
Edinburgh
Clinical Supervisor 2
Mr Sandy McAfee
Consultant Clinical Psychologist
Psychology Department
St John’s Hospital
Howden Road West
Livingston
EH54 6PP
Tel. 01506 523615
sandy.mcafee@nhslothian.scot.nhs.uk

References


doi:10.1176/ajp.151.6.895


doi:10.3402/ejpt.v6.25290


Appendix J: Empirical Research documents: Participant Information Sheet

Participant Information Sheet

We would like to invite you to take part in a thesis research project being carried out by The University of Edinburgh and NHS Lothian.

Before you decide if you would like to take part it is important for you to understand why the research is being done and what it will involve.

Please take time to read the following information carefully, if you are interested in taking part there will be an opportunity to discuss the research further before you make a decision.

- **What is the purpose of this study?**

The purpose of the study is to help us understand of the relationship between difficult and/or traumatic events in childhood and psychological distress. Traumatic experiences are defined as witnessing or experiencing an event which includes the threat of death, injury, or assault to yourself or others. Examples of this may be having experienced or witnessed abuse or neglect.

Specifically, this study will examine whether sets of memories, emotions and thoughts regarding oneself and the world can explain the relationship between childhood traumatic events and psychological distress.

- **Why have I been asked to take part?**

We are asking adults older than 64 years who have experienced childhood traumatic events if they wish to be considered to be included in the study. If you wish to take part a meeting will be arranged where you can ask questions. It is possible that at this meeting it is decided that the study is not suitable for you at this time.

- **Do I have to take part?**

*No, participating in this study is entirely voluntary. If you decide to take part you are still free to withdraw at any time and without giving a reason. Deciding not to take part or withdrawing from the study will not affect the healthcare that you receive.*

- **What do I have to do to participate?**

If you are interested in taking part, please either contact us directly on the number provided below or let your clinician know. Your clinician will ask you if you would like to be contacted by the researcher with further information on the study. If you agree, your clinician will pass on your contact details to the researcher. The researcher will then call you to provide you with more information and answer any questions. If you are willing to participate, a meeting will be arranged. At this meeting you will have the opportunity to ask
questions about the study and make a decision about whether or not to be involved. You can still change your mind at any time.

During the meeting, you will be asked to complete four questionnaires with the assistance of a researcher. The appointment is likely to last approximately one hour. You will be able to have a break if necessary.

- **Where will the meeting take place?**
  The meeting will take place at NHS premises but we will try and be flexible as to the time, date and venue of the appointment to accommodate your needs. The option of a home visit may also be available upon discussion with the researcher.

- **Who will be notified of my participation?**
  Your GP will be made aware of your participation in the study (but not of any of your answers), as recommended by The NHS Health Research Authority. In order to do this, you will be asked to provide your name, address, D.O.B and GP details in a separate form. This information will only be used to make contact with your GP.

- **What are the possible disadvantages of taking part?**
  We do not anticipate that you will experience any disadvantages from taking part in this study. However, some of the questions inquire about past traumatic experiences and you may find these questions intrusive. Therefore, in completing these questionnaires, there is a possibility that you may become distressed by the content of the questions. If this situation arises, one of the researchers will be available for a follow-up conversation to offer you support. Information on appropriate mental health support is also provided on page 4 of this information sheet.

- **What are the possible benefits of taking part?**
  No benefits for potential participants have been identified but you may derive some satisfaction from contributing to research which helps us better understand the link between childhood stressful experiences and psychological distress.

- **How will my privacy be protected?**
  This study will be confidential. Your name will not appear in any published research. The data will use unique identifiers only. A code will be placed on the questionnaires you complete and your name will be kept separately in a locked filing cabinet. Only the researchers will have access to these. The personal answers you give will not be shared with anyone else, including your GP.

  However, if we believed there was a risk of harm to yourself or others we would share this information with others. If that is the case, we would share this information with your GP and relevant authorities, which may include police or social services. In this situation, you would be informed and we would alert your GP so they could support you.

- **Where will my data be stored?**
  All data will be stored in locked filing cabinets to which only the researchers will have access. At the end of the study anonymous data will be stored electronically by the University
of Edinburgh. Personal data will be stored for 6 – 12 months and anonymised research data will be stored for 5 years. It is possible that the anonymised data will be used for further research in the future.

- **What will happen to the results of the research study?**
  It is the intention of the researchers to submit the results of this study for publication in a peer-reviewed journal. The findings of the study will be also published as a university thesis and may be included in academic conferences. No identifiable information will be included in publications and it will not be possible to link you to the study data in any way.

- **Will I receive a copy of the results?**
  A report of the findings can be made available to you after the end of the research if you wish. You can also find out further information by contacting us on the number provided below.

- **Who is organising the research?**
  This study is being organised/spONSORED and funded by The University of Edinburgh.

- **Who has reviewed the study?**
  The study proposal has been reviewed by The University of Edinburgh and NHS Lothian. All research in the NHS is looked at by an independent group of people, called a Research Ethics Committee. A favorable ethical opinion has been obtained by the North of Scotland Research Ethics Committee. NHS Management approval has also been given.

