PTSD and Psychosocial Functional Impairment in Military Populations

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Thesis Declaration Form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature:

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Date: 17th July 2023

Overview

The three parts of this thesis detail a research process focusing on the relationship between PTSD and psychosocial functional impairment in military samples. Part one is a mapping or scoping review which summarises the results of studies looking at the relationship between specific symptoms of PTSD and various definitions of functional impairment in military samples. The methods of how the search was conducted are detailed and the samples, methods, and results for each of the studies found are summarised to give an overview of the current state of research in this area. Part two is an empirical study involving a path analysis looking at the relationship between the symptom clusters of Post traumatic stress disorder (PTSD) as defined by the DSM-5 and functional impairment as measured by the Work and Social Adjustment Scale (WSAS) in a sample of UK armed forces (UKAF) veterans referred to a specialist mental health service. The study sought to determine if alcohol use disorders as measured by the AUDIT mediated between PTSD and functional impairment. Part 3 is a critical appraisal of the whole research process for the thesis that details some reflections, challenges encountered, and lessons learnt.

Impact Statement

Both the review and the empirical study highlight the importance of functional impairment as a key aspect of mental health diagnoses in general and a way of conceptualizing the impact of mental health problems in peoples' lives, such as their ability to socialise, seek and maintain employment, have intimate relationships, maintain a home, and engage with family life. This thesis also highlights the needs of the approximately 1.85 million UKAF veterans currently living in the UK, representing approximately 3% of the total population (ONS, 2023).

The literature review in part one provides a broad and much needed summary of an important area of clinical research. Though the history of the study and treatment of PTSD and indeed clinical psychology in general is heavily based in research on military populations, the summarising and distilling of this research when considering PTSD and functional impairment is comparatively rare. Methodologically, this review demonstrates the importance of the scoping review as a way of detailing 'the lay of the land' regarding an area of research both to determine if any clear conclusions can be identified and to help provide a foundational starting point where future researchers could identify smaller bodies of research for further study. Another benefit of the literature review is how it serves to characterise how functional impairment and PTSD tends to be defined and measured in research on veterans, thereby serving as a conceptual mapping of functional impairment and PTSD; such mapping being one of the key purposes of scoping reviews (Anderson et al., 2008). This review has a clinical implication for the treatment of military populations as it sounds a note of caution regarding making any definitive statements about which characteristics of PTSD are correlated with or predictive of various psychosocial functional impairments.

The empirical study in part two provides an example of research on UKAF personnel, a hard-to-reach population for study as only in recent years has this population been provided with specialist NHS mental health services for the treatment of their specific

needs. This study represents what can be achieved in terms of analyses of routinely gathered secondary data and consequently represents an example of practice-based evidence (PBE). Such research is needed in specialist services as they are ideally placed to both gather the necessary hard to find data and to employ the results of such PBE in their clinical work. Methodologically, this study represents how the increasingly used methods of path analysis, and the related method of structural equation modelling (SEM) can be used to investigate the rich clinical data that may be available to mental health services. In terms of clinical implications, the presented findings highlight two possible areas of focus for the clinical assessment and treatment of PTSD in military samples. Increased PTSD severity was significantly associated with higher levels of potential alcohol use disorders and higher levels of avoidance and negative alternations in cognitions and mood were found to have a particularly strong relationship with higher levels of functional impairment. These findings recommend that clinicians should screen for alcohol use when treating military personnel with high levels of PTSD severity and should consider focusing on avoidance and negative alterations in cognitions and mood when discussing the different domains of daily life involved in psychosocial functioning.

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I'd like to thank the veterans of the UK without which this study would not be possible. Though your service may have ended, your ability to seek help for the hardest moments of your lives continues to demonstrate the courage that has always been demanded of you.

And I'd like to thank Julia Marotti for being herself throughout this process.

Part 1: Literature Review

The Relationship Between PTSD Symptoms and Psychosocial Functional Impairment in Military Samples: A Scoping Review

Abstract

Background: This scoping review details the methods and results of studies examining the relationship between PTSD symptom clusters and psychosocial functional impairment in military samples.

Methods: A literature search was carried out using four electronic databases (PsycINFO, EMBASE, MEDLINE and PubMed). Search terms related to functional impairment were combined with terms associated with military veterans and PTSD.

Results: The methods and results for the 78 studies found were grouped according to the domains of functioning they covered including overall, mental, physical, social, intimate relationship, sexual, family/parental, aggression/hostility, and occupational/educational functioning. There was a wide variety of methods and measures used with heterogenous results and inconsistent findings even when studies examined the same subconcepts of functional impairment. Though many PTSD symptoms were found to correlate significantly with functional impairment, fewer remained significantly associated once demographic and military variables were controlled for.

Conclusion: This review concludes that this is a markedly heterogenous area both overall and within each of the domains of functional impairment identified including regarding how functional impairments and PTSD symptoms are defined and measured. These results may indicate that a range of extraneous variables are operating in mediating and moderating roles between PTSD and functional impairment, with recommendations for future research to be focused upon examining and mapping the impact of these variables. Due to the nature of these findings, it is difficult to clearly state which aspects of PTSD lead to greater functional impairment in military samples.

Introduction

PTSD and Traumatic Events

Since its inclusion in the Diagnostic and Statistical Manual of Mental Disorders, Third Edition (DSM-III) in 1980 (Turnbull, 1998; APA, 1980), PTSD has been defined as a reaction to traumatic life events such as road traffic accidents, natural disasters, rape, assault, murder, and war (Acierno et al., 1999; Brewin et al., 1999; Foa et al., 1995; Mayou et al., 2001). Exposure to such traumatic events is common with lifetime exposure to trauma estimated at ~ 50-90% (Kessler et al., 1995; Resnick et al. 1993; Breslau et al., 1998). The prevalence rate for PTSD in the general population is ~ 2-9% (Breslau et al., 1991; Kessler et al., 1995; Knipscheer et al., 2020; Lukaschek et al., 2012).

PTSD in Military Samples

Prevalence rates for probable PTSD in military populations range from 4.2% for regular UKAF personnel recently deployed to Iraq and Afghanistan, reducing to 4% for those not yet deployed, 5% for reservists deployed and 1.8% for reservists not yet deployed (Fear et al., 2010), indicating that deployment on operations may increase rates of PTSD depending on the nature of your military service. A study following a similar sample of UKAF personnel found probable PTSD rates of 4.8% for still serving regular personnel, rising to 7.4% for ex-serving personnel (Stevelink et al., 2018), suggesting veteran status is associated with higher levels of PTSD. A study of US armed forces personnel estimated a probable PTSD rate of 13% amongst those deployed to Iraq and Afghanistan (Hoge et al., 2004), with the significantly higher rates than UKAF samples being potentially explained by a higher intensity and frequency of combat experiences amongst the US armed forces (Hoge & Castro, 2006). Researchers looking at records of US veterans of the Vietnam war found a lifetime prevalence of PTSD of 18.7% with 9.1% still suffering from PTSD over a decade after the conflicts end, with the rate of PTSD strongly associated with the level and intensity of combat experienced (Dohrenwend et al., 2006). Risk factors for PTSD in UKAF personnel include having a lower military rank,

being unmarried, having low educational achievement, and experiencing childhood adversity (Iversen et al., 2008).

PTSD Symptom Clusters Using the PTSD Checklist for DSM-5 (PCL-5)

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition's (DSM 5) criteria for PTSD includes direct or indirect exposure to a traumatic event, such as actual or threatened death, serious injury, or sexual violence (criterion A); re-experiencing phenomena, including distressing involuntary memories, dreams, and flashbacks (criterion B); avoidance of internal or external reminders of the traumatic event (criterion C); negative alterations in cognitions and mood (NACM), including distorted cognitions about the event, negative affect and detachment from others (criterion D); and alterations in arousal and reactivity, including angry outbursts, hypervigilance, and sleep disturbances (criterion E). In addition to these symptoms having to have persisted for more than one month (criterion F), there must also be a clinically significant level of distress or 'impairment in social, occupational, or other important areas of functioning' (criterion G) also known as, psychosocial functional impairment (hereafter referred to as functional impairment).

Functional Impairment

Functional impairment is defined as the interference in the ability to live life as the result of a disorder (Donahue et al., 2017) and is moderately correlated with symptom severity in a range of mental health disorders including depression (McKnight & Kashdan, 2009), anxiety (McKnight et al., 2016), and social anxiety (Hambrick et al., 2003). PTSD has been associated with functional impairments in social and family functioning (Stein et al., 1997), occupational functioning (Stein et al., 2000), and physical functioning (Vesterling et al., 2008). The National Institute for Health and Care Excellence [NICE] (2018) guidelines for PTSD highlight functional impairment as being an associated consequence of PTSD and thus of vital concern in the recognition, assessment, treatment, and ongoing management of the disorder.

Functional Impairment in Military PTSD

Previous reviews looking at PTSD and functional impairment in military samples have focused on specific domains of impairment such as relationships (Monson et al., 2009; Taft et al., 2011; Sijercic et al., 2022); sexual dysfunction (Bentsen et al., 2015; Bird et al., 2021); parenting and family functioning (Creech et al., 2014; Christie et al., 2019; Kritikos et al., 2018); social functioning (Gettings et al., 2022); and intimate partner violence (Misca & Forgey, 2017; Birkley et al., 2016). Only two reviews focused upon the individual symptoms of PTSD and their relationships to functional impairment (Bird et al., 2021; Birkley et al., 2016). Other reviews covered more than one domain of impairment (Schnurr et al., 2009; Rodriguez et al., 2012) though some focused upon only one PTSD symptom (Schuman et al., 2018).

Rationale

To our knowledge, no review has mapped out in detail the extant literature on the relationship between PTSD symptoms and multiple domains of functional impairment in military populations. Such a map would provide a useful foundation for future studies wishing to explore topics in this area as well as provide a summary of the evidence base available for clinicians treating veterans and active service members with PTSD. This scoping review therefore aims to provide such a map.

Methods

Protocol and Registration

This scoping review drew on the standards of the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR; Tricco et al., 2018) to guide its focus, structure, and design. The review was registered with Open Science Framework (OSF; Culloty & Kamboj, 2023).

Eligibility Criteria

Studies meeting the following criteria were included: (a) published in a peer-reviewed journal; (b) published in English; (c) involved military veterans or active service personnel as a sample; (d) concerned the presentation, measurement, or treatment of PTSD; (e) included some measure of functional impairment; (d) measured individual PTSD symptoms; and (f) measured whether there was any link between individual PTSD symptoms and functional impairment. No limits were placed on publication year.

Search Strategy and Data Sources

A literature search was carried out using four electronic databases (PsycINFO, EMBASE, MEDLINE and PubMed). Search terms related to functional impairment were combined with those for military veterans and PTSD with the use of multiple synonyms for inclusivity ensuring that a comprehensive range of studies were found (see Appendix C). The databases were searched for articles published on or before 27th November 2022 when the search took place. Further backward referencing searches were made of the citations from review articles found in the search (n = 43) for eligible studies that may have been missed in the main search.

Studies Selection

The author performed the initial stage of selection by removing duplicates resulting in 4,222 unique studies. Titles and abstracts were then reviewed for each of these studies. If an abstract appeared to be relevant, describing the relationship between PTSD and functional impairment in veterans, the full article was retrieved if possible and evaluated for

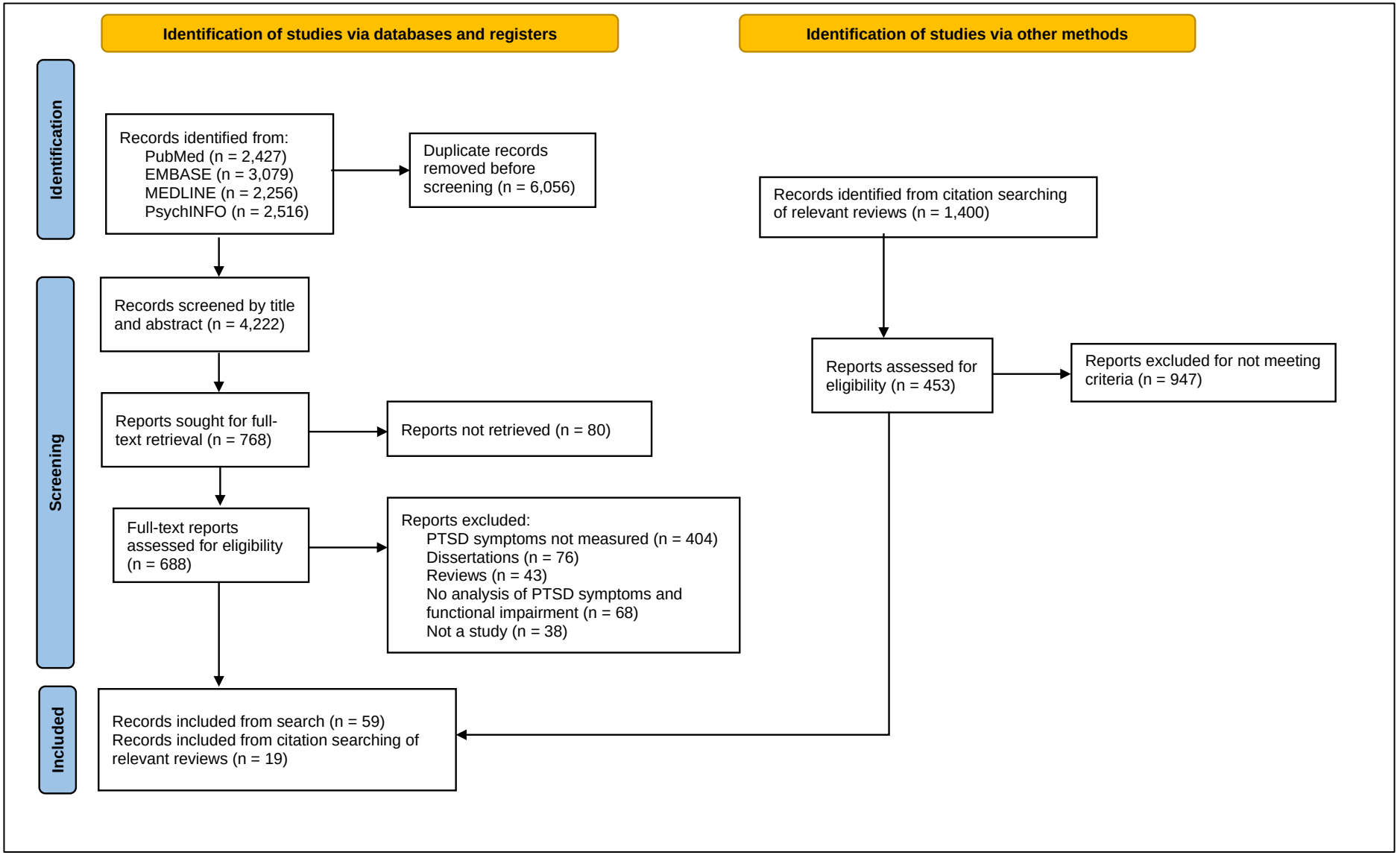
inclusion (n = 688). The full text of these remaining studies were independently assessed for eligibility by the author and two other researchers. A consensus was then reached among the researchers regarding final eligibility and studies not meeting criteria were excluded. After the addition of studies gathered from the backward referencing of relevant reviews articles found in the search (n = 19), the final included set consisted of 78 studies describing the association between PTSD, and functional impairment in veterans. The PRISMA diagram in Figure 1 illustrates the selection process for the relevant studies.

Data Extraction and Synthesis of Results

The included studies were then organised by the author and two researchers independently according to each study's definition of functional impairment in a 'conceptual mapping' exercise (Anderson et al., 2008). The extracted data included authors, sample size, military population type (veterans or active service members), gender of the sample population, research design, country, PTSD measure, functional impairment measure, specific aspects or subcategories of functional impairment reported on, the main findings reported, and data analysis method used.

Figure 1

PRISMA Diagram



Results

Studies Characteristics

Most of the 78 studies originated in North America (n = 54). In terms of research design, most were cross sectional (n = 71), with a small minority being longitudinal (n = 5), or both (n = 2). Regarding samples, most studies were on veterans (n = 52), with others on both veterans and service members (n = 13), prisoners of war (POWs; n = 3) or both veterans and POWs (n =1). Regarding the involvement of non-military samples, 12 included data from the partners of the veterans or active service members, typically to provide a measure of the partner's perspective of their partner's impairment and 1 study included a mixed sample with some civilian participants from first responder services. Sample sizes ranged from n = 45 to n = 10,069, although most studies included n = 45-500 participants. Regarding the gender breakdown of the samples, 36 studies looked at men only, 8 at woman only and 28 looked at both men and women with the average sample being 87% men, with 6 studies not stating the gender of their participants.

Measures of PTSD

As shown in Appendix A, 45 studies used some version of the PTSD Checklist (PCL) such as the civilian PCL-C (n = 9; Weathers et al., 1993), military PCL-M (n = 18; Weathers et al., 1991), stressor specific PCL-S (n = 2; Riviere et al., 2011), or latest version constructed around the diagnostic criteria of the DSM-5, the PCL-5 (n = 16; Weathers et al., 2013). Other measures included the Clinician-administered PTSD scale or CAPS (n = 20; Blake et al., 1995) or its newer variant for DSM-5 the CAPS-5 (Weathers et al., 2018); the PTSD Inventory or PTSD-I (n = 4; Solomon et al., 1993; Solomon & Horesh, 2007); the Impact of events scale or IES (n = 1; Horowitz et al., 1979) or its revised version the IES-R (n = 2; Weiss, 2007); the Mississippi scale for combat-related PTSD or M-PTSD (n = 3; Keane et al., 1988); the Davidson Trauma Scale or DTS (n = 2; Davidson et al., 1997); the Posttraumatic Stress Scale or PSS (n = 2; McIntyre & Ventura, 1996; McIntyre, 1997). Other measures only featured in one study including the Purdue PTSD scale (PPTSDS;

Figley, 1989), the PTSD symptom scale interview (PSS-I; Foa et al., 1993), and the Trauma Symptom Inventory A (TSI-A; Briere et al., 1995).