**Support resources and available services.**

Breathing Space 0800 83 85 87
The Samaritans 08457 90 90 90
You can also visit the website below for additional support and advice:
NHS Choices: Post-traumatic stress disorder (PTSD) - Complex PTSD
[http://www.nhs.uk/Conditions/Post-traumatic-stress-disorder/Pages/Complex.aspx](http://www.nhs.uk/Conditions/Post-traumatic-stress-disorder/Pages/Complex.aspx)

**You are welcome to contact us to ask questions about the research and share any considerations.**

*Contact information:*
Eleni Vasilopoulou
Trainee Clinical Psychologist
Psychology Department
2nd Floor MacKinnon House
Royal Edinburgh Hospital
Edinburgh
EH10 5HF
If you would like to discuss this study with someone independent of the study team please contact: Dr Angus Macbeth on (0)131 650 3893 or email: angus.macbeth@ed.ac.uk
If you wish to make a complaint about the study please contact:

NHS Lothian Complaints Team  
2nd Floor, Waverley Gate,  
2-4 Waterloo Place  
Edinburgh  
EH1 3EG  
Tel: 0131 536 3370  
Email: feedback@nhslothian.scot.nhs.uk

NHS Lanarkshire Patient Affairs  
Laura Jack, Patient Affairs Manager  
NHS Lanarkshire Headquarters  
Kirklands, Fallside Road, Bothwell. G71  
8BB  
Tel: 01698 858321  
Email: PatientAffairs.Primarycare@lanarkshire.scot.nhs.uk

NHS Fife Patient Relations  
Room 104, Hayfield House, Hayfield Road  
Kirkcaldy  
KY2 5AH  
Tel: 01592 648153  Ext: 28153  
Email: patientrelations.fife@nhs.net

NHS Forth Valley Patient Relations and Complaints Service  
Forth Valley Royal Hospital  
Stirling Road, Larbert  
FK5 4WR  
Tel.: 01324 566660  
Email: fv-uhb.complaints@nhs.net

Thank you very much for reading this information sheet.
The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

What is the research about?

We are interested in the relationship between childhood traumatic events, Early Maladaptive Schemas (EMS) and Complex Posttraumatic Stress Disorder (CPTSD) symptoms among older adults (>64 years). Specifically, we are interested in examining whether EMS mediate the relationship between childhood traumatic events and CPTSD symptom severity.

Why is the research being carried out?

Complex Posttraumatic Stress Disorder (CPTSD) has been proposed for inclusion in the ICD-11 as a sibling condition to Posttraumatic Stress Disorder (PTSD). CPTSD is viewed as a result of exposure to cumulative trauma, particularly in childhood. In addition to PTSD symptoms (re-experiencing, avoidance/numbing, and hyperarousal/hypervigilance), CPTSD also includes symptom clusters that highlight self-organization disturbances (affective dysregulation, negative self-concept and disturbances in relationships). Early Maladaptive Schema (EMS) have been shown to be significant predictors of PTSD in adults who have experienced traumatic events. However, to our knowledge no studies have investigated the role of EMS in the development of CPTSD within the older adult population.

Who is being asked to take part?

Inclusion criteria: Older adults (>64) with a history of childhood trauma (physical abuse, sexual abuse, emotional abuse, physical neglect, emotional neglect) will be eligible for participation. In order to participate in the study service users would need to be willing to participate voluntarily and to be able to give written informed consent.

Exclusion criteria: Older adults who lack fluency in English will be excluded. Older adults in crisis, experiencing suicidal thoughts with clear intent to harm themselves will also be excluded from this study. The study will exclude individuals who lack capacity to consent to research. Older adults who present with a diagnosis of Mild Cognitive Impairment (MCI) or Dementia will also be excluded from the study as this may influence the accuracy of the findings.

What are the possible benefits of taking part?

No benefits for potential participants have been identified.
What are the possible disadvantages of taking part?

There is no evidence to suggest that asking people about trauma results in any serious or long-lasting harm. It is possible however that participants might find some of the questionnaire topics distressing. A care protocol has been developed outlining the steps that will be taken to manage any participant distress. Copies of the care protocol are available from the main researcher at request.

What am I being asked to do?

The researcher would be grateful if you could review your current caseload and identify any patients that may meet inclusion and exclusion criteria for the current study. Individuals at any stage of therapy can participate. During your routine contact with your patient, the researcher would request that you discuss the current study with them and issue them with a copy of the Information Sheet. If your patient expresses an interest in the current study, the researcher requests that you ask for their permission for the researcher to contact them to provide further information regarding the study. You will then be asked to contact the researcher via telephone with the potential participant’s details.

Procedure

Potential participants will have at least 24 hours to consider the Participant Information sheet. The researcher will then telephone potential participants to provide them with further information about the study, answer any questions and establish whether they meet inclusion criteria. The researcher will send a further Participant Information sheet if required. If potential participants remain interested in taking part in the study, the researcher will arrange a meeting during which participants will sign the consent forms. Following this, participants are asked to complete a demographic questionnaire as well as the following study measures, lasting in total approximately 55 minutes: Young Schema Questionnaire – Short Form, 3rd Edition; ICD 11 Trauma Questionnaire – Version 1.2; Childhood Trauma Questionnaire.

Who is doing this research?

The main researcher (Eleni Vasilopoulou) is a Trainee Clinical Psychologist based in NHS Lothian. This study a thesis project, part of the Doctorate in Clinical Psychology Programme training at the University of Edinburgh. The study is being supervised by Dr Azucena Guzman (Lecturer, University of Edinburgh), Prof Thanos Karatzias and Mr Sandy McAfee (Consultant Clinical Psychologists).

You can contact the main researcher at eleni.vasilopoulou@nhslothian.scot.nhs.uk to obtain more information or to discuss whether a patient may be suitable for the study. If you would like to hear independent advice on this research project, please contact Dr Angus Macbeth at angus.macbeth@ed.ac.uk

Thank you for taking the time to read this information sheet.

Appendix L: Empirical Research documents: Consent form
**Participant Consent Form**

**Study Title:** The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

Participant ID: ______________

Name of Researchers: Eleni Vasilopoulou. Supervisors: Azucena Guzman, Thanos Karatzias, Sandy McAfee

<table>
<thead>
<tr>
<th>I confirm that I have read and understood the information sheet for the above study (Version <em><strong>. Date</strong></em>____) and have had the opportunity to consider the information and ask questions.</th>
<th>Please initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>I understand that my participation is voluntary and that I am free to withdraw at any time, without giving reason, without my medical care or legal rights being affected.</td>
<td></td>
</tr>
<tr>
<td>I understand that non-identifiable data may be transferred from the research site to the university.</td>
<td></td>
</tr>
<tr>
<td>I understand that the findings of this study will be submitted for publication.</td>
<td></td>
</tr>
<tr>
<td>I understand that my GP will be notified of my participation, using the contact details I have provided to the study team for this purpose and that additional information may be supplied to my GP if cognitive difficulties or disclosures are revealed to the researcher during the study.</td>
<td></td>
</tr>
<tr>
<td>I understand that relevant sections of my medical notes and data collected during the study may be looked at by individuals from the regulatory authorities and from the Sponsors (NHS Lothian and the University of Edinburgh) or from the/other NHS Board(s) where it is relevant to my taking part in this research. I give permission for those individuals to have access to my records.”</td>
<td></td>
</tr>
<tr>
<td>I agree for anonymised data from this study to be used in future ethically approved research.</td>
<td></td>
</tr>
<tr>
<td>I agree to take part in the above study.</td>
<td></td>
</tr>
</tbody>
</table>

____________________________  ________________  ________________
Name of Participant  Date  Signature

____________________________  ________________  ________________
Name of Person taking consent  Date  Signature

Appendix M: Empirical Research documents: Debriefing form
Debriefing Form

The relationship between childhood traumatic events, early maladaptive schemas and complex posttraumatic stress disorder symptoms among older adults (>64 years): A mediation analysis.

Thank you for participating in the above study. The information gathered from this study will help us better understand the relationship between traumatic experiences and distress in older adults. This may inform new ways of identifying and responding to people who have experienced trauma.

The final results and conclusions of the study will be published as a university thesis in March 2019. They will also be shared through conferences and peer reviewed scientific journals. No identifiable information will be included in any publication.

We are happy to provide you with a summary of the results of the study if you provide your contact details below. Please also keep a copy of this form for yourself.

If you wish to receive a summary of the results of this research when they are published please provide your contact details:

Name:  
Address: 

If you wish to make a complaint about the study please contact: 
NHS Lothian Complaints Team  
2nd Floor, Waverley Gate, 2-4 Waterloo Place  
Edinburgh  
EH1 3EG  
Tel: 0131 536 3370  
Email: feedback@nhslothian.scot.nhs.uk
It is not thought that participating in this study results in any serious or long term psychological harm. However, the topics covered by this study can be difficult to talk or think about. If taking part in this study causes you distress, the researcher would recommend that at first instance you seek support from your GP or clinician. If you feel that would like additional support, please see the details of organisations below that may be able to help:

**Breathing Space**
Breathing Space is a free and confidential phone service that provides support during times of difficulty. They aim to provide a safe and supportive place through listening, offering advice and providing information.
Telephone: 0800 838 587
Website: [www.breathingspace.scot](http://www.breathingspace.scot)

**The Samaritans**
The Samaritans provides a free, confidential phone service that aims to create a place for people to talk through their problems, explore their options and find a way through their current difficulties.
Telephone: 116 123
Website: [www.thesamaritans.org](http://www.thesamaritans.org)

**National Association for People Abused in Childhood (NAPAC)**
NAPAC supports both men and women who have experienced any form of abuse in childhood.
Telephone: 0808 801 0331
Website: [www.napac.org.uk](http://www.napac.org.uk)

The NSPCC is a charity that works to prevent child abuse and to support individuals who have experienced abuse as children. There is a section on their website about Non-recent abuse for adults who experienced abuse as children
Website: [www.nspcc.org.uk](http://www.nspcc.org.uk)

**NHS Choices: Post-traumatic stress disorder (PTSD) - Complex PTSD**
You can also visit the website below for additional support and advice:
Dear Participant,

Thank you very much for offering your time and energy to take part in our research project with title: The mediating role of early maladaptive schemas in the relationship between childhood traumatic events and complex posttraumatic stress disorder symptoms in older adults.