Domains of Functional Impairment

The studies' findings were organised into 9 different categories according to the domain(s) of functional impairment covered: overall (n = 13), mental (n = 8), physical (n = 11), social (n = 18), intimate relationships (n = 30), sexual (n = 13), family/parental (n = 18), aggression/hostility (n = 13), and occupational/educational functioning (n = 12). These relevant findings are outlined below. Note that the studies' may feature in multiple domains if their results looked at multiple areas of functional impairment.

Overall Functioning

Results as summarised in Table 1 showed re-experiencing, avoidance, arousal and PTSD-related dysphoria correlated with functional impairment (Pietrzak et al., 2010); re-experiencing, avoidance, arousal and NACM correlated with reduced satisfaction in life (Spies et al., 2020) and higher levels of illness intrusiveness in daily functioning (Rassu et al., 2022); and higher re-experiencing, avoidance, arousal and numbing symptoms correlated with higher functional impairment (Maguen et al., 2009) and lower global assessment of functioning (GAF) scores (Miller et al., 2008). However, a study with a majority female sample of US veterans found only higher levels of avoidance to be significantly correlated with lower levels of quality of life (Wiblin et al., 2021) with another study on Croatian POWs finding only higher levels of re-experiencing and arousal as correlated with lower wellbeing (Loncar et al., 2014). The only study to find none of the PTSD symptoms studied (re-experiencing, avoidance, arousal and NACM) to be directly correlated with functional impairment did however find higher overall PTSD severity to be indirectly associated with functional impairment, mediated by the higher levels of PTSD-related dissociative symptoms (Boyd et al., 2018).

Regression analyses showed that increased re-experiencing predicted greater functional impairments alongside depression related symptoms such as NACM (Meyer et

al., 2018) and dysphoria (Pietrzak et al., 2010), while others showed bidirectional effects with lower levels of wellbeing significantly predicting higher levels of re-experiencing (Loncar et al., 2014) with none of these studies finding avoidance and arousal to be significantly related to functional impairment. These findings contrast with regression analyses finding increased avoidance to predict lower life satisfaction and increased arousal to a predict lower global functioning (Shea et al., 2010) or increased avoidance and arousal predicting greater functional impairment (Maguen et al., 2009), with both again showing re-experiencing as not predictive of either. A SEM study proposed an indirect causal association between PTSD and functional impairment with increased re-experiencing, avoidance, arousal, and dysphoria symptoms proposed to cause greater functional impairment via 'internalizing symptoms' which were defined as inwardly directed negative affect and distress (Disner et al., 2017). Other SEM studies found increased PTSD symptoms relating to negative affect such as NACM and dysphoria to be associated with lower quality of life levels (Pietrzak et al., 2015) and increased avoidance and numbing to be associated with lower GAF scores (Miller et al., 2008), again with neither study finding a significant association with re-experiencing.

Mental Health Functioning

Studies as summarised in Table 2, showed increased re-experiencing, avoidance, and arousal as significant correlates of decreased mental functioning (Asnaani et al., 2018; St. Cyr et al., 2014; Wiblin et al., 2021) with other studies finding additional correlates including NACM (Rassu et al., 2022; Bras et al., 2011) and irritability, dissociation, impaired self-reference, and tension reduction behaviours (Bras et al., 2011). However, hierarchical regressions that partialed out the effect of variables such as the veterans age, ethnicity, gender, physical injury, substance misuse, depression, combat deployment status and time since deployment showed only increased re-experiencing as a significant predictor of lower mental functioning with arousal and numbing as insignificant (Asnaani et al., 2014). Other hierarchical regressions showed either increased avoidance to be a significant predictor of

Table 1

Overall Functioning

Overall Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Boyd et al (2018)	62	SM V C	84	CS	US	PCL-5	WHODAS 2.0	Functional impairment	Correlation												
									Mediation										D		
Disner et al (2017)	295	V	94	CS	US	CAPS	SAS-SR	Functional impairment	SEM	I	I	I			I						
Loncar et al (2014)	184	POW	100	CS	Cro	IES-R	WHO-Five Wellbeing Index	Quality of life	Correlation												
									Hierarchical reg.												
Maguen et al (2009)	203	SM	93	CS	US	PCL	Study questions	Functional impairment	Correlation												
									Multiple reg.												
Meyer et al (2018)	252	V	69	CS	US	PCL-5	WHODAS 2.0; IPF	Functional impairment	Multiple reg.												
Miller et al (2008)	315	V	100	CS	US	CAPS	GAF	Global assessment of functioning	Correlation												
									SEM	D	D	D	D								
Pietrzak et al (2010)	272	V	?	CS	US	PCL-M	DRRI	Functional impairment	Correlation												
									Regression												
Pietrzak et al (2015)	1484	V	89.7	CS	US	PCL-5	Q-LES-Q-SF	Quality of life	SEM	D	D	D		D	D	D	D				
Rassu et al (2022)	184	V	90.8	CS	US	PCL-5	IIRS	Illness intrusiveness	Correlation												
Shea et al (2010)	124	V	96	CS	US	CAPS	LIFE	Life satisfaction	Linear reg.												
							GAFS	Global assessment of functioning	Linear reg.												
Spies et al (2020)	72	SM V	100	CS	Ger	CAPS-5	SWLS	Life satisfaction	Correlation												
Wiblin et al (2021)	115	V	10.4	CS	US	CAPS	QOLI	Quality of life	Correlation												

SM = service member; V = veteran; C = civilian; POW = prisoner of war; CS = cross sectional

WHODAS 2.0 = WHO Disability Assessment Schedule; SAS-SR = Social Adjustment Scale-Self Report; IPF = Inventory of Psychosocial Functioning; GAF = Global Assessment of Functioning Scale; DRRI = Deployment, risk and resilience inventory; Q-LES-Q-SF = Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form; IIRS = Illness Intrusiveness Scale; LIFE = Longitudinal Interval Follow-up Schedule; SWLS = Satisfaction With Life Scale; QOLI = Quality of Life Inventory.

Note. 'study question(s)' refers to questions created by the study authors for that specific study

Key:
Significant
Nonsignificant
I Indirect effect
D Direct effect

reduced mental functioning (Richardson et al., 2010) or neither re-experiencing, avoidance nor arousal as associated with mental functioning (Asnaani et al., 2018) once other variables such as demographics and military deployment were controlled for.

In a network analysis that mapped out connections between all the individual items of the PCL-5 with various functional impairments, mental functioning was found to be weakly connected with some but not all of the individual items of NACM (negative beliefs, detachment, and restricted affect) and arousal (irritability/anger, self-destructiveness/reckless behaviours and difficulty concentrating), with no connections between any of the re-experiencing or avoidance items (Armour et al., 2017). Some of these findings were supported by a SEM study (Pietrzak et al., 2015) which proposed that higher levels of depression-related symptoms of NACM, dysphoria and anhedonia to be directly associated with impaired mental functioning; however, this study also proposed that increased re-experiencing and avoidance directly caused impaired mental functioning with arousal and externalizing symptoms not significantly associated.

Physical Functioning

As shown in table 3, higher rates of re-experiencing, avoidance, and arousal were found to be significant correlates of reduced physical functioning (St. Cyr et al., 2014) with another study adding NACM, irritability, dissociation, impaired self-reference, and tension reduction behaviours as additional significant correlates (Bras et al., 2011). In contrast, other studies found increased re-experiencing and arousal (Asnaani et al., 2018; Wiblin et al., 2021) to be significantly correlated with reduced physical functioning. Again however, there were some findings that suggested none of the PTSD symptom clusters studied such as re-experiencing, avoidance, arousal or NACM were correlated with reduced physical functioning (Rassu et al., 2022).

When partialing out the effects of other variables such as demographics and combat deployment status, regression analyses showed increased re-experiencing, arousal and numbing (Asnaani et al., 2014), only arousal but not re-experiencing and avoidance

Table 2

Mental Functioning

Mental Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Armour et al (2017)	221	V	86.7	CS	US	PCL-5	SF-8	Mental functioning	Network analysis												
Asnanni et al (2014)	168	V	93	CS	US	CAPS	SF-36	Mental functioning	Hierarchical reg.												
Asnaani et al (2018)	366	V	88	CS	US	PSS-I	VR-12	Mental functioning	Correlation												
									Hierarchical reg.												
Bras et al (2011)	248	V	100	CS	Cro	TSI-A	WHOQOL-BREF (item)	Psychological health	Correlation												
Pietrzak et al (2015)	1484	V	89.7	CS	US	PCL-5	SF-8	Mental functioning	SEM	D	D	D		D	D	D	D				
Rassu et al (2022)	184	V	90.8	CS	US	PCL-5	SF-12	Mental functioning	Correlation												
Richardson et al (2010)	120	V	100	CS	Can	CAPS	SF-36	Mental functioning	Hierarchical reg.												
St. Cyr et al (2014)	291	SM V	91.8	CS	Can	PCL-M	SF-36	Mental functioning	Correlation												
Wiblin et al (2021)	115	V	10.4	CS	US	CAPS	SF-36	Mental functioning	Correlation												

SM = service member; V = veteran; CS = cross sectional

SF = Short Form Health Survey Questionnaire; VR = Veterans RAND Health Survey; WHOQOL-BREF = WHO Quality of Life BREF

Note. 'Study question(s)' refers to questions created by the study authors for that specific study; 'item (s)' refers to individual items being used from the measure

Key:
Significant
Nonsignificant
I Indirect effect
D Direct effect

Table 3

Physical Functioning

Physical Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Armour et al (2017)	221	V	86.7	CS	US	PCL-5	SF-8	Physical functioning	Network analysis												
Asnanni et al (2014)	168	V	93	CS	US	CAPS	SF-36	Physical functioning	Hierarchical reg.												
Asnaani et al (2018)	366	V	88	CS	US	PSS-I	VR-12	Physical functioning	Correlation												
									Hierarchical reg.												
Aversa et al (2013)	943	V	94	L	US	CAPS; PCI	VR-36; SF-36	Physical functioning	Hierarchical linear model												
								Role-physical	Hierarchical linear model												
								Bodily pain	Hierarchical linear model												
								General health	Hierarchical linear model												
								Vitality	Hierarchical linear model												
Bras et al (2011)	248	V	100	CS	Cro	TSI-A	WHOQOL-BREF (item)	Physical Health	Correlation												
Murphy et al (2020)	275	V	94.9	CS	UK	PCL-5	Study questions	COVID stressors	Multiple reg. (reverse effect)												
Pietrzak et al (2015)	1484	V	89.7	CS	US	PCL-5	SF-8	Physical functioning	SEM	D	D	D		D	D	D	D				
Rassu et al (2022)	184	V	90.8	CS	US	PCL-5	SF-12	Physical functioning	Correlation												
Richardson et al (2010)	120	V	100	CS	Can	CAPS	SF-36	Physical functioning	Hierarchical reg.												
St. Cyr et al (2014)	291	SM V	91.8	CS	Can	PCL-M	SF-36	Physical functioning	Correlation												
Wiblin et al (2021)	115	V	10.4	CS	US	CAPS	SF-36	Physical functioning	Correlation												

SM = service member; V = veteran; CS = cross sectional; L = longitudinal

SF = Short Form Health Survey Questionnaire; VR = Veterans RAND Health Survey; WHOQOL-BREF = WHO Quality of Life BREF

Note. 'study question(s)' refers to questions created by the study authors for that specific study; 'item (s)' refers to individual items being used from the measure; 'reverse effect' refers to the PTSD symptom clusters being the DV, i.e. being predicted by the functional impairment

Key:
Significant
Nonsignificant
I Indirect effect
D Direct effect

(Asnaani et al., 2018) or neither re-experiencing, avoidance nor arousal as predictive of physical functioning (Richardson et al., 2010). Only one study (Aversa et al., 2013) broke down physical functioning into separate components and conducted a hierarchical linear regression of 943 US veterans looking at five aspects of physical health functioning ('physical functioning', 'role-physical', 'bodily pain', 'general health', and 'vitality') as defined by the SF-36 (Jenkinson et al., 1994) and VR-36 (McHorney et al., 1994; Kazis et al., 2004) and found increased numbing symptoms to be a predictor of all five, with increased re-experiencing predicting only physical functioning and vitality, arousal predicting only role-physical and avoidance predicting none of the five items. Only one regression analysis treated PTSD symptoms as criterion variables and found that a higher number of stressors reported by veterans because of the COVID-19 pandemic significantly predicted increased rates of re-experiencing, avoidance, arousal, and dysphoria symptoms (Murphy et al., 2020).

A network analysis found weak associations between physical functioning and some of the individual items relating to re-experiencing (nightmares), arousal (exaggerated startle response and hypervigilance), and NACM (trauma-related amnesia and loss of interest) symptoms of PTSD (Armour et al., 2017), though again it should be noted, most of the remaining 20 items of the PCL-5 were found to have no association to physical functioning including all of the items relating to avoidance. These findings contrast with a SEM study that found increased re-experiencing, arousal, NACM, anhedonia and externalizing behaviours to not be significantly associated with reduced physical functioning but did find increased avoidance and dysphoria as having significant and direct causal relationships to reduced physical functioning (Pietrzak et al., 2015).

Social Functioning

Results for social functioning (Table 4) showed higher levels of re-experiencing, avoidance, and arousal were found to be correlated to veterans' perceptions of their having less social support (Gewirtz et al., 2010) and greater social impairment (Kaier et al., 2014)

with increased avoidance, arousal, and numbing, but not re-experiencing being correlated with reduced self-ratings of their own social skills (LaMotte et al., 2017). Other studies showed increased re-experiencing, avoidance, arousal and NACM as correlated with lower levels of perceived social support and decreased acknowledgement from others as being a victim of trauma (Spies et al., 2020) and correlated with impaired social relations and social environment alongside other PTSD symptoms such as irritability, dissociation, impaired self-reference, and tension reduction behaviours (Bras et al., 2011). Lunney & Schnurr (2007) found increased re-experiencing, arousal, and numbing as correlated with reduced self-expression and increased numbing as correlated with lower ratings of social surroundings; however, when analysed in a regression only numbing symptoms remained as a significant predictor of each.

Pietrzak et al. (2010) used the items of the Deployment, risk and resilience inventory (DRRI; Vogt et al., 2008) to show increased re-experiencing, avoidance, arousal and dysphoria to be correlated to lower self-ratings for the items ‘peers’, ‘resilience’, ‘hardiness’, ‘purpose’, ‘leadership’, ‘perseverance’, ‘spiritual’, ‘post deployment social support’ and increased ratings for ‘perceived stigma’ and ‘perceived barriers to care’ with the exception of ‘unit support’ which was correlated with higher levels of re-experiencing, avoidance and dysphoria, but not arousal. However, when variables such as age, deployment status, depression, alcohol use, suicidal ideation, and recent mental health treatment were held constant, only increased levels of dysphoria remained a significant predictor of all the DRRI items except for avoidance which predicted post-deployment social support but none of the other items. Other findings from regression analyses showed increased arousal and numbing but not re-experiencing and avoidance to significantly predict lower social functioning (Aversa et al., 2013), but only numbing to predict social skills deficits (LaMotte et al., 2017). Regarding self-ratings of received social support, regressions found re-experiencing, avoidance, arousal, and dysphoria to be significant predictors (Murphy et al., 2020; Jukic et al., 2020) but interestingly, none of these symptoms were found to predict whether veterans lived alone (Murphy et al., 2020). Increased avoidance, but not re-

Table 4

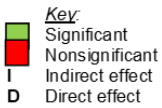
Social Functioning

Social Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Aversa et al (2013)	943	V	94	L	US	CAPS; PC	VR-36; SF-36	Social functioning	Hierarchical linear model												
Bras et al (2011)	248	V	100	CS	Cro	TSI-A	WHOQOL-BREF (item)	Social relationships	Correlation												
								Environment	Correlation												
Bravo-Mehmedbasic & Kucukalic (2011)	100	V	100	CS	B&H	IES-R	Study questions	Perception of social support	Multi. Analysis (reverse effect)												
Gewirtz et al (2010)	468	SM	100	CS	US	PCL-M	Study questions	Perception of social support	Correlation												
Jukic et al (2020)	259	V	100	CS	Cro	PCL-5	Study questions	Social Support	Regression												
								Perception of social support	Chi-squared tests												
Kaier et al (2014)	124	V	86	CS	US	CAPS	CAPS (SF item)	Social impairment	Correlation												
LaMotte et al (2017)	92	V	100	CS	US	CAPS	Social skills task (for study)	Social skills deficits	Correlation												
								Social skills deficits	Regression												
Lunney & Schnurr (2007)	319	V	100	CS & L	US	CAPS	QOLI	Self-expression	Correlation												
								Self-expression	Regression												
								Surroundings	Correlation												
								Surroundings	Regression												
Murphy et al (2020)	275	V	94.9	CS	UK	PCL-5	Study questions	Social support	Multiple reg. (reverse effect)												
								Living alone	Multiple reg. (reverse effect)												
Pietrzak et al (2010)	272	V	?	CS	US	PCL-M	DRRI	Peer, resilience, hardiness, purpose, leadership, perseverance, spiritual, perceived stigma, barriers to care	Correlation												
									Regression												
								Unit support	Correlation												
									Regression												
								Postdeployment social support	Correlation												
									Regression												
Raab et al (2015)	158	V	100	CS	US	PCL-M, PC	QOLI	Self-expression	Regression												
Rona et al (2009)	10069	SM V	?	CS	UK	PCL	SF-36 (item)	Social activities	Odds ratios												
Ross et al (2018)	331	V	96	CS	UK	PCL-5	WSAS	Social activities	Network analysis												
Schnurr & Lunney (2008)	561	V	63.8	CS	US	CAPS	QOLI	Self-expression (men)	Multiple reg.												
								Self-expression (women)	Multiple reg.												
								Surroundings (men)	Multiple reg.												
								Surroundings (women)	Multiple reg.												
Shea et al (2010)	124	V	96	CS	US	CAPS	CAPS (item)	Social impairment	Linear reg.												
							LIFE	Relationships w/friends	Linear reg.												
								Global social adjustment	Linear reg.												
Sippel et al (2018)	3789	V	93.3	CS	US	PCL	BAM (items)	Bothered by problems getting along	Ordinal reg.												
								Days of contact with loved ones	Ordinal reg.												
Spies et al (2020)	72	SM V	100	CS	Ger	CAPS-5	CSS	Social support	Correlation												
							SAQ	Social acknowledgement as a victim	Correlation												

SM = service member; V = veteran; CS = cross sectional; L = longitudinal

SF = Short Form Health Survey Questionnaire; VR = Veterans RAND Health Survey; WHOQOL-BREF = WHO Quality of Life BREF; QOLI = Quality of Life Inventory; DRRI = Deployment, risk and resilience inventory; WSAS = Work and Social Adjustment Scale; LIFE = Longitudinal Interval Follow-up Schedule; BAM = Brief Addiction Monitor; CSS = Crisis Support Scale; SAQ = Social Acknowledgment as a Victim or Survivor Questionnaire

Note. 'study question(s)' refers to questions created by the study authors for that specific study; 'item (s)' refers to individual items being used from the measure; 'reverse effect' refers to the PTSD symptom clusters being the DV, i.e. being predicted by the functional impairment



experiencing or arousal, were found to significantly predict higher levels of social impairment and lower ratings of relationships with friends; with higher avoidance arousal, but not re-experiencing predicting reduced global social adjustment (Shea et al., 2010).