As agreed, we have enclosed a lay summary of our results, which we hope will be of interest to you.

It was very nice to meet you and I wish you all the best for the future.

Yours sincerely,

Eleni Vasilopoulou
Trainee Clinical Psychologist
Lothian Older People’s Psychology Service
Lay Summary of Study

Complex Posttraumatic Stress disorder (CPTSD) is a term used to describe a variety of difficulties that people experience as a result of long-term exposure to childhood traumatic events. Such difficulties may include re-experiencing the traumatic event as if it was happening in the present, avoiding reminders of the traumatic events as well as a persistent sense of threat. People with CPTSD may also experience difficulties in managing their emotions, problems in relationships and a negative view of themselves.

Exposure to traumatic events is not always enough to explain the development of CPTSD symptoms. In fact, the majority of people who experience traumatic events do not go on to develop post-traumatic symptoms. Thus, previous research has sought to investigate which factors make people more likely to develop such symptoms. Research in adults has identified Early Maladaptive Schemas (EMS) as a risk factor which makes people more vulnerable to develop post-traumatic symptoms. EMS are sets of memories, emotions and thoughts regarding oneself, the world and one’s relationship with others. Examples of EMS may include cognitions such as “I don’t fit in” or “I am a good person because I think of others more than myself”.

Although EMS have been shown to make adults more prone to developing post-traumatic symptoms, we have no knowledge of whether this is also true for older adults (age 64+ years). However, we do know that adaptation to trauma may be different across different age groups. For example, specific circumstances such as reduced social support, health difficulties, or loss of a loved one might make coping with early trauma more difficult for older adults.

The current study examined whether EMS can explain the relationship between early traumatic events and CPTSD symptoms in a sample of older adults who currently use NHS Mental Health services in Scotland. In addition, the study investigated whether specific types of schema make survivors of childhood trauma more likely to experience CPTSD symptoms. Forty-two participants with a history of childhood trauma who were able to consent to research and had no diagnosis of MCI or dementia were included in this study. Participants completed three measures assessing childhood trauma, EMS and CPTSD symptoms, along with a demographic questionnaire.

Our results showed that participants who had experienced greater degree of trauma in childhood were more likely to report high EMS. In addition, the degree of EMS that participants held impacted on their level of symptoms: Participants scoring higher on EMS suffered more CPTSD symptoms. Two schema categories, Disconnection and Impaired Autonomy were specifically linked to CPTSD symptom severity. Disconnection schemas include beliefs around others being emotionally unresponsive, hurtful, or manipulative. Impaired Autonomy includes beliefs around others being unreliable, and around one’s self being dependent and vulnerable to harm. Participants reporting more Disconnection and Impaired Autonomy EMS were more likely to experience CPTSD symptoms.

Our results suggest that challenging schemas, especially those around Disconnection and Impaired Autonomy, could help reduce CPTSD symptom severity in older adults. These results can inform clinical assessment and may support the development of old age specific trauma interventions in order to promote positive outcomes for this population.
Appendix O: Systematic Review: Prospero registration

**Factors associated with the severity of Post-Traumatic Stress Disorder and Complex Post-Traumatic Stress Disorder in older adults: a systematic review**

Eleni Vasilopoulou, Azucena Guzman, Thanos Karatzias, Beata Michalska da Rocha

Citation


**Review question**

What are the factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

Specifically, our review will seek to answer the following research questions:

1. What are the pre-trauma factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

2. What are the peri-trauma factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

3. What are the post-trauma factors associated with Post Traumatic Stress Disorder and Complex Post Traumatic Stress Disorder symptom severity among older adults?

**Searches**

An initial search of the Cochrane Database of Systematic Reviews (CDSR) and the Database of Abstracts of Reviews of Effects (DARE) was performed to ensure the absence of similar reviews. Following this, a systematic database search was conducted in February 2018 to identify relevant studies. Databases containing unpublished material were also included. The following databases were included in the search: MEDLINE, PsycINFO, Embase, CINAHL, ASSIA, PILOTS and Sociological Abstracts. PROQUEST Dissertation and Thesis Global was used to identify unpublished literature. A combination of different keyword searches were entered in each database. Broader terms were preferred due to the relative dearth of empirical research on this topic. The keywords referring to PTSD and CPTSD were “Post traumatic*”, “Posttraumatic*”, “Complex post trauma*” and “Complex posttrauma*”. These were combined with the keywords “older adult*”, “older people”, “geriatric”, “old age”, “aged” and “elderly”. A combination of index and MeSH terms were used according to the requirements of each database. Language (English) and publication date restrictions (later than 1980) were imposed. The searches will be re-run just before the final analyses and further studies may be retrieved for inclusion. Reference lists of relevant articles will also be reviewed.

**Types of study to be included**

We will include cross-sectional studies, correlational studies, cohort studies, case-control studies, prospective studies and longitudinal studies.

**Condition or domain being studied**
Post-traumatic stress disorder (PTSD) and Complex Post-Traumatic Stress Disorder (CPTSD) (Maercker et al., 2013) in Older Adults.

According to the forthcoming 11th version of the International Classification of Diseases (ICD-11), PTSD comprises three symptom clusters: re-experiencing in the here and now; deliberate avoidance; and sense of current threat. CPTSD has been proposed for inclusion in the ICD-11 as a sibling condition to Posttraumatic Stress Disorder (PTSD). In addition to the three PTSD symptom clusters, CPTSD also includes symptom clusters that highlight disturbances in self-organization (affective dysregulation, negative self-concept and disturbances in relationships). In contrast to PTSD which can be triggered by a single event, CPTSD is viewed as a result of repeated and prolonged exposure to trauma, particularly in childhood (Maercker et al., 2013).

Factors associated with the severity of post-traumatic psychopathology in adults can be divided into three main categories: pre-trauma, peri-trauma and post-trauma factors. Pre-trauma factors can include age, gender, race/ethnicity, cognitive ability, socio-economic status and neurobiological factors (Brewin et al., 2000; DiGangi et al., 2013; Feder et al., 2009; Yehuda & Flory Janine, 2007). Examples of peri-trauma factors may include trauma severity, trauma duration and type of trauma exposure (Ozer et al., 2003). Post-trauma factors can include additional life stress, social and family support, coping strategies, cognitive schemas and physical health (Johnson & Thompson, 2008; Karatzias et al., 2016; Udwin et al., 2000).

This review aims to systematically examine and analyse studies within the older adult population investigating the association between PTSD or CPTSD severity and (a) pre-trauma factors (b) peri-trauma factors or (c) post-trauma factors.

References:


doi:undefined

doi:10.1002/jts.20260

Participants/population
Inclusion: Older Adults (age>59 years) exposed to either single event or cumulative trauma and experiencing PTSD or CPTSD symptoms. Exclusion: Younger adults (59 years and below). Non-traumatised individuals.

Intervention(s), exposure(s)
Not applicable.

Comparator(s)/control
We will include studies where people with PTSD or CPTSD are compared to healthy individuals, and studies comparing groups differing on PTSD/CPTSD severity.

Context
The present review will include quantitative studies based on the following inclusion and exclusion criteria: (a) Studies will have to include participants exposed to either single event trauma or cumulative trauma, as per PTSD diagnostic criterion A (American Psychiatric Association, 2013); (b) Studies will be considered for inclusion if at least 50% of their sample comprises of adults older than 59 years; (c) Studies will have to use PTSD or CPTSD questionnaires to measure post-traumatic severity; (d) Studies reporting continuous data and diagnostic status will both be included. (e) Studies that examine the interaction of PTSD/CPTSD with pre-, peri- or post-trauma related factors will be included; (f) Studies utilising a between groups design comparing groups differing on PTSD/CPTSD diagnostic status or severity will also be included; (g) Research addressing the impact of interventions on trauma symptoms will be excluded as it has a different focus; (h) The search will be limited to studies published in English due to the lack of translation resources; (i) The search will also be limited to studies conducted after 1980, when PTSD was first codified as a disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM), Third Edition (DSM-III) (American Psychiatric Association, 1981)

Main outcome(s)
Posttraumatic Stress Disorder (PTSD) and Complex Posttraumatic Stress Disorder (CPTSD) mean scores on a validated scale. PTSD and CPTSD measures should examine symptom clusters in line with the following diagnostic manuals: (a) For PTSD: DSM-IV, DSM-5, International Classification of Diseases version 10 (ICD-10) or ICD-11; (b) For CPTSD: ICD-11 proposed criteria.

Additional outcome(s)
None.

Data extraction (selection and coding)
Title and/or abstract screening will be independently conducted by the first and last review authors. The first and last authors would then independently assess the full text of these potentially eligible studies for eligibility. Deviating evaluations will be discussed in order for a consensus rating to be obtained. Any disagreement will be resolved through discussion with a third author.

Details from eligible studies will be extracted using a pre-designed data extraction form. The following data will be extracted: (a) Study design (b) Total number of participants (c) Type of trauma exposure; (d) Associated Factors measured; (e) Participant characteristics, such as age, gender, employment status, PTSD/CPTSD diagnosis and comorbidity; (f) Participant inclusion and exclusion criteria; (g) Information on the measures used; (h) Data collection process; (i) Data analysis procedure; (j) Main findings and (k) Conflict of interest/source of funding. When data are missing or unclear, further information will be sought from the study authors. Cohen’s Kappa coefficient will be calculated to provide an estimate of inter-rater reliability. Two review authors will extract data independently. Discrepancies will be identified and resolved through discussion (with a third author where necessary).