In addition to findings from Lunney & Schnurr (2007), increased numbing symptoms were highlighted as of particular importance when predicting reduced social functioning in several regression studies, predicting both higher self-ratings of difficulties getting along with others (along with dysphoria) and a reduction in the number of days contact with loved ones (Sippel et al., 2018). Two studies looking at social functioning as measured by the Quality-of-Life Inventory (QOLI; Frisch et al., 1992) found only increased numbing symptoms to be a predictor of reduced self-expression when controlling for covariates such as depression and other PTSD symptoms (Raab et al., 2015), with this being the case in both male and female US veterans (Schnurr & Lunney, 2008). However, when these studies looked at the 'social surroundings' measure of the QOLI, Raab et al. (2015) showed none of the four symptoms as predictive once controlling for depression and other PTSD symptoms, whereas Schnurr & Lunney (2008) found increased numbing symptoms to be a significant predictor in male but not female veterans.

Other analyses included a SEM study finding increased re-experiencing, avoidance, arousal, and dysphoria as having significant indirect relationships with reduced social functioning mediated by higher levels of internalizing symptoms (Disner et al., 2017), with a network analysis showing increased re-experiencing, avoidance and NACM but not arousal, as having weak associations with lower ratings of social activities (Ross et al., 2018). Perceptions of social support were found not to be significantly predicted by re-experiencing, avoidance, and arousal in a multiple analysis of variance (Bravo-Mehmedbasic & Kucukalic, 2011); however, another study using chi-squared tests found increased levels of all three symptoms plus dysphoria to be significant predictors (Jukic et al., 2020). One study made use of odds ratios to calculate that impairments in social activities were related to higher levels of re-experiencing and arousal, but that increased avoidance and numbing symptoms had the strongest relationship to social impairment

(Rona et al., 2009).

Intimate Relationship Functioning

Regarding studies looking at intimate relationship functioning (Table 5), in terms of whether veterans were married or in an intimate relationship, re-experiencing, avoidance, arousal, numbing, NACM, dysphoria, and anhedonia were not found to be correlated with whether veterans were married or not (Blais et al., 2018; Blais et al., 2019; Possemato et al., 2015); regression analyses showed no PTSD symptoms as predictive of marital status (Blais et al., 2019; Jukic et al., 2019; Murphy et al., 2020) with only one study finding only arousal as predictive (Jukic et al., 2020). Regarding relationship duration, only dysphoria was found to correlate in one study (Blais et al., 2018) with other studies showing no PTSD symptoms as correlated (Blais et al., 2020; Blais et al., 2022a).

Regarding predictors and correlates of impaired intimate relationship functioning and reduced marital satisfaction, some studies found increased re-experiencing, avoidance, arousal and numbing to be significant correlates (Cook et al., 2004; Renshaw & Campbell, 2011; Lunney & Schnurr, 2007) but unrelated in a regression analysis (Malaktaris et al., 2019). Other findings showed only avoidance (Campbell & Renshaw, 2013) or avoidance and numbing as significant correlates with only numbing remaining significant in regressions controlling for demographics and variables relating to military deployment (Possemato et al., 2015; Cook et al., 2004; Lunney & Schnurr, 2007; Schnurr & Lunney, 2008; Raab et al., 2015). Reduced marital satisfaction was shown to be correlated with re-experiencing, avoidance, and arousal (Hedrix & Anellli, 1993; Hendrix et al., 1995; Pereira et al., 2019), with one study finding increased re-experiencing, avoidance, and numbing, but not arousal, as correlated with reduced relationship satisfaction, but only arousal remaining significant in a regression (Riggs et al., 1998). One longitudinal study found increased re-experiencing, avoidance, arousal, and dysphoria as correlated with reduced relationship satisfaction in veterans at 2-3 months postemployment, with only avoidance and dysphoria remaining correlated 1year postemployment (Erbes et al., 2011) suggesting the relationship between PTSD symptom clusters and intimate relationship functioning may change over

time. Riggs et al. (1998) found re-experiencing, avoidance, arousal and numbing as correlated with reduced relationship satisfaction, with only numbing remaining as a significant predictor in a regression. The related concept of relationship adjustment was also studied with findings showing increased re-experiencing, avoidance, arousal, and dysphoria as correlated (Gewirtz et al., 2010), but with only avoidance and dysphoria remaining correlated 1year postemployment and only dysphoria remaining significant in a regression analysis (Erbes et al., 2012); however, another regression showed increased re-experiencing, avoidance, and arousal as significant predictors of impaired marital adjustment (Solomon et al., 2011).

Several studies in this domain focused upon the views of the partners of the veterans finding that increased re-experiencing, avoidance, arousal and numbing in the veterans was correlated with reductions in their partners' marital satisfaction (Renshaw et al., 2014; Riggs et al., 1998) relationship desires (LaMotte et al., 2015) and an increase in relationship problems (Riggs et al., 1998). Regressions showed only increased re-experiencing and numbing remained significant predictors of reduced marital satisfaction (Renshaw et al., 2014) and increased numbing a predictor of reduced relationship desires (LaMotte et al., 2015). However, other results indicated that re-experiencing, avoidance, arousal, numbing, and dysphoria were not correlated with partner's relationship satisfaction (Campbell & Renshaw, 2013). Riggs et al. (1998) found that in regression analyses, only the veteran's increased numbing symptoms were a consistent predictor of their partners' reduced levels of marital satisfaction, increased fear of intimacy and higher numbers of relationship problems.

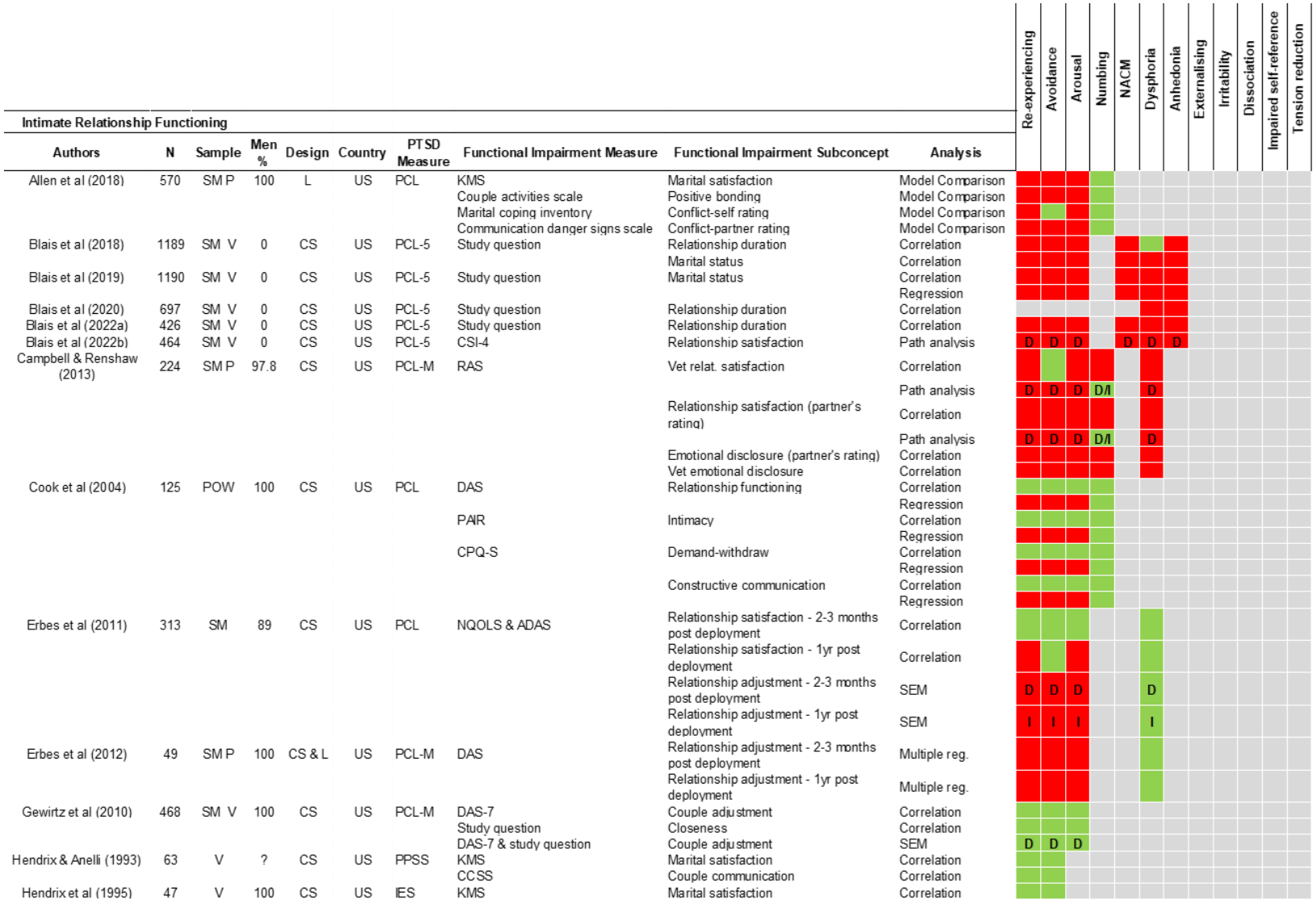
Other concepts covered in the marriage and relationship domain included reductions in the emotional, social, sexual, intellectual and recreational intimacy between the veterans and their partners which was found to be correlated with increased re-experiencing, avoidance, arousal, and numbing in veterans (Cook et al., 2004; Riggs et al., 1998; Gewirtz et al., 2010) but only increased avoidance and arousal in a sample of POWs (Solomon et al., 2008), with regressions in both cases showing only increased numbing to be a

significant predictor. Relationship problems were found to be positively correlated with increases in re-experiencing, avoidance, arousal, and numbing (Riggs et al., 1998), with avoidance and numbing remaining as the only predictors in regressions (Riggs et al., 1998; Malaktaris et al., 2019). Various communication-related concepts such as the ability of veterans to express themselves to their partner honestly or 'self-disclosure' were shown to be correlated (Cook et al., 2004; Hendrix & Anelli, 1993) or not correlated (Campbell & Renshaw, 2013; Solomon et al., 2008) with increased PTSD symptoms, with only numbing remaining significant in regressions (Cook et al., 2004). Malaktaris et al. (2019) asked veterans to rate themselves on a series of statements relating to communication in their intimate relationships such as 'I have the skills to communicate my needs and feelings' and found increased numbing to be most correlated with lower self-ratings on these questions followed by arousal and avoidance, with re-experiencing not correlated at all; this was supported by a model comparison analysis showing numbing and not re-experiencing as a strong predictor of relationship bonding, communication, and satisfaction (Allen et al., 2018).

Results from SEMs varied, suggesting direct associations between increased re-experiencing, avoidance and arousal and reductions in the latent variable of relationship adjustment (Gewirtz et al., 2010) or showing only increased dysphoria as having a significant direct association (Erbes et al., 2011). Other SEMs highlighted the importance of increased numbing as a predictor of lower relationship satisfaction in veterans (Campbell & Renshaw, 2013) and of reductions in their partners' relationship satisfaction and relationship distress (Campbell & Renshaw, 2013; Renshaw & Campbell, 2011); however, one SEM found none of the PTSD symptoms to be directly related to relationship satisfaction, but this was attributed to the high levels of intercorrelation between the PTSD symptoms cancelling out their unique effects (Blais et al., 2022b). A network analysis by Ross et al. (2018) showed relationships as measured by the WSAS (Mundt et al., 2002) as weakly connected to some of the PCL-5 items relating to NACM (Diminished interest, detachment, and restricted affect) and arousal (Irritability/anger), with no associations with

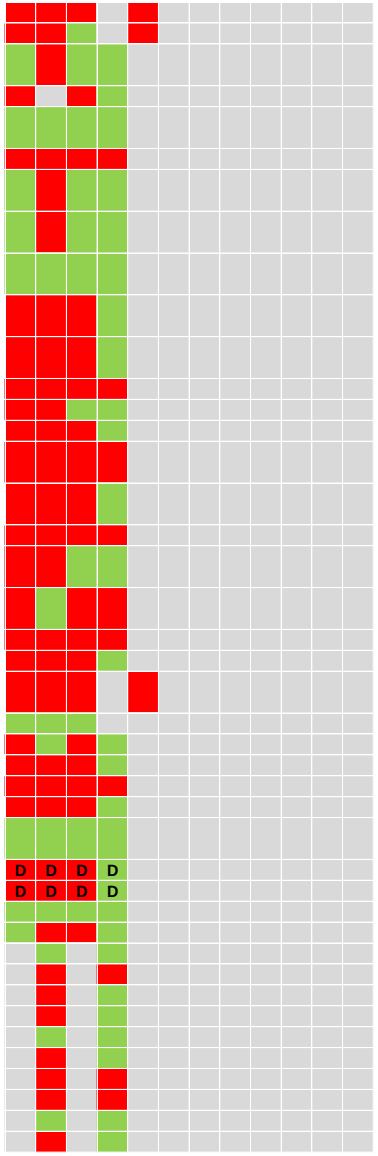
Table 5

Intimate Relationship Functioning

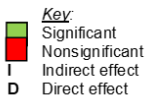


Intimate Relationship Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Allen et al (2018)	570	SM P	100	L	US	PCL	KMS	Marital satisfaction	Model Comparison												
							Couple activities scale	Positive bonding	Model Comparison												
							Marital coping inventory	Conflict-self rating	Model Comparison												
							Communication danger signs scale	Conflict-partner rating	Model Comparison												
Blais et al (2018)	1189	SM V	0	CS	US	PCL-5	Study question	Relationship duration	Correlation												
								Marital status	Correlation												
Blais et al (2019)	1190	SM V	0	CS	US	PCL-5	Study question	Marital status	Correlation												
									Regression												
Blais et al (2020)	697	SM V	0	CS	US	PCL-5	Study question	Relationship duration	Correlation												
Blais et al (2022a)	426	SM V	0	CS	US	PCL-5	Study question	Relationship duration	Correlation												
Blais et al (2022b)	464	SM V	0	CS	US	PCL-5	CSI-4	Relationship satisfaction	Path analysis	D	D	D		D	D	D					
Campbell & Renshaw (2013)	224	SM P	97.8	CS	US	PCL-M	RAS	Vet relat. satisfaction	Correlation												
									Path analysis	D	D	D	D/I		D						
								Relationship satisfaction (partner's rating)	Correlation												
									Path analysis	D	D	D	D/I		D						
								Emotional disclosure (partner's rating)	Correlation												
								Vet emotional disclosure	Correlation												
Cook et al (2004)	125	POW	100	CS	US	PCL	DAS	Relationship functioning	Correlation												
									Regression												
							PAIR	Intimacy	Correlation												
									Regression												
							CPQ-S	Demand-withdraw	Correlation												
									Regression												
								Constructive communication	Correlation												
									Regression												
Erbes et al (2011)	313	SM	89	CS	US	PCL	NQOLS & ADAS	Relationship satisfaction - 2-3 months post deployment	Correlation												
								Relationship satisfaction - 1yr post deployment	Correlation												
								Relationship adjustment - 2-3 months post deployment	SEM	D	D	D			D						
								Relationship adjustment - 1yr post deployment	SEM	I	I	I			I						
Erbes et al (2012)	49	SM P	100	CS & L	US	PCL-M	DAS	Relationship adjustment - 2-3 months post deployment	Multiple reg.												
								Relationship adjustment - 1yr post deployment	Multiple reg.												
Gewirtz et al (2010)	468	SM V	100	CS	US	PCL-M	DAS-7	Couple adjustment	Correlation												
							Study question	Closeness	Correlation												
							DAS-7 & study question	Couple adjustment	SEM	D	D	D									
Hendrix & Anelli (1993)	63	V	?	CS	US	PPSS	KMS	Marital satisfaction	Correlation												
							CCSS	Couple communication	Correlation												
Hendrix et al (1995)	47	V	100	CS	US	IES	KMS	Marital satisfaction	Correlation												

Jukic et al (2019)	45	POW	100	CS	Cro	PCL-5	Study questions	Marital status	Regression
Jukic et al (2020)	259	V	100	CS	Cro	PCL-5	Study questions	Marital status	Regression
LaMotte et al (2015)	249	V P	100	CS	US	CAPS	DCQ	Partner's relationship desires (intimacy)	Correlation
									Regression
								Partner's relationship desires (shared activities)	Correlation
									Regression
								Partner's relationship desires (responsibilities)	Correlation
Lunney & Schnurr (2007)	319	V	100	CS & L	US	CAPS	QOLI	Relationship functioning (pre-treatment)	Correlation
								Relationship functioning (pre-post treatment change)	Correlation
								Relationship functioning (pre-treatment)	Regression
								Relationship functioning (pre-post treatment change)	Regression
Malaktaris et al (2019)	74	V	100	CS	US	PCL-S	Study questions	Q1 - I'm happy with my relationship	Correlation
								Q2 - I can communication difficulties	Correlation
								Q3 - I can communicate my needs	Correlation
								Q4 - My partner communicates their needs	Correlation
								Q5 - I can communicate to resolve issues	Correlation
								Q6 - My partner can resolve issues	Correlation
								Q7 - PTSD is interfering in my relationship	Correlation
								Q8 - I want my partner included in my treatment	Correlation
								Relationship satisfaction	Multiple reg.
								PTSD-related relational interference	Multiple reg.
Murphy et al (2020)	275	V	94.9	CS	UK	PCL-5	F-SozU	Being in a relationship	Multiple reg. (reverse effect)
Pereira et al (2019)	138	V	100	CS	Por	PSS	IMS	Marital satisfaction	Correlation
Possemato et al (2015)	137	V	88	CS	US	CAPS	SAS-SR	Relationship functioning	Correlation
									Multiple reg.
							Study question	Marital status	Correlation
Raab et al (2015)	158	V	100	CS	US	PCL-M, PC	QOLI	Relationship functioning	Regression
Renshaw & Campbell (2011)	206	SM P	98.5	CS	US	PCL-M	RAS	Relationship functioning	Correlation
								Partner's relationship distress	SEM
								Partner's psychological distress	SEM
Renshaw et al (2014)	483	SM P	100	CS	US	PCL	KMS	Partner's marital satisfaction	Correlation
									Regression
Riggs et al (1998)	50	V P	100	CS	US	PCL-M	MSI	Marital status inventory (veteran)	Correlation
									Regression
								Marital status inventory (partner)	Correlation
									Regression
							FIS	Fear of intimacy (veteran)	Correlation
									Regression
								Fear of intimacy (partner)	Correlation
									Regression
							DAS	Relationship satisfaction (veteran)	Correlation
									Regression



								Relationship satisfaction (partner)	Correlation	
									Regression	
							RPS	Relationship problems (veteran)	Correlation	
									Regression	
								Relationship problems (partner)	Correlation	
									Regression	
Ross et al (2018)	331	V	96	CS	UK	PCL-5	WSAS	Relationship functioning	Network analysis	
Schnurr & Lunney (2008)	561	V	63.8	CS	US	CAPS	QOLI	Relationship functioning (men)	Multiple reg.	
								Relationship functioning (women)	Multiple reg.	
Solomon et al (2008)	125	V POW	100	CS	Isr	PTSD-I	SDI	Self disclosure (veteran)	Correlation	
								Self disclosure (POW)	Correlation	
									Path analysis	D D
							CIQ	Intimacy (veteran)	Correlation	
								Intimacy (POW)	Correlation	
									Path analysis	D D D
Solomon et al (2011)	473	V	100	CS	Isr	PTSD-I	DAS	Marital adjustment	Regression	



SM = service member; V = veteran; POW = prisoner of war; P = partner; CS = cross sectional; L = longitudinal

KMS = Kansas Marital Satisfaction Scale; CSI-4 = Couples satisfaction Index; RAS = Relationship Assessment Scale; DAS = Dyadic Adjustment Scale; PAIR = Personal Assessment of Intimacy in Relationships; CPQ-S = Communications Pattern Questionnaire—Short Form; NQOLS = Navy Quality of Life Survey; ADAS = Abbreviated Dyadic Adjustment Scale; CCSS = Couple Communication Skills Scale; DCQ = Desired Changes Questionnaire; QOLI = Quality of Life Inventory; F-SozU = Perceived Social Support Questionnaire; IMS = Index of Marital Satisfaction; SAS-SR = Social Adjustment Scale-Self Report; MSI = Marital Status Inventory; FIS = Fear of Intimacy Scale; RPS = Relationship Problems Scale; WSAS = Work and Social Adjustment Scale; SDI = Self Disclosure Index; CIQ = Capacity for intimacy Questionnaire

Note. 'study question(s)' refers to questions created by the study authors for that specific study; 'reverse effect' refers to the PTSD symptom clusters being the DV, i.e. being predicted by the functional impairment

re-experiencing or avoidance.

Sexual Functioning

Regarding studies look at sexual functioning (Table 6), studies on female US veterans found that decreased sexual functioning as measured by the Female Sexual Function Index (FSFI; Rosen et al., 2000) was correlated with higher levels of re-experiencing, avoidance, arousal, NACM, dysphoria, and anhedonia (Blais et al., 2018; Blais et al., 2020; Blais et al., 2022b) with only dysphoria and anhedonia remaining as significant predictors in a regression (Blais et al., 2018) and pathway analyses showing only increased anhedonia as having a significant direct relationship reduced sexual functioning (Blais et al., 2018; 2020; 2022a). Regarding the related concept of reduced sexual satisfaction, increased re-experiencing, avoidance, arousal, numbing, dysphoria, and anhedonia were correlated in a sample of female US veterans (Blais et al., 2018; 2022a) and increased re-experiencing, arousal and avoidance were found to be correlated in samples of male veterans (Pereira et al., 2019; McIntyre-Smith et al., 2015; Bachem et al., 2020). Regressions controlling for demographics and military variables showed only increased NACM (Letica-Crepilja, 2019) or avoidance (Bachem et al., 2020) as significant predictors of reduced sexual satisfaction with other studies showing avoidance to be a correlate but not a predictor of reduced sexual satisfaction (McIntyre-Smith et al., 2015). Mediation analyses showed increases in dysphoria and anhedonia as mediating the relationship between having experienced sexual assault/harassment and reductions subsequent sexual satisfaction (Blais et al., 2018). Regarding female veterans and reduced sexual satisfaction, regressions found increased re-experiencing, arousal, NACM, dysphoria and anhedonia but not avoidance as significant predictors (Blais et al., 2018), but a pathway analysis showed only re-experiencing, NACM and anhedonia as direct causes (Blais et al., 2022a).

Regarding reduced sexual desire, increased avoidance but not re-experiencing or arousal were found to be significantly associated in a sample of male veterans (Badour et al., 2015; Richardson et al., 2019) with others finding only NACM as associated (Letica-

Crepilja, 2019) or neither re-experiencing, avoidance nor arousal as significantly associated (McIntyre-Smith et al., 2015). Notably, only one study examined the attitudes of partners of veterans, with results showing increased re-experiencing, but not avoidance or arousal shown by the veterans as correlated with their partners' reduced sexual satisfaction, with none of these symptoms being proposed as directly casual in a SEM (Bachem et al., 2020). Studies looking at higher rates of sexual problems and dysfunctions varied in their findings with increases in re-experiencing and arousal in female veterans (Schnurr et al., 2009) and arousal and NACM (Letica-Crepilja, 2019) or numbing (Nunnink et al., 2010) identified as being significantly associated in male veterans. Increased sexual anxiety and concerns were found to be correlated with higher levels of re-experiencing, avoidance, arousal and numbing with only numbing remaining as a significantly associated in a regression in a sample of male veterans (Bhalla et al., 2018) and arousal and numbing as significant correlates in a sample of female veterans (Schnurr et al., 2009). Several studies focused on more specific physical aspects of sexual functioning with findings showing erectile dysfunction (ED) and the need for ED medication was uncorrelated with re-experiencing, avoidance, or arousal, but increased avoidance was correlated with decreased sexual arousal, though not in a regression analysis (Badour et al., 2015). Increased avoidance and arousal, but not re-experiencing was correlated with increased ED and reduced orgasmic functioning (McIntyre-Smith et al., 2015); and a regression identified NACM as the only significant predictor of increased ED, reduced orgasmic functioning, and increased frequency of premature ejaculation (Letica-Crepilja, 2019). A pathway analysis on sexual functioning in female veterans showed no individual PTSD symptom clusters but overall PTSD severity as having a direct effect on reduced levels of arousal and lubrication (Blais et al., 2022b).

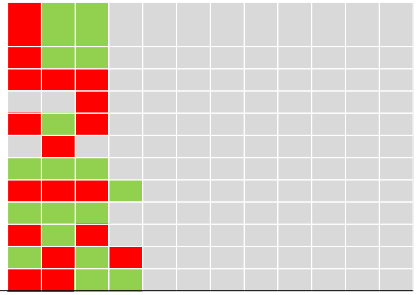
Family/ Parental Functioning

In terms of studies looking at veterans in terms of their family and parental functioning (Table 7), Ruscio et al. (2002) found increased avoidance, arousal and numbing

Table 6

Sexual Functioning

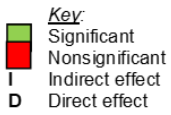
Sexual Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Bachem et al (2020)	191	V P	100	CS	Isr	PTSD-I	ISS	Sexual satisfaction (veteran)	Correlation												
									SEM	D	D	D									
								Sexual satisfaction (partner)	Correlation												
									SEM	D	D	D									
Badour et al (2015)	150	V	100	CS	US	CAPS; PCL-M	Study questions	Erectile dysfunction problem list	Correlation												
								Eectile dysfunction medication	Correlation												
							BDI-II (item)	Sexual desire	Correlation												
									Regression												
							IPF (items)	Sexual desire	Correlation												
									Regression												
								Arousal	Correlation												
									Regression												
Bhalla et al (2018)	221	SM P	100	L	US	PCL-M	MSQ (item)	Sexual anxiety	Correlation												
									Regression												
Blais et al (2018)	1189	SM V	0	CS	US	PCL-5	SSS-W	Sexual satisfaction	Correlation												
									Regression												
									Mediation (between harassment and sexual satisfaction)												
									Mediation (between assault and sexual satisfaction)												
							FSFI	Sexual function	Correlation												
									Regression												
									Mediation (between harassment and sexual function)												
									Mediation (between assault and sexual function)												
Blais et al (2020)	697	SM V	0	CS	US	PCL-5	FSFI	Sexual function	Correlation												
									Path analysis						D	D					
Blais et al (2022a)	426	SM V	0	CS	US	PCL-5	FSFI	Sexual function	Correlation												
									Path analysis	D	D	D		D	D	D					
							SSS-W	Sexual satisfaction	Correlation												
									Path analysis	D	D	D		D	D	D					
Blais et al (2022b)	464	SM V	0	CS	US	PCL-5	FSFI	Lubrication	Path analysis	D	D	D		D	D	D					
								Arousal	Path analysis	D	D	D		D	D	D					
Letica-Crepilja (2019)	300	V	100	CS	Cro	PCL-5	IIEF	Sexual dysfunction	T-tests												
								Erectile dysfunction	Hierarchical reg.												
								Orgasmic function	Hierarchical reg.												
								Hypoactive sexual desire	Hierarchical reg.												
							RAS	Intercourse satisfaction	Hierarchical reg.												
								Overall sexual satisfaction	Hierarchical reg.												
							PEDT	Premature ejaculation	Hierarchical reg.												

McIntyre-Smith et al (2015)	99	SM V	100	CS	Can	PCL-M	IIEF	Erectile functioning	Correlation	
								Orgasmic functioning	Correlation	
								Hypoactive sexual desire	Correlation	
									Regression	
								Intercourse satisfaction	Correlation	
									Regression	
								Overall sexual satisfaction	Correlation	
Nunnink et al (2010)	445	SM V	89	CS	US	DTS	Study questions	Sexual functioning problems	Log. Regression	
Pereira et al (2019)	138	V	100	CS	Por	PSS	ISS	Sexual satisfaction	Correlation	
Richardson et al (2019)	543	SM V	100	CS	Can	PCL-M	PRIME-MD (item)	Sexual desire/pleasure concerns	Hier. Ord. Regression	
Schnurr et al (2009)	242	SM V	0	CS	US	CAPS	TSI	Dysfunctional sexual behaviour	Correlation	
								Sexual concerns	Correlation	

SM = service member; V = veteran; P = partner; CS = cross sectional; L = longitudinal

ISS = Index of Sexual Satisfaction; BDI-II = Beck Depression Inventory-II; IPF = Inventory of Psychosocial Functioning; MSQ = Multidimensional sexuality questionnaire; SSS-W = Sexual Satisfaction Scale for Women; FSFI = Female Sexual Function Index; IIEF = International Index of Erectile Function; RAS = Relationship Assessment Scale; PEDT = Premature Ejaculation Diagnostic Tool; PRIME-MD = Primary care evaluation of mental disorders

Note. 'study question(s)' refers to questions created by the study authors for that specific study; 'item (s)' refers to individual items being used from the measure



as negatively correlated with whether veterans were in contact with their children, with only arousal and numbing remaining significant in a regression; increased re-experiencing, avoidance, arousal, and numbing were correlated with reductions in the quality of contact with their children, but only avoidance and numbing remaining significant in a regression; but notably none of these symptoms significantly correlated with whether veterans were living with their children. Regarding veterans' ratings of their children, Ruscio et al. (2002) found the veteran parent's increased arousal and numbing predicted their rating of their child as expressing higher levels of disagreement and disapproval, with numbing also predicting their rating of their child's positive and negative behaviours.

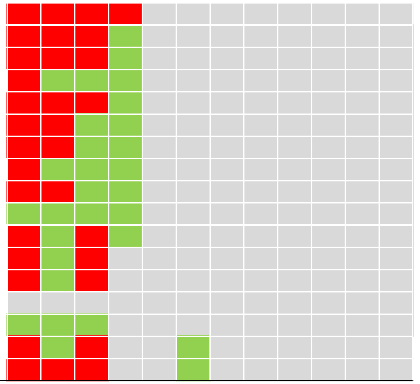
Regarding lower levels of overall family functioning, results showed increased re-experiencing, avoidance, arousal, and dysphoria as correlated, with only dysphoria as significant in a regression (Pietrzak et al., 2010); and increased re-experiencing and avoidance as correlates of reduced family cohesion, expression, and flexibility (Hendrix & Anelli, 1993) and general functioning (Pereira et al., 2012), but not of family conflict (Hendrix, 1995). A mediation analysis showed increased avoidance to have an indirect impact on reduced family functioning, mediated by the veteran parent's decreased sense of competence (Laifer et al., 2019). Other findings showed no PTSD symptoms as predictors of family functioning both inside and outside the home, despite positive correlations (Possemato et al., 2015). Longitudinal studies showed increased re-experiencing, avoidance and arousal as correlated with reduced family functioning both before and after mental health treatment (Evans et al., 2009), however SEMs proposed only increases in avoidance as leading to reduced family functioning post-treatment (Evans et al., 2010). Others found increased avoidance and arousal as predictors of veteran's rating their family functioning as lower, but only increased arousal in the veterans predicting their partner's ratings of family functioning (Evans et al., 2003). Studies also found reverse effects with SEMs suggesting that reduced family functioning leads to higher rates of re-experiencing, avoidance, and arousal post-treatment, with only avoidance and arousal being predicted by family functioning at the later post-treatment follow-up (Evans et al., 2010). Research

Table 7

Family/Parental Functioning

Family/Parental Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Berz et al (2008)	60	V	0	CS	US	M-PTSD	Study question	Parenting	Correlation												
									Regression												
Evans et al (2003)	270	VP	?	CS	Aus	PCL-M; CAPS	FAD	Family functioning (veteran)	Correlation												
									Path analysis		D/I	I									
								Family functioning (par)	Correlation												
									Path analysis			I									
Evans et al (2009)	311	V	100	L	Aus	PCL-M	FAD-12	Family functioning (pre-treatment)	Correlation												
								Family functioning (post-treatment)	Correlation												
Evans et al (2010)	1822	VP	100	L	Aus	PCL-M	FAD-12	Family functioning (pre-treatment)	Correlation												
								Family functioning (post-treatment)	Correlation												
								Family functioning	SEM (reverse effect)	D	D	D									
								Family functioning	SEM	D	D	D									
Gewirtz et al (2010)	468	SM	100	CS	US	PCL-M	APQ-9	Parenting (positive parenting)	Correlation												
								Parenting (inconsistent parenting)	Correlation												
								Parenting (poor supervision)	Correlation												
							SAS-SR	Parenting involvement	Correlation												
							APQ-9; SAS-SR	Parenting behaviours	SEM	D	D	D									
Hendrix & Anelli (1993)	63	V	?	CS	US	PPSS	KPSS	Parental satisfaction	Correlation												
							FACES III	Family flexibility	Correlation												
								Family cohesion	Correlation												
Hendrix et al (1995)	47	V	100	CS	US	IES	FRI	Family cohesion	Correlation												
								Family conflict	Correlation												
								Family expression	Correlation												
							KPSS	Parental satisfaction	Correlation												
Laifer et al (2019)	191	V	?	CS	US	PCL	FAD	Family functioning	Correlation												
									Regression												
									Mediation analysis		I										
							PSOC	Parenting sense of competence	Correlation												
Pereira et al (2012)	101	V	100	CS	Por	PSS	FACES III	Family functioning	T-tests												
Pietrzak et al (2010)	272	V	?	CS	US	PCL-M	DRRI	Family	Correlation												
									Regression												
Possemato et al (2015)	137	V	88	CS	US	CAPS	SAS-SR	Parental relationship with child	Correlation												
									Multiple reg.												
								Family-outside home	Correlation												
									Multiple reg.												
								Family-inside the family unit	Correlation												
									Multiple reg.												
Ross et al (2018)	331	V	96	CS	UK	PCL-5	WSAS	Home management	Network analysis												
								Private activities	Network analysis												

Ruscio et al (2002)	66	V	100	CS	US	CAPS	Study question	Living with children	Correlation
							LISRES-A	Child's misbehaviour	Correlation
									Regression
								Child's positive sharing & support	Correlation
									Regression
								Child's disagreement & disapproval	Correlation
									Regression
							Study questions	Contact with children	Correlation
									Regression
								Quality of contact with children	Correlation
									Regression
Samper et al (2004)	250	V	100	CS	US	M-PTSD	Study question	Parenting satisfaction	Correlation
									Regression
Solomon et al (1987)	382	V	?	CS	Isr	PTSD-I	FES	Family environment	Correlation
Solomon et al (2011)	473	V	100	CS	Isr	PTSD-I	Study questions	Parental functioning	Regression
Tomassetti-Long (2015)	94	V	100	CS	US	PCL-M	PSI-SF	Parenting Stress	Correlation
									Hierarchical reg.