**Risk of bias (quality) assessment**

A quality appraisal checklist was created in order to evaluate the quality of the reviewed studies and assess risk of bias. This was created based on the ‘STROBE Statement: Checklist of items that should be included in reports of cross-sectional studies’ (Von Elm et al., 2014) and other published tools (McLean et al., 2008; Scottish Intercollegiate Guidelines Network, 2012). Quality factors included background information, participant selection, assessment and measures, statistical analysis and generalisability of findings. All studies will be rated independently by the first and last authors of this review. Cohen’s Kappa coefficient will be calculated to assess inter-rater reliability. Deviating evaluations will be discussed in order for a consensus rating to be obtained. Further discrepancies will be addressed with the involvement of a third review author where necessary. The following characteristics will be considered in the Quality Appraisal:

**BACKGROUND:** The study addresses an appropriate and clearly focused question.

**SELECTION OF SUBJECTS:** Sample is clearly defined and the methods of selection are stated; Exclusion and Inclusion criteria are listed; Cases are clearly defined and differentiated from controls (if applicable); The study reports how the sample size was reached and provides power calculations; Sample size is adequate to answer the research question.

**ASSESSMENT:** The study uses a robust measure of PTSD/CPTSD; The study uses a robust measure for each associated factor

**STATISTICAL ANALYSIS:** The study explains analytic methods for all outcome analyses; The study explains how missing data were handled in the analysis; The analyses are appropriate to answer the research question(s).

**RESULTS:** The study describes demographic characteristics and all variables of prognostic importance; The study provides confidence intervals for prevalence estimates and P values for any major group comparisons; The study reports an adequate response rate (>50%).

**DISCUSSION:** The study discusses biases and limitations; The study states conflict of interest and/or source of funding.
References:


Strategy for data synthesis
We will provide a narrative synthesis of the findings from the included studies, structured around the type of factor measured e.g. pre-trauma, peri-trauma or post-trauma factor. We anticipate that there will be limited scope for meta-analysis because of the range of different outcomes measured across the small number of existing studies.

Analysis of subgroups or subsets
While subgroup analyses may be undertaken it is not possible to specify the groups in advance.

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University of Edinburgh/ NHS Lothian
https://www.ed.ac.uk/

Review team members and their organisational affiliations
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Dr Azucena Guzman. University of Edinburgh
Professor Thanos Karatzias. Edinburgh Napier University/Rivers Centre for Traumatic Stress
Dr Beata Michalska da Rocha. NHS Lothian

Anticipated or actual start date
23 January 2018
Anticipated completion date
01 August 2018

Funding sources/sponsors
NHS Lothian/ University of Edinburgh

Conflicts of interest
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English

Country
Scotland

Stage of review
Review_Ongoing

Subject index terms status
Subject indexing assigned by CRD

Subject index terms
Adult; Humans; Stress Disorders, Post-Traumatic

Date of registration in PROSPERO
10 April 2018

Date of publication of this version
10 April 2018

Details of any existing review of the same topic by the same authors

Stage of review at time of this submission

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Versions

10 April 2018
Appendix P: Systematic Review; Changes in protocol

The following changes were made:

1. Kate Forsyth, Assistant Psychologist was added to the research team to assist with the data extraction procedure. In regard to the quality appraisal, as previously noted, all studies were independently by the first author and Dr Beata Michalska.
2. The Systematic Review exclusively focused on published research.
3. The Systematic Review did not address pre- and peri- trauma factors.
4. Studies were rated as ‘High Quality’, ‘Good Quality’ or ‘Low Quality’ according to published guidelines (Harrison, Reid, Quinn & Shenkin, 2016)
5. The completion date of the review was extended to January 2019.

Appendix Q: Systematic Review: Clinical Psychology Review: Guide for authors

Guide for Authors

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As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.
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This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

References in a special issue
Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

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Reference style

References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication. References should be formatted with a hanging indent (i.e., the first line of each reference is flush left while the subsequent lines are indented).


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## Appendix R: Systematic Review: Data extraction form

### DATA EXTRACTION FORM

<table>
<thead>
<tr>
<th><strong>Reviewer:</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General information</strong></td>
<td>Researcher performing data extraction</td>
</tr>
<tr>
<td></td>
<td>Date of data extraction</td>
</tr>
<tr>
<td></td>
<td>Citation</td>
</tr>
<tr>
<td></td>
<td>Country of origin</td>
</tr>
<tr>
<td><strong>Study characteristics</strong></td>
<td>Study design</td>
</tr>
<tr>
<td></td>
<td>Type of trauma exposure</td>
</tr>
<tr>
<td></td>
<td>Associated factors measured</td>
</tr>
<tr>
<td></td>
<td>Inclusion and exclusion criteria</td>
</tr>
<tr>
<td><strong>Participant characteristics</strong></td>
<td>Age</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
</tr>
<tr>
<td></td>
<td>PTSD/CPTSD diagnosis</td>
</tr>
<tr>
<td></td>
<td>Comorbidity</td>
</tr>
<tr>
<td><strong>Measure Information</strong></td>
<td>Measure of PTSD/CPTSD</td>
</tr>
<tr>
<td></td>
<td>Measure of Traumatic Events (if applicable)</td>
</tr>
<tr>
<td></td>
<td>Measures of associated factors a.</td>
</tr>
<tr>
<td></td>
<td>b.</td>
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<td></td>
<td>c.</td>
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<td></td>
<td>d.</td>
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<tr>
<td></td>
<td>e.</td>
</tr>
<tr>
<td><strong>Data collection process</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Data analysis procedure</strong></td>
<td>Type of Analysis</td>
</tr>
<tr>
<td></td>
<td>Statistical techniques used</td>
</tr>
<tr>
<td><strong>Main findings</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Source of funding/conflict of interest</strong></td>
<td></td>
</tr>
</tbody>
</table>
Appendix S: Systematic review: Quality Criteria checklist