SM = service member; V = veteran; P = partner; CS = cross sectional; L = longitudinal

FAD = Family Assessment Device; APQ = Alabama Parenting Questionnaire; SAS-SR = Social Adjustment Scale-Self Report; KPSS = Kansas Parental Satisfaction Scale; FACES III = Family Adaptability and Cohesion Evaluation Scales III; FRI = Family relationships index; PSOC = Parenting Sense of Competence Scale; DRRI = Deployment, risk and resilience inventory; WSAS = Work and Social Adjustment Scale; LISRES-A = Life Stressors and Social Resources Inventory-Adult Form; FES = Family Environment Scale; PSI-SF = Parenting Stress Index-Short Form

Note. 'study question(s)' refers to questions created by the study authors for that specific study; 'reverse effect' refers to the PTSD symptom clusters being the DV, i.e. being predicted by the functional impairment; the results from Solomon et al. (1987) are not shown on this table due to space, but they are detailed in the main text of this review

breaking down PTSD into 14 symptoms using the PTSD-I perhaps counterintuitively, found that married veterans had a higher number of PTSD symptoms than unmarried veterans, especially regarding re-experiencing symptoms, with these symptoms having a particularly negative impact upon ratings of expressiveness within the family (Solomon et al., 1987).

Studies focusing on aspects of parenting varied in their findings with results suggesting higher levels of re-experiencing and avoidance as correlated (Hendrix & Anelli, 1993) or not correlated (Hendrix et al., 1995) with reduced parental satisfaction; increased re-experiencing, avoidance and arousal as positively correlated with self-ratings of inconsistent parenting, poor supervision and poor involvement, with only reductions in avoidance correlated with increased ratings of positive parenting, with a SEM showing direct negative relationships between all three symptoms and poor parental behaviours overall (Gewirtz et al., 2010). Increased avoidance was correlated with reduced parental satisfaction (Samper et la., 2004) and increased avoidance and arousal as correlated with reduced parental sense of competence (Laifer et al., 2019). Results from regression analyses also varied with higher arousal a predictor of reduced parenting ability (Berz et al., 2008); increased dysphoria a predictor of higher levels of parenting stress (Tomassetti-Long, 2015); increased avoidance a predictor of reduced parenting satisfaction (Samper et al., 2004); re-experiencing, avoidance and arousal as predicting poorer parental functioning (Solomon et al., 2011); or neither re-experiencing, avoidance, arousal nor numbing as predictive of the veterans' parental relationships with their children (Possemato et al., 2015). A network analysis found weak direct associations between reduced home management ratings as measured by the WSAS and increased PTSD symptoms relating to re-experiencing (nightmares, recurrent thoughts, and physiological cue reactivity), arousal (exaggerated startle response) and NACM (diminished interests) in a sample of UKAF veterans (Ross et al., 2018).

Aggression/ Hostility

Studies looking at higher rates of aggression and hostility (Table 8) found increased

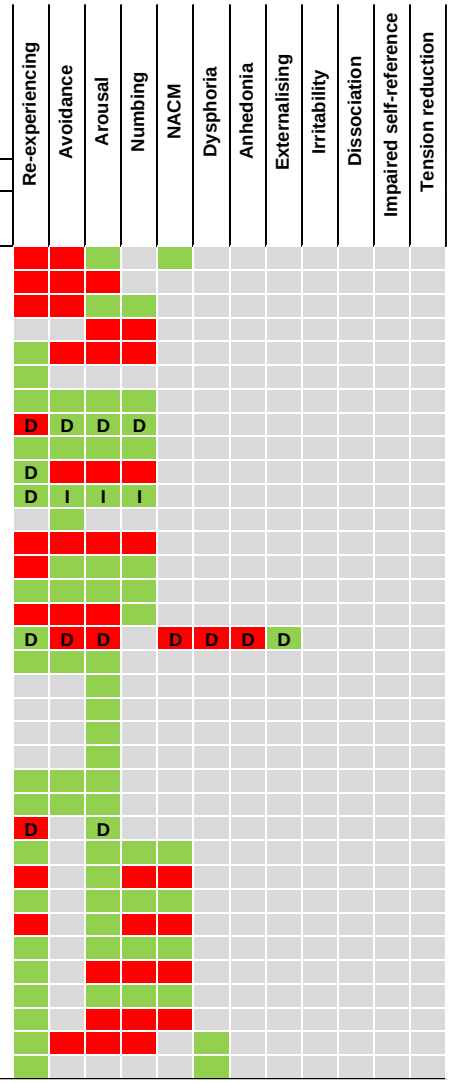
levels of re-experiencing, avoidance, arousal and numbing as positively correlated, but only re-experiencing as having a direct positive association with increased aggression in a SEM model, with the other symptoms having an indirect relationship via higher levels of anger (Hellmuth et al., 2012). Increased re-experiencing and dysphoria were associated with higher levels of aggression in a regression analysis (Watkins et al., 2017); with re-experiencing as having no significant correlation to aggression (LaMotte et al., 2017). Studies comparing aggression over time found increased arousal and numbing as correlated with higher levels of current aggression and only increased re-experiencing correlated with higher rates of lifetime aggression, but with a regression controlling for age, education, history of being a victim of abuse, substance use, childhood adversity and experience of combat, finding only re-experiencing as a predictor of lifetime aggression and no symptoms as predictors of current aggression (Flanagan et al., 2014). When distinguishing between aggression and violence towards family members or strangers, correlations found increased re-experiencing, avoidance, arousal and numbing as correlated with increases in both, but only increased arousal as associated with higher rates of family aggression and increased re-experiencing with higher rates of aggression towards strangers in a regression analysis (Sullivan & Elbogen, 2014).

Results from studies looking at higher levels of intimate partner psychological abuse expressed by veterans towards their partners varied, with increased re-experiencing, arousal, avoidance, and numbing found to be uncorrelated (LaMotte et al., 2017), but with a regression finding increased arousal as being significantly associated with higher levels of psychological abuse (Savarese et al., 2001). Other studies included SEMs proposing that increased re-experiencing and externalizing behaviours as having direct associations with increased hostility (Pietrzak et al., 2015); avoidance, arousal and numbing but not re-experiencing, as having direct associations with increased anger (Hellmuth et al., 2012); increased arousal and NACM as associated with higher rates of dangerous driving and fighting behaviours (Ashwick et al., 2018); and one study looking at POWs finding increased re-experiencing, avoidance and arousal as correlated with higher rates of verbal

Table 8

Aggression/ Hostility

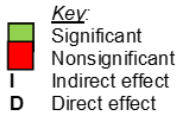
Aggression/ Hostility									
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**
Ashwick et al (2018)	403	V	96	CS	UK	PCL-5	WRA-4; study questions	Risk taking (driving & fighting)	Regression
Berz et al (2008)	60	V	0	CS	US	M-PTSD	CTS (item)	Intimate partner violence	Correlation
Flanagan et al (2014)	79	V	87.3	CS	US	CAPS	ASI	Aggression (recent)	Correlation
									Regression
								Aggression (lifetime)	Correlation
									Regression
Hellmuth et al (2012)	359	V	92	CS	US	PCL-M	TAS	Anger	Correlation
									SEM
							Study questions	Aggression	Correlation
									Path analysis
									SEM
Hendrix et al (1995)	47	V	100	CS	US	IES	AVS	Abusive violence	Correlation
LaMotte et al (2017)	92	V	100	CS	US	CAPS	CTS2	Intimate partner abuse (psychological)	Correlation
								Intimate partner abuse (phyisical)	Correlation
Maguen et al (2009)	203	SM	93	CS	US	PCL	Study questions	Violence	Correlation
									Multiple reg.
Pietrzak et al (2015)	1484	V	89.7	CS	US	PCL-5	BSI	Hostility	SEM
Samper et al (2004)	250	V	100	CS	US	M-PTSD	CTS	par violence	Correlation
Savarese et al (2001)	376	V P	100	CS	US	M-PTSD	CTS	Physical violence	Correlation
									Hierarchical reg.
								Psychological abuse	Correlation
									Hierarchical reg.
Solomon et al (2008)	125	V POW	100	CS	Isr	PTSD-I	CTS	Verbal violence (veteran)	Correlation
								Verbal violence (POW)	Correlation
									Path analysis
Sullivan & Elbogen (2014)	1090	V	84.5	CS	US	DTS	CTS; MCVS	Family aggression	Correlation
									Multi. Log. Regression
								Severe family violence	Correlation
									Multi. Log. Regression
								Stranger aggression	Correlation
									Multi. Log. Regression
								Severe stranger violence	Correlation
									Multi. Log. Regression
Watkins et al (2017)	2570	V	93.3	CS	US	PCL	Study questions	Aggression	Likelihood ratio test
									Log. Regression



SM = service member; V = veteran; P = partner; POW = prisoner of war; CS = cross sectional

WRA-4 = Walter Reed Aggression Scale; CTS = Conflict Tactics Scale; ASI = Addiction Severity Index; TAS = Trait Anger Scale; AVS = Abusive Violence Scale; BSI = Brief symptom inventory; MCVS = MacArthur Community Violence Scale

Note. 'study question(s)' refers to questions created by the study authors for that specific study; 'item (s)' refers to individual items being used from the measure



aggression, but only arousal as having a direct relationship to increased verbal aggression in a pathway analysis (Solomon et al., 2008). Studies looking at veterans' increased expressions of violence also varied with results finding increased re-experiencing, avoidance, and arousal as correlated (Samper et al., 2004) or not correlated (Berz et al., 2008) with others identifying only arousal (Savarese et al., 2001), avoidance (Hendrix et al., 1995) or numbing (Maguen et al., 2009) as correlated.

Occupational/ Educational Functioning

Key findings for occupational and educational functioning (Table 9) include increased re-experiencing, avoidance, arousal, and dysphoria (Pietrzak et al., 2010; Kaier et al., 2014) as correlated with higher levels of occupational impairment. Other results show increased dysphoria (Pietrzak et al., 2010); avoidance and arousal (Shea et al., 2010); or re-experiencing, avoidance, and numbing as being correlated with increased occupational impairment but with no PTSD symptoms being significantly associated with the related concept of occupational satisfaction in regressions (Schnurr & Lunney, 2011). Odds ratios showed increased avoidance and numbing as most strongly associated with decreased ability to work, with re-experiencing being the least associated (Rona et al., 2009).

Regarding the more general concept of 'achievement' as measured by the QOLI, regressions found increased re-experiencing, avoidance, arousal and numbing as significantly associated, but not when controlling for depression and the intercorrelations between symptoms, meaning none had a significant impact on self-ratings of achievement above and beyond the other symptoms of PTSD (Raab et al., 2015). Other findings included increased numbing as the only predictor of reduced achievement (Lunney & Schnurr, 2007) with these results being found in both male and female veterans (Schnurr & Lunney, 2008). Regarding reduced educational achievement post military service, none of the PTSD symptom clusters were significantly associated with the levels of education achieved by veterans (Jukic et al., 2019; 2020), but increased dysphoria was significantly associated with higher levels of 'school difficulties' as measured by the DRRI (Pietrzak et

al., 2010). Regarding more objective measure of occupational functioning such as whether veterans were employed or not, studies found no PTSD symptoms as correlated with or predictive of employment status (Schnurr & Lunney, 2011; Jukic et al., 2019), with others finding only increased arousal as predictive of unemployment (Jukic et al., 2020). Measures of material and economic status found increased arousal and NACM (Jukic et al., 2019) or avoidance, arousal and NACM (Jukic et al., 2020) as predicting lower socioeconomic status in regressions; increased dysphoria predicting lower financial status (Pietrzak et al., 2010); and a reverse effect of material status as predicting avoidance and arousal symptoms (Loncar et al., 2014).

Table 9

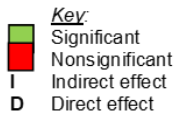
Occupational/ Educational Functioning

Occupational/ Educational Functioning										Re-experiencing	Avoidance	Arousal	Numbing	NACM	Dysphoria	Anhedonia	Externalising	Irritability	Dissociation	Impaired self-reference	Tension reduction
Authors	**N**	**Sample**	**Men %**	**Design**	**Country**	**PTSD Measure**	**Functional Impairment Measure**	**Functional Impairment Subconcept**	**Analysis**												
Jukic et al (2019)	45	POW	100	CS	Cro	PCL-5	Study questions	Employment	Regression												
								Education	Regression												
								Socioeconomic	Regression												
Jukic et al (2020)	259	V	100	CS	Cro	PCL-5	Study questions	Employment	Regression												
								Education	Regression												
								Socioeconomic	Regression												
Kaier et al (2014)	124	V	86	CS	US	CAPS	CAPS (item)	Occupational impairment	Correlation												
Loncar et al (2014)	184	POW	100	CS	Cro	IES-R	WHO-Five Wellbeing Index	Material status	Correlation												
								Material status	Hierarchical reg.												
Lunney & Schnurr (2007)	319	V	100	CS & L	US	CAPS	QOLI	Achievement (pre-treatment)	Correlation												
								Achievement (pre-post treatment change)	Correlation												
								Achievement (pre-treatment)	Regression												
								Achievement (pre-post treatment change)	Regression												
Pietrzak et al (2010)	272	V	?	CS	US	PCL-M	DRRI	Work	Correlation												
									Regression												
								Financial	Correlation												
									Regression												
								School	Correlation												
									Regression												
Raab et al (2015)	158	V	100	CS	US	PCL-M, PC	QOLI	Achievement	Regression												
Rona et al (2009)	10069	SM V	?	CS	UK	PCL	SF-36 (items)	Work	Odds ratios only												
								Accomplished less	Odds ratios only												
								Limited work	Odds ratios only												
								Difficulty performing work	Odds ratios only												
Schnurr & Lunney (2008)	561	V	63.8	CS	US	CAPS	QOLI	Achievement (men)	Multiple reg.												
								Achievement (women)	Multiple reg.												
Schnurr & Lunney (2011)	253	V	0	CS	US	CAPS	Study question	Employment status	Correlation												
									Regression												
							CAPS (item)	Occupational impairment	Correlation												
									Regression												
							QOLI (Item)	Occupational satisfaction	Correlation												
									Regression												
Shea et al (2010)	124	V	96	CS	US	CAPS	CAPS (item)	Occupational functioning	Linear reg.												

SM = service member; V = veteran; POW = prisoner of war; CS = cross sectional; L = longitudinal

QOLI = Quality of Life Inventory; DRRI = Deployment, risk, and resilience inventory; SF = Short Form Health Survey Questionnaire

Note. 'study question(s)' refers to questions created by the study authors for that specific study; 'item (s)' refers to individual items being used from the measure



Discussion

Summary of Main Findings

This scoping review summarises research examining the relationship between individual PTSD symptoms and functional impairment in military samples. The main finding is that, despite all the studies examining the military population, this is a very heterogenous area of research in terms designs, methods, and results, both overall and within each of the domains of functional impairment identified; including in terms of how functional impairments and PTSD symptoms are measured and examined. Given this heterogeneity, any conclusions drawn from this data are tentative at best, however some themes do seem to be present such as some PTSD symptoms appearing to be significantly correlated with functional impairment across domains, however once variables like demographics and aspects of military service such as deployment and combat exposure are controlled, far fewer symptoms remain significantly associated with functional impairment. However, it must be noted that multiple regression results should be read as which symptoms had a unique impact above and beyond the other PTSD symptoms due to these analyses controlling for the impact of the other symptoms and thus cancelling out their shared effects. Another finding was that PTSD symptoms tended not to be significantly associated with the arguably more objective measures of impairment such as martial and employment status, whether parents are living with their children, duration of their intimate relationships, nor with the more physical aspects of functional impairment such as whether they experience erectile dysfunction; instead, they tend to be more associated with the more subjective aspects of functional impairment such as relationship satisfaction or a general sense of wellbeing. These generally inconsistent results between studies even when examining the same subconcepts within a domain of functional impairment may suggest that there are extraneous variables that have yet to be fully understood and mapped out that are causing these inconsistencies. Furthermore, it may be that military populations are more varied than may otherwise be assumed given the similar job role, training, experiences, stressors and

risks they share. In terms of the clinical implications, these heterogeneous results suggest that clinical discussions regarding whether certain symptoms of PTSD are the cause of functional impairment and thus should be the focus of psychological treatment or prioritised in terms of service development and policy reform regarding specialist support for military populations should be cautious and keep in mind the currently inconsistent nature of some of the findings.

Limitations

The aim of this scoping review was arguably somewhat ambitious, having to summarise a complex set of results for an unexpectedly large number of studies. Consequently, the depth of analysis for the results of these studies had to be sacrificed in favour of breadth, a common limitation of scoping reviews (Arksey & O'Malley, 2005). This in turn means that key characteristics of the studies found which may explain some of the discrepant findings may have remained beyond the scope of the present review. However, it is doubtful that the inclusion of a further one or two variables would explain these discrepancies given their frequency and how they appear in every domain of functional impairment covered. Furthermore, the inclusion of more variables would have made the review prohibitively large and complicated to read, reducing its practical impact for clinical and research purposes. However, future reviews could aim to expand the scope further perhaps through the inclusion of grey literature such as dissertations.

The process of categorisation of the studies, could have been ordered differently as arguably some of the categories almost overlap, for example marriage and relationships and studies looking at intimate partner violence in the aggression/hostility category; with other categories being broader in their scope than others, for example the social functioning category. However, as no meta-analyses were conducted, this remains an issue of style and presentation rather than a methodological error. There was no use of service user consultation carried out as part of this review, however this is suggested as optional by Arksey & O'Malley (2005) and may be a future essential component as the scoping review method becomes better defined (Levac et al., 2010).

Conclusion and Recommendations

The conclusion of this scoping review is that research looking at the relationship between PTSD symptoms and functional impairment in military populations is highly varied and the diversity of results means that any broad conclusions drawn in this area by subsequent studies should be tentative at best and should highlight the wide disparity in findings from the broader literature. Though a full mapping of the variables that were controlled for by the various studies was beyond the scope of the present review, reduction in PTSD symptoms remaining significantly associated with functional impairment once demographic and military variables are controlled indicates further investigation and mapping of these variables as to their possible mediating or moderating roles should be a central feature of future research in this area. Future research should thus be guided by the question suggested by Pawson (2002) for reviews generate evidence-based policy of 'what works for whom in what circumstances?'. Examples for such future research include focusing on non-US military populations and female veterans as much of the research on female veterans revolved around the topic of sexual functioning; further investigating the bidirectional relationship between PTSD and functional impairment as a result of findings showing a reverse effect of functional impairments predicting PTSD symptoms; specifying the nature of the traumatic experiences such as whether they occurred during combat or non-military circumstances and if the relationship between PTSD and impairment change accordingly; greater use of more objective measures of impairment; and greater use of SEM and path analysis methods in order to investigate the complex relationships between these mediating and moderating variables.

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Part 2: Empirical Paper

The Relationship Between PTSD Symptom Clusters and Psychosocial Functional Impairment in a Population of Help-Seeking UK Armed Forces Veterans

Abstract

Background: This study looked at whether symptoms of alcohol use disorder (AUD) mediated the relationship between the symptom clusters of PTSD and psychosocial functional impairment in a help-seeking sample of UK Armed Forces (UKAF) veterans.

Methods: Assessment measures from 302 veterans being treated at a specialist NHS mental health service were analysed using path analyses to examine the relationship between PTSD symptoms as measured by the PCL-5 (Intrusion, Avoidance, Negative alterations of cognitions and mood (NACM), and Arousal), psychosocial functional impairment measured by the Work and social adjustment scale (WSAS) and the potential mediating role of AUD as measured by their AUDIT scores. Two models were tested statistically, one with PTSD represented by total PCL-5 scores (simple mediation) and one with the four PTSD symptom clusters as predictors of functional impairment (via AUD symptoms).

Results: We found that (1) overall PTSD severity predicted AUD, (2) avoidance and NACM are significant predictors of functional impairment, (3) alcohol did not directly predict functional impairment.

Conclusion: The main findings from this study indicate that higher levels of avoidance and NACM symptoms play a strong role in increasing veterans' perception of themselves as being functionally impaired. However, though alcohol consumption does not appear to predict functional impairment, further research is required to definitively rule out its role as a mediator between PTSD and veterans' self-ratings of functional impairment. These findings must be interpreted with caution given the relatively modest sample size and lack of power to detect significant indirect effects.

Introduction

The PTSD in the UKAF Population:

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM 5) diagnostic criteria for PTSD defines four symptom clusters of re-experiencing symptoms, avoidance, negative alterations in cognitions and mood (NACM), and alterations in arousal and reactivity (American Psychiatric Association, 2013). This four-factor model has been found through confirmatory factor analysis to adequately fit in samples of trauma exposed populations (Blevins et al., 2015), though other studies have suggested alternative models (see Armour et al., 2016a for a review).

UKAF veterans returning from deployments to Afghanistan and Iraq presented with probable PTSD at ~4-6% (Fear et al., 2010; Stevelink et al., 2018), common mental health conditions such as depression at 19.7% and alcohol use at 13% (Fear et al., 2010). Rates of PTSD in US military samples appear to be higher at 13% (Hoge et al., 2004) with a lifetime rate of 18.7% amongst US veterans of the Vietnam war (Dohrenwend et al., 2006), with this discrepancy being potentially the result of more frequent and intense combat experiences amongst US forces (Hoge et al., 2006). Risk factors for PTSD in veterans include being of a younger age, being a woman, from an ethnic minority, low educational achievement, non-officer ranks, being in the army (as opposed to navy or air force), having a combat-related role, a high number of deployments, longer length of deployments, and prior adverse life events, trauma, or psychological problems (Xue et al., 2015; Iversen et al., 2008; Owens et al., 2009).

Research has found higher rates of PTSD as a risk factor for suicide in military veterans (Bull & Kang, 1994), with a review systematic and literature reviews concluding that most recent studies indicate PTSD in military samples is significantly associated with increased suicide attempts (Holliday et al., 2018; Pompili et al., 2013) with traumatic brain injuries (TBI) and chronic pain as possible mediators of this relationship (Blakey et al., 2018). PTSD in military samples has also been associated with physical health

complications such as hypertension, an increased risk of cardiovascular, gastrointestinal, dermatologic, and musculoskeletal disorders (Burg et al., 2017; Schnurr et al., 2000)

Alcohol and PTSD

PTSD symptoms of arousal (Sakusic et al., 2010), avoidance (Debell et al., 2014), and negative affect, anhedonia, and dysphoric arousal (Erwin et al., 2017) are associated with higher alcohol consumption in veterans. Risk factors for increased alcohol use in military samples include being a man, younger, and from an ethnic minority (Ursano et al., 2016; Jacobsen et al., 2008; see Dworkin et al., 2018 for a review). Alcohol consumption is also associated with a worsening of complications from PTSD such as reckless behaviours and anger (McGlinchey et al., 2021) and higher levels of expressed aggression (Babić et al., 2010). Surveys showed that veterans perceived their substance use including alcohol as being as consequence of their PTSD symptoms worsening, with subsequent improvements in their symptoms leading to a reduction in use (Back et al., 2014). Alcohol consumption has also been found to partially mediate the relationship between PTSD and treatment outcomes in veterans (Forbes et al., 2008). Alcohol use has also been implicated as a mediating variable between PTSD in veterans and higher levels of functional impairment (see Jacobsen et al., 2001 for a review).

PTSD and Functional Impairment

Functional impairment defined as interference the inability to live life due to a disorder (Donahue et al., 2017), is moderately correlated with PTSD across a range of functional impairment domains (Stein et al., 1997; Stein et al., 2000; Vesterling et al., 2008). NICE guidelines for PTSD (2018) highlight functional impairment as being vital in the recognition, assessment, treatment, and ongoing management of PTSD. Recommendations for the assessment and treatment of PTSD advise the measurement of psychosocial functional impairment via the use of multidimensional measures (Konecky et al., 2014; Miler et al., 2008). PTSD symptoms experienced by veterans have been linked with various impairments including perceived emotional health being predicted by intrusive

symptoms and negative alterations in mood (Asnaani et al., 2014); global assessment of functioning (GAF) scores decreasing with higher levels of avoidance and numbing symptoms (Miller et al., 2008); and negative alterations in cognitions and mood and reexperiencing with impairments in close relationships and home management (Ross et al., 2018).

Rationale

Despite a significant proportion of studies on PTSD being on military samples and with many of these studies examining the impacts of PTSD on various forms of functional impairment, few studies have looked at the relationships between the individual PTSD symptoms and functional impairment whilst testing for the possible role of intermediate variables such alcohol in this relationship, fewer still have made use of path analysis and have relied instead upon regression, correlations. Given the prevalence of PTSD and alcohol consumption in military participants and the recommendations to examine mental health related functional impairment in this group (Konecky et al., 2014; Miller et al., 2008), this study sought to examine the relationship between multidimensional aspects of PTSD, severity of AUD and functional impairment in a sample of UKAF veterans to provide a more accurate characterisation of this common and debilitating presentation.

The rationale behind including alcohol as the mediating variable of interest in addition to its already stated high level of prevalence in military populations, is due to findings showing alcohol consumption in military populations to be significantly associated to higher levels of PTSD symptoms (McGlinchey et al., 2021) and behaviours that could negatively impact overall functioning such as aggression (Babić et al., 2010). Furthermore, the findings indicating that reductions in PTSD symptoms result in reductions in alcohol consumption (Back et al., 2014) and that alcohol consumption has been implicated in the relationship between PTSD and treatment outcomes (Forbes et al., 2008) suggest that it may serve a mediating role between PTSD and functional impairment. Specifically, individuals may drink more as a result of their PTSD symptoms which in turn leads to behaviours such as aggression which negatively impact their ability to function in daily life

such as with their family, at work or in social situations (Jacobsen et al., 2001). A final reason for the inclusion of alcohol as a variable is that due to current NICE guidelines (2018) stating that an individual cannot be excluded from treatment solely on the basis of alcohol or substance misuse. Therefore it is vital that the role of alcohol as a potential mediator between the symptoms of PTSD and functional impairment be investigated to ensure its potential impact in the clinical processes of assessment and psychological treatment can be elucidated and mitigated against.

Aims and Research Questions

The aim of this study was to determine if AUD as measured by the AUDIT (Alcohol Use Disorders Identification Test; Saunders et al., 1993) played a mediating role between PTSD severity or symptom clusters (as measured by the PCL-5) and functional impairment as measured by the WSAS (The Work and Social Adjustment Scale; Mundt et al., 2002).

Research questions:

1 - Does AUD mediate the relationship between PTSD (overall and as symptom clusters) and functional impairment in UKAF veterans?

2 – Which of the four PTSD symptom clusters as defined by the DSM-5 is significantly and meaningfully related to functional impairment in UKAF veterans?

Methods

Setting

This study used retrospective data routinely gathered from veterans referred to, assessed, and treated by the London NHS Veterans Mental Health Service (henceforth referred to as the veteran service). This involved searching electronic patient records of veterans referred to the service who provided consent for their data to be used for service evaluation and research purposes for completed measures and inputting them into databases for later analysis. The veteran service serves the Greater London area and accepts referrals from any source provided the consent of the veteran has been obtained. The resulting sample is thus broadly representative of the help-seeking veteran population

of London.

Sample

All veterans in the sample were referred to the veteran service between April 2017 and April 2023. For veterans who were referred more than once during this time frame, only the data gathered from their first referral was included to ensure that no veterans were counted more than once.

Data Collection

Veterans completed a battery of self-report measures at assessment as a routine part of the clinical pathway, this was usually done at the point of referral or assessment. Whilst the majority were completed by the veterans as self-report measures, a minority were completed with a clinician assisting. Data came from veterans who provided basic demographics and completed the main measures of interest (PCL-5; AUDIT and WSAS) during the referral or assessment stage of their care (i.e., prior to having commenced any form of therapeutic intervention).

Research Governance and Ethics

Ethical approval was sought from Camden & Islington NHS Foundation Trust with the project formally registered as a service evaluation (see appendices) with the cooperation and approval of the service's management. Regarding data protection, all data was anonymised and treated confidentially in line with the Data Protection Act 2018 and the General Data Protection Regulation (GDPR) 2018. All participants had provided written consent to have their data used for research and service evaluation purposes in their consent forms as part of their referrals and assessments.

Measures

The measures used in this project included:

PSTD – The Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Blevins et al., 2015)

The PCL-5 is a 20-item self-report measure of PTSD symptoms reflecting the DMS-

V diagnostic criteria for PTSD with a possible maximum score of 80. The PCL-5 items are grouped into four subscales which measure the DSM-5 symptom clusters of PTSD including cluster B: re-experiencing (items 1-5), cluster C: Avoidance (items 6 & 7), cluster D: Negative alterations in cognition and mood or NACM (items 8-14), and cluster E: Arousal (items 15-20). The PCL-5 exhibits strong reliability, validity, internal consistency (α = .94), test-retest reliability (r = .82); and convergent (rs = .74 to .85) and discriminant (rs = .31 to .60) validity (Blevins et al., 2015).

Alcohol – Alcohol Use Disorders Identification Test (AUDIT; Saunders et al., 1993)

The AUDIT is a 10-item self-report questionnaire for alcohol consumption, drinking behaviour, adverse psychological reactions, and alcohol related problems with a possible maximum score of 40. Saunders et al. (1993) reported the measure as having high overall sensitivity (92%) and specificity (94%) when using a score of 8/40 as the cut-off for hazardous drinking.

Functional Impairment – The Work and Social Adjustment Scale (WSAS; Mundt et al., 2002)

The WSAS is a 5-item self-report measure of impaired functioning asking the respondent to rate their levels of impairment over 5 dimensions (work, home management, social leisure activities, private leisure activities and family and relationships). The scale is reliable, valid, and sensitive with Mundt et al. (2002) reporting a good Cronbach's alpha of 0.7 to 0.94 and an adequate test-retest correlation of 0.73.

Study Design

The study used a cross-sectional design. As a result, the scores represent a snapshot of the relationships between the variables included. The software Mplus (Version 8.8; Muthén & Muthén B.O., 2017) and IBM SPSS Statistics (Version 28) were used for the analysis.

Data Analysis Plan

The main statistical analysis involved path and mediation analysis which is a subset

of Structural Equation Modelling (SEM) that tests specific theoretical models of how variables relate to each other using regression equations and measures of covariance, calculates the overall amount of variance of the dependent variable explained by the model (R^2) and provides an estimate of the error for each of the dependent variables (Kline, 2016). Path analysis is also able to test the effect of multiple independent variables on multiple dependent variables whilst placing some of these dependent variables into mediating roles within the model (Geiser, 2012). The paths between each variable and the error terms for each dependent variable are referred to as parameters (Kline, 2016) and are usually expressed as regression coefficients (Kaplan, 2008). Parameters were estimated using full information maximum likelihood (FIML; Schafer & Graham, 2002) which is the default in Mplus (Geiser, 2013). Direct and indirect pathways were evaluated using p values and confidence intervals gained from the use of bootstrapping including for both the direct and indirect effects (Efron & Tibshirani, 1986; MacKinnon, Lockwood, & Williams, 2004).

Sample Size

This study's sample of 302 places it in a similar range to other studies looking at PTSD in military populations using SEM-related analyses that have used samples of 315 (Miller et al., 2008), 295 (Disner et al., 2017), 359 (Hellmuth et al., 2012) and 313 (Erbes et al., 2011); and above others that have used samples of 191 (Bachem et al., 2020), 206 (Renshaw & Campbell, 2016), 125 (Solomon et al., 2008) and 270 (Evans et al., 2003). Though SEM-related techniques such as path analysis are commonly referred to as a large sample technique, what constitutes an adequate sample size for a particular analysis is a complex question to answer (Kline, 2016). It is generally accepted that factors necessitating larger samples include having a more complex model with more parameters, non-normal distributions, a mixture of continuous and categorical variables, instruments with low reliability, and higher levels of missing data (Kline, 2016). A simple recommendation is for sample sizes in to be above 200 based upon studies looking at the average sample sizes in published research (Shah & Goldstein, 2006; MacCallum & Austin, 2000). Other recommendations include the 'N:q rule' (Jackson, 2003) whereby the adequacy of the

sample size is determined by the number of observations per estimated parameter in the model with 5 being poor, 10 being fair and 20 being ideal. More appropriate methods for determining sample size involve the use of simulations to determine adequate sample size for a particular model (Mooney, 1997; Wolf, Harrington, Clark, & Miller, 2013; Holtmann, Koch, Lochner, & Eid, 2016). Whilst this approach normally involves trying to determine likely parameter estimates a priori of any analyses, an alternative is to run retrospective Monte Carlo simulations using the parameter estimates that result from running an analysis. This posteriori Monte Carlo simulation method involves using bootstrapping techniques to determine whether the sample size used is sufficient to provide unbiased parameter estimates and to allow for a high percentage of potential significant effects to be found, the latter statistic essentially representing a measure of statistical power (Thoemmes, MacKinnon& Reiser, 2010).

Variables

In path analyses, the terms ‘independent’ and ‘dependent’ variable don’t neatly fit due to a variable potentially playing both roles within a model; instead, the terms ‘exogenous’ and ‘endogenous’ respectively are used as they are somewhat analogous for predictor and criterion variables respectively. (Gunzler et al., 2013). Predictors in this study included the PTSD symptoms as measured by the PCL-5 and demographics (age and ethnicity) which were included as exogenous variables to control for their effect. Endogenous variables were AUD and functional impairment represented by the total scores on the AUDIT and the WSAS, with the AUDIT scores positioned as a mediating variable between the PCL-5 and WSAS scores. To measure and control the impact of the demographics of age and ethnicity and the impact of statistical outliers, models were created with demographics and outliers excluded or included to allow for comparison. Due to specific demographic categories predominating in the sample, such as 82.8% of participants being white the variable for ethnicity was transformed into a binary or dichotomous variable of white/non-white to simplify the interpretation of the findings. Similarly, as the sample was overwhelmingly male (93.7%), sex was not included as a

covariate as literature suggests that including dichotomous variables (as all veterans identified themselves as either male or female) with a greater than 90-10 split between the two categories could lead to the smaller category having a disproportionate impact on the analyses (Rummel, 1970). Due to significant missing data for the work item of the WSAS, the WSAS variable was transformed into an average of either all five items or of the four remaining items for veterans where a score for the work item was missing. The variable of military branch was not included as a covariate in the analysis as this would have created a prohibitive number of parameters to estimate which would have had a detrimental impact on statistical power given the sample size.

Outliers

Following recommendations in the literature regarding the identification and control of outliers, a two-stage process was used focusing first on univariate and then multivariate outliers (Tabachnick & Fidell, 1989). To transform the outliers identified a method of Winsorization was used involving assigning a value 1 below the next non-outlier score. Univariate outliers were identified using box plots on SPSS for each variable using the interquartile range (IQR) to identify scores that were between 1.5 and 3 IQR above quartile 3, these were defined as potential outliers, with any scores more than 3 IQR above quartile 3 being defined as extreme outliers. Of the main variables of interest, five potential outliers found for the variable AUDIT (total >33) which were all transformed to scores of 31. No univariate outliers were found for any of the other variables. Multivariate outliers were identified after these univariate transformations were made using the Mahalanobis distance with 3 participants out of 302 being identified as multivariate outliers. These three cases were removed, consequently a new sample with transformed outliers numbering 299 veterans was created.