<table>
<thead>
<tr>
<th>QUALITY CRITERIA CHECKLIST</th>
<th>Reviewer:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study identification (Include author, title, year of publication, journal title, pages)</td>
<td></td>
</tr>
<tr>
<td><strong>In a well conducted cross-sectional study:</strong></td>
<td>Does this study do it?</td>
</tr>
<tr>
<td><strong>BACKGROUND</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 The study addresses an appropriate and clearly focused question.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td><strong>SELECTION OF SUBJECTS</strong></td>
<td></td>
</tr>
<tr>
<td>1.2 Sample is clearly defined and the methods of selection are stated.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.3 Exclusion and Inclusion criteria are listed</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.4 Cases are clearly defined and differentiated from controls (if applicable)</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.5 The study reports how the sample size was reached and provides power calculations.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.6 Sample size is adequate to answer the research question</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td><strong>ASSESSMENT</strong></td>
<td></td>
</tr>
<tr>
<td>1.7 The study uses a robust measure of PTSD/CPTSD</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.8 The study uses a robust measure for each associated factor</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td><strong>STATISTICAL ANALYSIS</strong></td>
<td></td>
</tr>
<tr>
<td>1.9 The study explains analytic methods for all outcome analyses.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.10 The study explains how missing data were handled in the analysis.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.11 The analyses are appropriate to answer the research question(s)</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td><strong>RESULTS</strong></td>
<td></td>
</tr>
<tr>
<td>1.12 The study describes demographic characteristics and all variables of prognostic importance</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.13 The study provides confidence intervals for prevalence estimates and P values for any major group comparisons.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.14 The study reports an adequate response rate (&gt;50%).</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td><strong>DISCUSSION</strong></td>
<td></td>
</tr>
<tr>
<td>1.14 The study discusses biases and limitations.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td>1.15 The study states conflict of interest and/or source of funding.</td>
<td>Yes ☐ No ☒ Can’t say ☐</td>
</tr>
<tr>
<td><strong>SECTION 2: OVERALL ASSESSMENT OF THE STUDY</strong></td>
<td></td>
</tr>
<tr>
<td>How well was the study done to minimise the risk of bias?</td>
<td>High quality (+++) ☐ Good Quality (+) ☐ Low Quality ☐</td>
</tr>
</tbody>
</table>
Appendix T: Systematic Review: Quality Appraisal: Operationalisation of Quality Criteria

1. BACKGROUND
The study addresses an appropriate and clearly focused question. Studies that score ‘yes’ in this criterion present a clear and well covered theoretical hypothesis and specific objectives.

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Background</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study addresses an appropriate and clearly focused question, a clear and well covered theoretical hypothesis and specific objectives.</td>
</tr>
<tr>
<td>‘No’</td>
<td>Unclear or no specific objectives or hypothesis are presented.</td>
</tr>
</tbody>
</table>

2. SELECTION OF SUBJECTS
Studies should clearly define the population under investigation and the methods of participant selection. In particular, studies should be clear about the setting and locations of recruitment. Moreover, participant exclusion and inclusion criteria should be clearly defined, as a way of minimising selection bias. If the study has a control group, exclusion and inclusion criteria should be listed both for subjects and controls and should be applied consistently. The study should also report how it reached the specific sample size in addition to power calculations, or variance and effect estimates. Cohort studies should similarly select the two groups being studied from source populations that are comparable in all respects other than the factor under investigation. Furthermore, participation and drop-out rates should be reported.