Models

To account for the possible impacts that transforming outliers and the addition of control variables as covariates may have on the path analysis, sensitivity analyses were

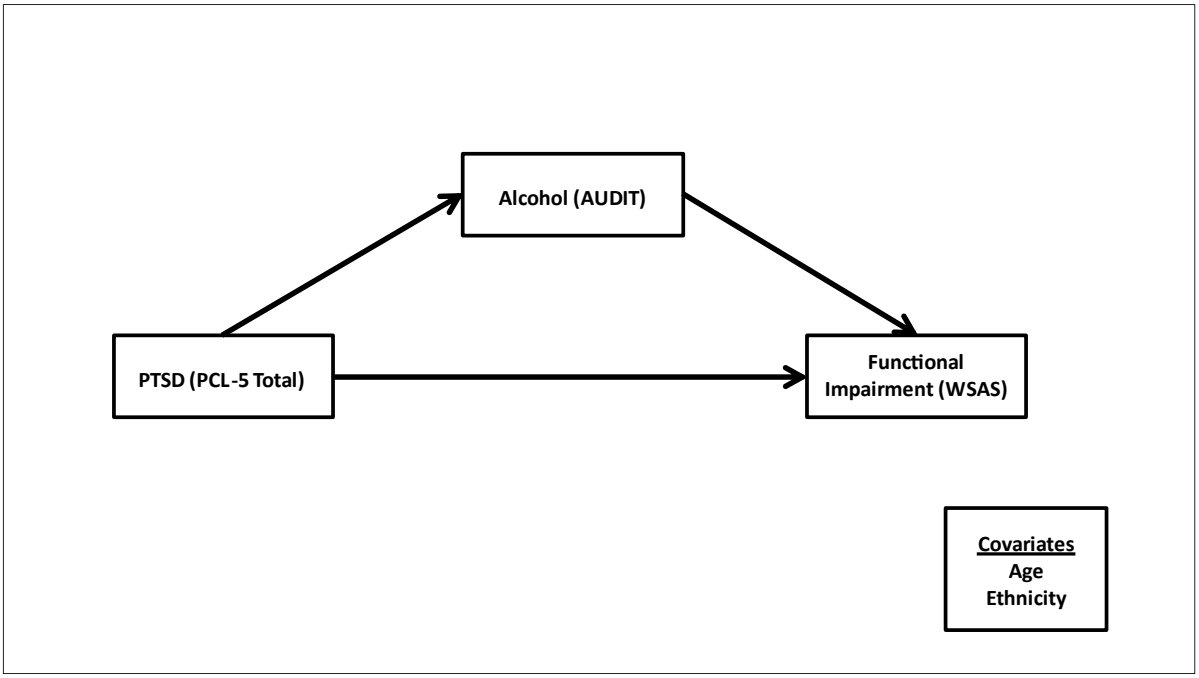
performed with/without the outliers being transformed and with/without the covariates. Because these did not differ substantially, the final models with the outliers being transformed and covariates included forms the basis of the analysis. To limit the potential impact of employing a model of too high a complexity leading to reduced statistical precision in estimating parameters and reduced power, a simpler mediation model was included using PCL-5 total scores rather than PCL-5 symptoms cluster scores to limit the number of parameters being estimated.

Model 1 – PTSD Total

Model 1 involved testing for the direct and indirect effects between total PTSD severity (PCL-5) and functional impairment (WSAS) with alcohol use (AUDIT) as the mediating variable. The predictor variable was PTSD represented by the total scores on the PCL-5; the endogenous variable was functional impairment represented by the average WSAS scores; the mediating variable was alcohol consumption represented by the total AUDIT scores; and the demographic control variables of age and ethnicity were included as covariates. This model contained 7 parameters without covariates and 15 parameters with covariates included.

Figure 1

Model 1: PTSD Total



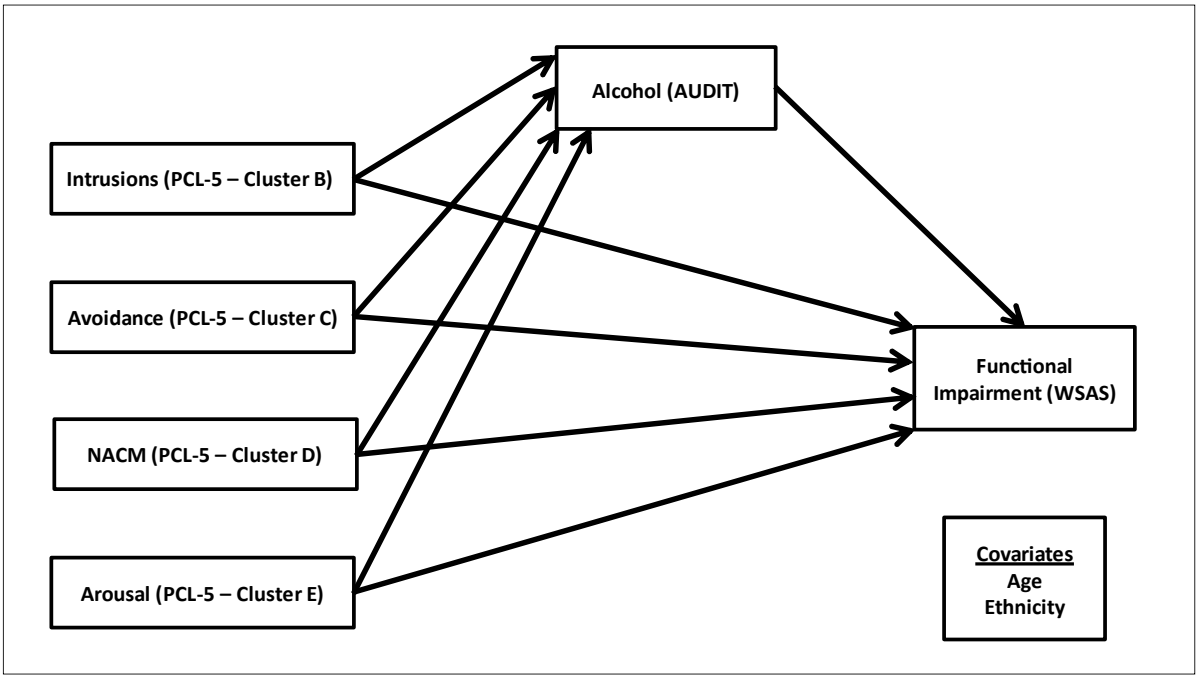
Model 2 – PTSD Symptom Clusters

Model 2 involved testing for the direct and indirect effects between the four PTSD symptom clusters (PCL-5) and functional impairment (WSAS) with alcohol use (AUDIT) as the mediating variable. The predictor variables were the four PTSD symptom clusters of intrusion, avoidance, NACM, and arousal represented by the scores on each of the subscales of the PCL-5; the endogenous variable was functional impairment represented by the average WSAS scores; the mediating variable was alcohol consumption represented by the AUDIT scores; and the demographic control variables of age and ethnicity were included as covariates. This model contained 13 parameters without covariates and 39 parameters with covariates included. As all the models tested contained all the potential paths between each variable and included no restrictions on the model (i.e. removing pathways between one or more variables), they are referred to as a 'just identified' or 'saturated' models (Kline, 2016). For this reason, the various models cannot be compared in terms of how well they fit as none will contain any restrictions and so will fit the data perfectly. For the same reason, no use was made of the various indices of model fit as they

was not required.

Figure 2

Model 2: PTSD symptom clusters



Results

Demographics and Service Characteristics

The full data set prior to the outliers being transformed (Table 1) included 302 participants with 283 (93.7%) males and 19 (6.3%) females. In terms of ethnicity, 250 (82.8%) were white, 38 (12.6%) were black, 8 (2.6%) were mixed, 4 (1.3%) Asian, and 2 (0.7%) other. Regarding the military branch, 253 (83.8%) served in the army, 18 (6%) in the Royal Air Force, 16 (5.3%) in the Royal Marines, and 15 (5%) in the Royal Navy. The average age of the sample was 43.73 (SD = 11.79) and ranged from 21 years to 86 years of age. Regarding descriptive statistics on the measures used in the analysis (Table 2) once outliers were transformed, the mean scores were 8.90 out of a possible 40 for the AUDIT, 48.83 out of a possible 80 for the PCL-5, and the mean average WSAS score was 4.50 out of a possible 8.

Table 1

Full sample characteristics with outliers untransformed (N=302)

Demographic		n (%)	Mean	St. Deviation	Median	Range
Age			43.73	11.79	41.00	21-86
Sex	Male	283 (93.7%)				
	Female	19 (6.3%)				
Ethnicity	White	250 (82.8%)				
	Black	38 (12.6%)				
	Mixed	8 (2.6%)				
	Asian	4 (1.3%)				
	Other	2 (0.7%)				
Military Branch	Army	253 (83.8%)				
	Royal Air Force	18 (6%)				
	Royal Marines	16 (5.3%)				
	Royal Navy	15 (5%)				

Table 2

Descriptive statistics on sample with outliers transformed (N=299)

	Number	Mean	St. Deviation	Median	Range
Alcohol (AUDIT)	299	8.90	8.61	7.00	O-32
Functional Impairment (WSAS Average)	299	4.50	1.95	4.60	0-8
PTSD (PCL-5 total)	299	48.83	18.32	50.00	0-80
Re-experiencing (PCL-5 Cluster B)	299	11.73	5.61	12.00	0-20
Avoidance (PCL-5 Cluster C)	299	5.12	2.54	6.00	0-8
NACM (PCL-5 Cluster D)	299	17.54	7.02	19.00	0-28
Arousal (PCL-5 Cluster E)	299	14.44	5.70	15.00	0-24

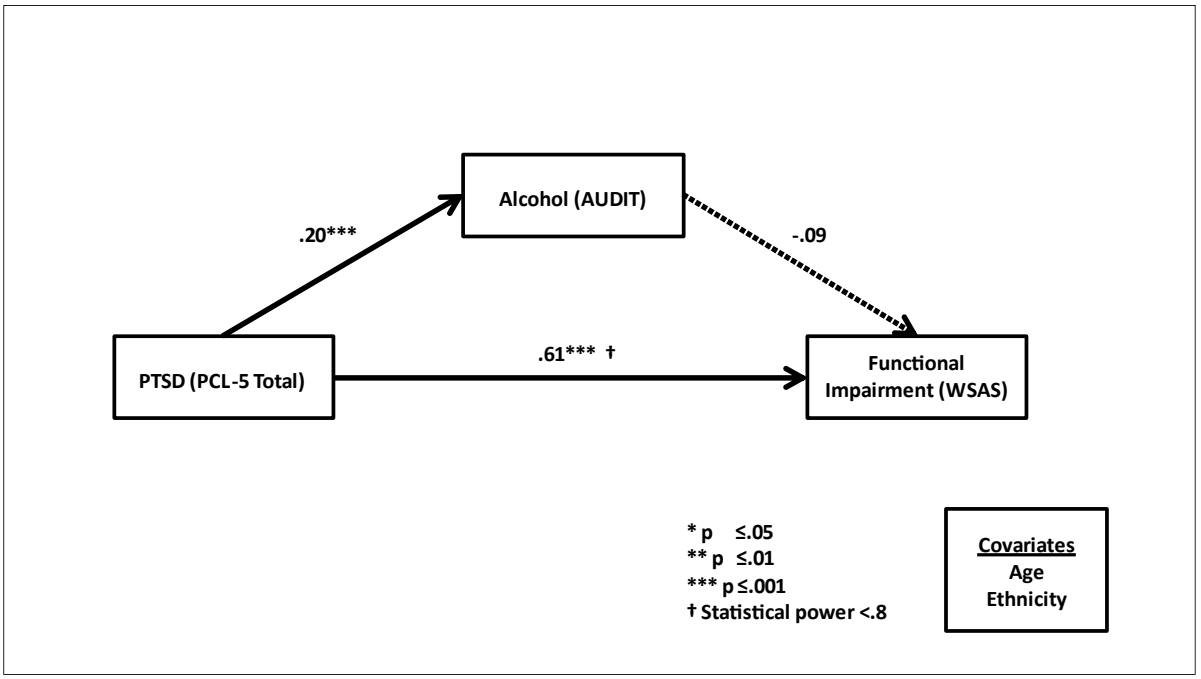
Model 1 – PTSD Total

The final version of model 1 with the outliers transformed and demographic covariates of age and ethnicity included and controlled for (N = 299) yielded the following results summarized in Table 3 and Figure 3. In terms of direct effects, PTSD significantly predicted alcohol scores β = .20, 95% CI [.10, .30], $p < .001$. and functional impairment β = .61, CI [.52, .69], $p < .001$; however, alcohol did not significantly predict functional impairment β = -.09, CI [-.18, .00], $p = .05$. Regarding indirect effects, alcohol was found not to be a significant mediator between PTSD and functional impairment β = -.01, CI [-.00, .00], $p = .076$. A Monte Carlo simulation of this model indicated that the PTSD → functional impairment path may have been estimated with low power (1-beta = .46) with all other paths in the model being adequately powered (≥.8). When the analyses were run with the sample that included outliers (N = 302), there were no differences in the whether paths were significant or not significant and no differences as to which paths were adequately powered. Regarding the inclusion of covariates, when the analyses were run with covariates not

included, alcohol became a significant predictor of functional impairment, however, the power for this parameter reduced to .55 and was thus underpowered. Other changes in the rules when run without covariates included the PTSD to functional impairment pathway becoming adequately powered and the indirect pathway including alcohol as a mediator between PTSD and functional impairment becoming underpowered. The direct pathway from PTSD to alcohol maintained its power whether covariates were included or removed.

Figure 3

Model 1 PTSD total: results



Note. A dotted line indicates a nonsignificant pathway.

Model 2 – PTSD Symptom Clusters

The final version of model 2 with the outliers removed and demographic covariates of age and ethnicity included and controlled for (N=299) yielded the following results summarized in Table 4 and Figure 4. In terms of direct effects of PTSD symptom clusters on alcohol, neither re-experiencing (β = -.02, CI [-.21, .16], p = .80), avoidance (β = .06, CI [-.07, .21], p = .34), nor NACM (β = -.14, CI [-.31, .02], p = .09) significantly predicted alcohol. However, arousal (β = .34, CI [.18, .50], p < .001) was found to significantly predict alcohol. Regarding direct effects of PTSD symptom clusters on functional impairment, re-

experiencing (β = -.10, CI [-.26, .05], *p* = .20) was found to not be a significant predictor. However, avoidance (β = .16, CI [.04, .29], *p* = .01), NACM (β = .39, CI [.24, .53], *p* < .001), and arousal (β = .25, CI [.08, .41], *p* < .001) were all significant predictors of functional impairment. Regarding the impact of alcohol, it was found not to be a significant direct predictor of functional impairment (β = -.08, CI [-.17, .00], *p* = .06). Regarding its potential mediating role, alcohol was found not to be a significant mediator between re-experiencing (β = .00, CI [-.01, .02], *p* = 0.83), avoidance (β = -.00, CI [-.03, .00], *p* = .44), NACM (β = .01, CI [-.00, .04], *p* = .26), and arousal (β = -.03, CI [-.072, -.001], *p* = .09) and functional impairment; it is important to state that the effect sizes for the indirect paths via alcohol were very small to the point of being meaningless.

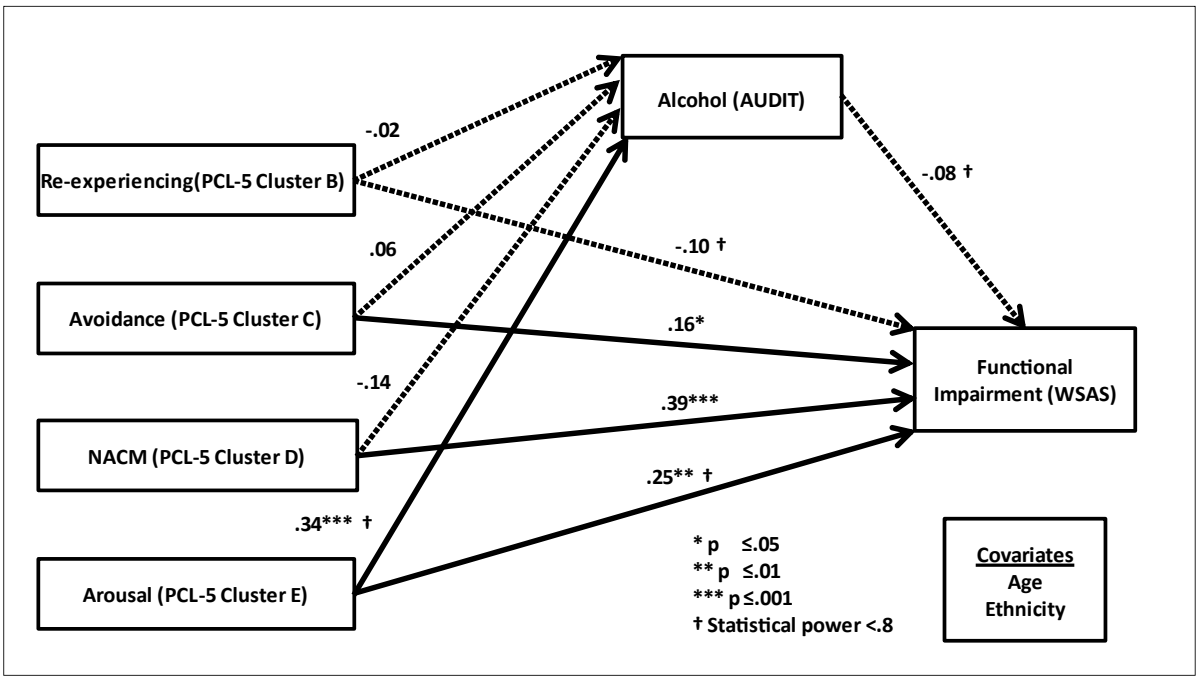
Results from the Monte Carlo simulations indicated that the estimates of the paths for the direct effects of PTSD symptom clusters on alcohol were adequately powered in the cases of re-experiencing (1.0), avoidance (.95), and NACM (1.0), but were underpowered for arousal (.06). Regarding the direct effects of PTSD symptom clusters on functional impairment the estimates of the paths for avoidance (1.0) and NACM (.93) were adequately powered, whereas the estimates for re-experiencing (.71) and arousal (.46) were underpowered. The estimates for alcohol as a predictor of functional impairment was underpowered (.26) as were the estimates for each of the indirect paths of alcohol as a mediator between re-experiencing (.24), avoidance (.15), NACM (.24) and arousal (.00) and functional impairment.

Regarding the impact of outliers and covariates, all the direct paths between PTSD symptom clusters and alcohol were did not change in significance or power when outliers were included or excluded, however, re-experiencing avoidance and NACM all went from being underpowered to be adequately powered once covariates were included. However, the direct path between arousal and alcohol went from being adequately powered when covariates were excluded to underpowered when covariates were included. Regarding the direct paths between PTSD symptoms clusters and functional impairment, the path between re-experiencing and functional impairment remained nonsignificant and

underpowered regardless of whether outliers or covariates were included. Avoidance remained significant but was underpowered without covariates and became adequately powered when covariates were included. NACM remained significant and adequately powered in all cases. Arousal remained significant in all cases but was only adequately powered when outliers and covariates were excluded. The direct path between alcohol and functional impairment remained underpowered in all cases and significant only when outliers and covariates were excluded. All the indirect paths which looked at alcohol as a mediator between the PTSD symptoms clusters and functional impairment remained insignificant and underpowered whether outliers or covariates were included or excluded from the analysis. The path with alcohol predicting functional impairment was only significant in the version of the model without outliers and without covariates (p = .03) but nonsignificant in all other cases and remained underpowered in all cases.