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Sample is clearly defined and the methods of selection are stated.</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study is clear about the setting, locations and methods of selection.</td>
</tr>
<tr>
<td>‘No’</td>
<td>The study does not include clear definitions of the source population. Failure to do so may introduce a significant degree of bias into the results of the study and the study might be rejected.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Exclusion and Inclusion criteria are clearly defined for cases and controls (if applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study lists participant exclusion and inclusion criteria and these are consistently applied among participants.</td>
</tr>
<tr>
<td>‘No’</td>
<td>The study does not list exclusion/inclusion</td>
</tr>
</tbody>
</table>

192
<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Cases are clearly defined and differentiated from controls (if applicable).</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study clearly differentiates cases from controls.</td>
</tr>
<tr>
<td>‘No’</td>
<td>The study does not clearly differentiate between cases and controls. Failure to do so may introduce a significant degree of bias into the results of the study and the study might be rejected.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Sample size, power calculations</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study reports how it reached the specific sample size in addition to power calculations.</td>
</tr>
<tr>
<td>‘No’</td>
<td>The study does not justify the sample size and fails to report any power calculations or variance and effect estimates.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Sample size is adequate to answer the research question.</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The sample size is adequate to answer the research question, based on magnitude of effect sizes and power calculations.</td>
</tr>
<tr>
<td>‘No’</td>
<td>Sample size is too small to answer the research question and the study is underpowered.</td>
</tr>
</tbody>
</table>

3. ASSESSMENT

3.1. PTSD/CPTSD

In order to reduce measurement error, the study should use a robust measure of PTSD or CPTSD. This suggests that the measurement used needs to show an acceptable level of psychometric properties i.e. validity and reliability and to be suitable for the population examined. PTSD and CPTSD measures should examine a broad range of symptom clusters in

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Robust measurement of PTSD/CPTSD is used</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The measurement used shows an acceptable level of validity and reliability for this population (cronbach’s α&gt;0.7) and examines symptom clusters in line with diagnostic manuals. This includes DSM-IV, DSM-5 and ICD-10 criteria for PTSD and ICD-11 proposed criteria for CPTSD.</td>
</tr>
<tr>
<td>‘No’</td>
<td>The measurement shows poor psychometric properties and is not based on DSM- or ICD- criteria.</td>
</tr>
</tbody>
</table>

3.2. ASSOCIATED FACTORS
Studies should include robust measures to measure PTSD or CPTSD associated factors. Similarly to the aforementioned trauma measures, measures of trauma associated factors need to demonstrate an acceptable level of psychometric properties.

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Measurement of Associated Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The measurement used shows an acceptable level of validity and reliability for this population (cronbachs α&gt;0.7)</td>
</tr>
<tr>
<td>‘No’</td>
<td>The measurement shows poor psychometric properties.</td>
</tr>
</tbody>
</table>

5. STATISTICAL ANALYSIS
Studies that score ‘yes’ in this domain should explain analytic methods for all outcome analyses, including those used to examine subgroups and interactions. Moreover, studies should report how missing data were handled in the analysis.
<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Statistical analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study explains analytic methods for all outcome analyses.</td>
</tr>
<tr>
<td>‘No’</td>
<td>Lack of clarity on analytic methods employed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Missing Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study explains how missing data were handled in the analysis.</td>
</tr>
<tr>
<td>‘No’</td>
<td>Poor handling or no mentioning of missing data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Statistical analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The analysis is appropriate to answer the research question.</td>
</tr>
<tr>
<td>‘No’</td>
<td>Not appropriate statistical analysis is employed.</td>
</tr>
</tbody>
</table>

6. RESULTS AND GENERALISABILITY
Studies should describe demographic characteristics and all variables of prognostic importance. Moreover, studies should provide confidence intervals for prevalence estimates and p values for any major group comparisons. Caution should be placed on studies that only report a single value with no precision assessment (Scottish Intercollegiate Guidelines Network, 2018).

Finally, the response rate of the population approached to participate should be more than 50%, as lower response rates might mean that the study population does not adequately represent the target population and this can influence the external validity of the study (Gliner & Morgan, 2009). This should also apply to studies using postal questionnaires (Salant & Dillman, 1994).

<table>
<thead>
<tr>
<th>CRITERION</th>
<th>Variables reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>‘Yes’</td>
<td>The study describes demographic characteristics and all variables of prognostic importance.</td>
</tr>
<tr>
<td>‘No’</td>
<td>Lack of clarity on the variables measured.</td>
</tr>
</tbody>
</table>
CRITERION | Precision analysis
---|---
‘Yes’ | The study provides confidence intervals for prevalence estimates and P values for any major group comparisons.
‘No’ | A single value is used without assessment of precision.

CRITERION | Response rate
---|---
‘Yes’ | The study has an adequate response rate (>50%)
‘No’ | The study has a low response rate (<50%)

7. DISCUSSION
A final quality criterion is for the study to discuss all biases and limitations and to state conflict of interest and/or source of funding.

CRITERION | Limitations
---|---
‘Yes’ | The study discusses biases and limitations.
‘No’ | The study does not address biases and limitations.

CRITERION | Funding/Conflict of Interest
---|---
‘Yes’ | The study discusses source of funding and conflict of interest.
‘No’ | The study fails to address the aforementioned issues.

8. OVERALL ASSESSMENT OF THE STUDY
High quality (++): Majority of criteria met (80%). Little or no risk of bias. Results unlikely to be changed by further research.

Good Quality (+): Most criteria met (>50%). Some flaws in the study with an associated risk of bias, Conclusions may change in the light of further studies.

Low quality (< or equal 50): Either most criteria not met, or significant flaws relating to key aspects of study design. Conclusions likely to change in the light of further studies.