Figure 4

Model 2 PTSD symptom clusters: results



Note. A dotted line indicates a nonsignificant pathway.

Discussion

Summary of Results

Regarding the relationship between the PTSD symptoms and AUD among the veterans studied, results from model 1 indicate that total PTSD severity does significantly predict AUD with a higher level of PTSD severity resulting in a higher AUD score. However, results from model 2 suggest that the individual PTSD symptoms of re-experiencing, avoidance and NACM do not have significant unique effects above and beyond the other symptoms on AUD except for arousal, though this pathway was too underpowered to provide a clear answer and the effect sizes for the direct path to alcohol was very small to the point of being meaningless. Alcohol also did not have a significant direct effect on functional impairment, though again this effect in the model with all the individual PTSD symptoms was too underpowered to be sure. Given that all the indirect effects of the PTSD symptoms on functional impairment via alcohol were also underpowered, again with very small effect sizes, it is not possible to give definitive conclusions regarding AUD's potential mediating role.

Regarding the relationships between PTSD and functional impairment, the results from model 1 indicate that a higher total PTSD severity significantly predicts a higher level of functional impairment, but again this path is too underpowered to provide a definitive conclusion. However, results from model 2 do provide some interesting insights suggesting that avoidance and NACM appear to have significant unique effects above and beyond the other PTSD symptoms with higher scores for each resulting in higher levels of functional impairment, with the effect sizes being small for avoidance to functional impairment, but medium for NACM to functional impairment. The potential unique effects of re-experiencing and arousal remain undetermined due again to underpowered paths between these and functional impairment, despite the path from arousal to functional impairment being statistically significant. The results support research highlighting NACM's role as significantly associated with greater levels of functional impairment (Meyer et al., 2018;

Pietrzak et al., 2015; Armour et al., 2017; Ross et al., 2018; Ashwick et al., 2018; Blais et al., 2018; Sullivan & Elbogen, 2014; Jukic et al., 2020), though many of these also highlighted other additional PTSD symptoms as also being significantly associated.

Study Advantages

This study contributes to the literature on PTSD in veterans and the relationship to functional impairment, in doing so it attempts to provide more depth to the mental health presentation of military populations by considering the impact of mental health on the ability of veterans to function in daily life. A positive contribution of this study is that it was conducted on a UK sample as most similar studies have focused on samples from the USA. By treating PTSD as a multidimensional entity and not only as a unidimensional one as is common in studies in this area, the results help to distinguish avoidance and NACM as symptoms worthy of particular attention when considering how to provide a more holistic intervention that results not only in a reduction in PTSD symptoms but also a subsequent improvement in the subjective experience of the veteran in multiple domains of their life. By using path analysis methodology, this study helps contribute to a relatively small proportion of PTSD studies on veterans that make use of this and other SEM related techniques. The use of the WSAS as a measure of functional impairment also sets this study apart, as though this measure is commonly used in the UK, it rarely appears in studies on military populations with the authors of this study only being aware of one other study in this area using the WSAS (Ross et al., 2018). One possible implication of this study's finding that many of the parameters were underpowered is that as it used a similar sized sample to many other studies in the field (Miller et al., 2008; Disner et al., 2017; Hellmuth et al., 2012; Erbes et al., 2011; Bachem et al., 2020; Renshaw & Campbell, 2011; Solomon et al., 2008 and Evans et al., 2003), the possibility is raised that some studies in this field are also underpowered as only two of these studies reported on power (Bachem et al., 2020; Renshaw & Campbell, 2011).

Regarding clinical implications, the adequately powered findings from this study suggest two key areas to consider further when assessing or treating PTSD in military

personnel, namely PTSD severity and its link to alcohol disorders and the link between NACM and avoidance with higher levels of functional impairment. Given the significant link found between higher PCL-5 scores and higher AUDIT scores, clinicians encountering individuals who score highly in terms of PTSD severity or whom meet diagnostic criteria should take the time to not only screen for alcohol disorders but to explore the role that alcohol may play in their lives and how it may relate to their present PTSD symptoms in terms of the traumas experienced or as a method of coping post trauma. However, the lack of adequately powered associations between individual PCL-5 subscales and AUDIT scores suggests broader generalisations about which specific PTSD symptoms play a role in alcohol use in military personnel should be tentative as further research is needed. Regarding the significant associations found between avoidance and NACM with higher levels of functional impairment, a further clinical implication is for clinicians to explore the roles that these symptoms in particular could be having in the major domains of an individual's life. For example, high levels of avoidance may lead to functional impairment through the withdrawing of the individual from social activities or family events. Similarly, NACM could be leading to higher levels of impairment through a process of behavioural deactivation similar to that seen in depression. Once again however, broader assumptions about the role that re-experiencing, or hyperarousal could be playing in the functional impairment experienced by military personnel should be tentative until further research has been carried out.

Study Limitations

One limitation of this study is the use of self-report measures as studies have argued that veterans may be prone to masking their symptoms, due to stigma (Murphy & Busuttil, 2015), though this may be less of a factor in this sample as they were veterans seeking help and going through a process of referral and assessment. Furthermore, the WSAS has been shown to provide consistent answers between self-report and clinician reported scores (Mundt et al., 2002) so it is hard to determine how these factors may play a

role in the responses of the veterans in this sample. Though the covariates of age and ethnicity were included in this analysis to control the impact of demographics, it was not possible to add further variables due to the limits imposed by the sample size. This leaves the possibility that unaccounted for variables such as other demographics or military variables such as whether the veterans had served in combat roles, experienced their traumas within or outside of military service or whether they had a diagnosis of PTSD or complex PTSD, were not possible to investigate. Similarly, the impact of whether PTSD manifests differently in male or female veterans remains unaccounted for due to the smaller number of female veterans in the sample.

Regarding the representativeness of the sample, this was a population of veterans that were seeking help for mental health difficulties and so may not be representative of the wider UKAF population as most veterans do not present with clinically significant mental health disorders (Fear et al., 2010). Furthermore, these veterans have been able to seek out or accept help and so may represent a different population from those veterans who are unable to access or seek out mental health support for reasons such as stigma. Due to the limitations imposed by the sample size it was not possible to break down functional impairment into specific domains, such as the five items of the WSAS including work, private leisure, social leisure, family and relationships and home management as this would have required a far larger number of parameters to estimate beyond the already 48 required for model 2. Such a model would have been extremely underpowered unless a larger sample could be provided and so remains a recommendation for future research.

Due to not having access to the item-by-item data form the measures included in the study, it was not possible to conduct a confirmatory factory analysis (CFA) to determine if the breakdown of the 20 items of the PCL-5 group into the four symptom clusters suggested by the DSM-5. Though many studies make use of the same four PTSD symptoms that are included in this study, other research has suggested that PTSD may breakdown into more than four symptoms (Liu et al., 2014; Tsai et al., 2015; see Armour et al., 2016 for a review). For example, Armour et al. (2015) found that a seven-factor model of the PCL-5 (with

factors of re-experiencing, avoidance, negative affect, anhedonia, externalizing behaviours, anxious arousal, and dysphoric arousal) fit the data better than the four-factor DSM-5 model for two trauma exposed samples of 1,484 US veterans and 497 undergraduate students.

Future Research

Suggestions for future research include making use of larger sample sizes to be able to run more complex models that can treat both PTSD and functional impairment as multidimensional entities. This would allow for far more nuanced investigations as to which PTSD symptoms if any have unique effects on multiple specific functional impairments such as ability to function at work, relationships, or family life. Alternatively, studies could focus on one specific aspect of functional impairment and include a greater number of potential demographics and military variables as covariates to partial out their effects. Such studies could also further investigate the potential mediating role of alcohol by looking at indirect effects as was attempted in this study. Future studies could also make use of item-by-item data from the relevant measures to run exploratory or confirmatory factor analyses, this would both determine how PTSD in veterans breaks down in terms of symptoms and will allow for accurate investigations of these symptoms relationships to other variables including functional impairment. Such an approach would follow the more traditional two-step SEM analysis (Anderson & Gerbing, 1988) of evaluating a 'measurement model' such as the dimensional structure of the PCL-5 items before determining if a model with a different set of factors is able to fit better and explain a greater amount of the variance in the data, this should lead to more powerful analyses. As all the pathways in these models were one directional going from PTSD to functional impairment, future studies could investigate bidirectional effects of functional impairment on PTSD which have been found in previous research (Murphy et al., 2020; Bravo-Mehmedbasic & Kucukalic, 2011; Evans et al., 2010; Kintzle et al., 2018). Future research could adopt a longitudinal approach and follow up a population of veterans to see if the relationships between PTSD symptoms and functional impairment changes post treatment.

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Part 3: Critical Appraisal

Introduction

Choice of project

Rather than joining an already running research project, I decided to create my own from the start. The motivation for this came from my years of experience working with military veterans in specialist mental health services. I became fascinated by the area, so my motivation stayed strong throughout the research process, this was essential in keeping on track when things did not go as anticipated as I was able to maintain an awareness of the importance of the research and its clinical and research implications. The data from the service had never been used before for research, so this was something I felt was important to start, especially considering the drive in the NHS for more mental health research (NHS, 2017). The idea behind the creation of the specialist NHS services for veterans was to both complement the mainstream mental health services already on offer, to supplement these by providing more specialist interventions, and to provide more intensive support for veterans unable to engage with treatment or whose presentations meant they fit into the gaps between current mental health service provision or are in some other way ineligible for other services. The specialist nature of the service as one that treats a specific population and fills the gaps of service provision meant that by its very nature it had access to a hard-to-reach population and could thus provide valuable and equally hard to find data. The service would also be best placed to utilize the results of the research in their own clinical work and service delivery.

Due to the clinical nature of the service the data came from, the dissemination of the research findings back to the team would be easy to achieve and could result in improvements and other refinements to the clinical treatment and support of the veteran population. Feedback from the clinical staff and indeed the veterans themselves on the research during and after dissemination would be vital for further research being conducted by the service. This project, in particular the empirical study, can thus be viewed as the service looking at and trying to understand the population it treats and in doing so

represents an example of practice-based evidence (PBE; Swisher, 2010); the subsequent dissemination and use of the research findings in turn representing evidence-based practice (EBP; Li et al., 2019). It is interesting to note that the research training I received on the DClinPsy course, my prior clinical experience, and the collaboration and support of the veteran service provided me respectively with the capability, motivation and opportunity that mimics the essential characteristics of the behavioural change required for PBE to be effective as defined in the Com-B framework (Michie, 2011).

The focus on functional impairment was aimed at ensuring more attention was being explicitly paid to the concept that in many ways sits at the heart of both clinical diagnosis and treatment. My experience of clinical conversations in MDTs was that they revolve around where the service user is struggling in terms of their daily activities, such as their abilities to seek employment, maintain a stable home environment and form relationships with others. In focusing both the literature review and empirical study on functional impairment, I also sought to bridge the gap between more objective measures of clinical presentations and more subjective discussions about such presentations as the use of self-report measures of functional impairment such as the WSAS arguably attempts to provide an objective measure of a subjective and hard to define and summarise concept. The surprisingly large number of measures found (Appendices A & B) will also be considered in further detail to see if any could be added to the measures already taken in the service.

The Literature Review

Motivation

Part of the motivation for conducting the literature review on functional impairment in veterans was my surprise at the lack of a map of the results for the research conducted in this area despite its clear importance regarding the impact of PTSD in general. My clinical experience involved many situations where questions were raised by clinical staff about what the research literature had to say regarding the symptoms of PTSD and their relationship to the multiple aspects of a veteran's activities of daily living and ability to

function in their work, home life, social life, and their intimate relationships with their loved ones. My hope was to create such a map that could be easily referred to and allow busy clinical staff to quickly and efficiently see what a large and varied area of research literature currently has to say.

Designing the search

The initial difficulty faced when designing the review was to balance the comprehensiveness of the search with the specificity of the findings, a central concern when defining and conducting scoping or mapping reviews (Arksey & O'Malley, 2005). Too narrow a search would leave out large amounts of potentially useful research, despite providing a greater depth in terms of the details of the findings, and too broad a map would lead to a more superficial coverage of the findings. This tension between breadth and depth of scope is characteristic of scoping reviews (Munn et al., 2018) as they aim to provide a broader scope to reveal the lay of the land regarding research findings. A similar dilemma was faced when charting the results to provide both an overarching narrative context for each of the domains of functional impairment and yet focus on the key results in a way that is easily comparable between studies. Such clear comparisons were hard to achieve given the varied nature of the methods and concepts of functional impairment used.

Conducting the search

A theme that ran throughout the review process was how the iterative nature of scoping reviews means that you find certain steps need to be retaken again as more information appears that pertains to how the previous step could have been done better. Knowing that the next stage relied upon your ability to complete the preceding stage created a mounting sense of pressure as to whether you could move onto the next step. This was especially the case with the initial search as literature that came up provided further terms for functional impairment that were useful to include in the search itself. The lack of a definitive rule about when you know you have gathered enough literature in your search is another example of how ill-defined aspects of the scoping review process are,

alongside the poorly defined nature of the descriptive method used by scoping reviews and the related processes of summarizing and charting the relevant data (Levac et al., 2010).

I made use of a template approach for the results section as suggested by Arksey & O'Malley (2005) by using tables to summarise. A significant amount of work went into designing and formatting the tables to ensure they were easy to understand and distilled the most important and relevant findings. As I found strictly narrative summaries of research findings arranged into tables as is typical in reviews to be too difficult to read, equivalent to reading the abstracts of the studies grouped together; the idea was to create tables that could be easily read by both clinical staff and researchers to navigate a large body of research to both inform their own clinical practice and to identify areas in need of further research. I made use of colours to illustrate statistical significance to make the most relevant data immediately accessible to readers in the same way colours and symbols are used in geographic maps or schematics. Designing the tables forced me to prioritise what I thought were the most important organizational concepts, with the result being that the specific definition or subconcept of functional impairment for each domain was the organizing concept rather than the methods, analysis or statistics used as the assumption was a reader would be more interested in conceptual mapping of how functional impairment was defined and which PTSD symptoms were significantly associated with it. One observation is how struck I was by the inconsistency of some of the findings as I had assumed that perhaps some clear themes would have appeared at least in one or two of the domains of impairment. Such themes would have made summarising the results easier instead of the challenge of navigating a messy and inconsistent area of research, though this 'messiness' resulted in some of the main conclusions of the review.

Other challenges

Despite having a clear idea about the subject area I wished to search and the basics of literature review methodology, I found it was easy to underestimate the amount of time the search itself takes despite making use of software such as EndNote. This was overcome by maintaining a clear focus on the end goal of the review and by simply

increasing the amount of time allotted to each step. There was also the issue of the search relying heavily at the initial stages on information contained in the titles and abstracts of studies as relevant information may not be present there making it harder to determine if a study meets inclusion criteria (Badger et al., 2000). Another challenge encountered was the unexpectedly large number of studies that met criteria as this resulted in an almost overwhelming amount of potential data to include from these studies that was hard to distil and summarise together especially given their heterogeneity in designs and methods. Consequently, there were many potential routes I could have gone down in terms of the focus of the review. I opted to arrange the tables around how functional impairment was defined as I felt that would be most useful for staff in specialist teams to know based upon my clinical experience. Another challenge was being able to define the individual domains of functional impairment with some domains such as social functioning being a somewhat miscellaneous category by comparison to the others. Though this was overcome partly through agreement between the other authors who aided in the search process about what constituted a relevant separate domain, the effect of this problem was limited as regardless of which domain a study was placed within, the information gathered from it remained the same. In fact this is an advantage of the descriptive stance taken by scoping reviews as should the results have been analysed in a more systematic fashion such as through a meta-analysis, the choice of which domain a study resided within would have had a greater impact on any subsequent findings. Thus, how the results were organised into the relevant tables remains an issue more of style than of methodological error.

Other things I would do differently include spending more time focusing on the variables controlled for by each of the studies as these may have given a clearer picture of why some of the findings were so inconsistent. However given the high number of studies found, this may have remained a difficult step to have achieved. Another dilemma faced was whether to include correlational data as this usually consisted of bivariate correlations without any demographics, military variables or the intercorrelations between the PTSD symptoms themselves being controlled for. However, the choice was made to include them

as it fit more into the goals of creating as comprehensive a map as possible and provided evidence of the importance of these other variables as when they were controlled for, the number of PTSD symptoms remaining significantly associated with functional impairment reduced markedly.

Implications

One of the main academic implications of the literature review were the recommendations made about how future research and reviews could be conducted in light of the results, in accordance with literature citing such a shaping of future research concepts as a key strength of the scoping review process (Munn et al., 2018). An important clinical implication of the literature review is that military samples, despite sharing many cultural and demographic characteristics in common that distinguish them from other populations, must be discussed with a degree of caution as the result of the review suggests there may be a significant amount of diversity within this population possibly explaining some of the heterogeneity of the findings. Furthermore, the multiple ways in which both PTSD and functional impairment are defined, measured and studied and the many extraneous variables that may be having an effect should invite a healthy degree of caution in clinical discussions regarding the relationship between PTSD and functional impairment and military service users in general.

The Empirical Paper

Implications

The main implication of the empirical study is its demonstration of feasibility in carrying out research on the routinely gathered data within specialist clinical services and how this can be used to inform the services' understandings of its target population. This will be achieved by the dissemination of not only my findings but also of the methods and statistics used in order to share more of the tools of research with clinical staff groups to help foster a desire and belief that such research can be done.

Challenges

The primary challenge that impacted the empirical study was the cyber-attack that affected multiple NHS trusts across the UK in summer 2022 (Milmo & Campbell, 2022). As a result of this attack, the data that was initially intended to be used for the analysis was unavailable. This was overcome by adopting the contingency plan of using some smaller databases of already gathered data and updating these over several months as new veterans were referred to the service and completed the necessary measures. One consequence of this was that as item-by-item data for each of the questions on the various measures used was not available, only total data for each veteran was available for the AUDIT and only scores for the individual symptom clusters of the PCL-5 were available, with item-by-item data only being available for the WSAS. This meant that the analysis couldn't include the intended confirmatory factor analysis that would have determined whether the four symptoms of the PCL-5 fit how the symptoms of PTSD were organised or whether a different symptom structure was more appropriate. Practically, the implications of the cyber-attack meant there was a significant amount of time spent being unaware of whether access to the full data was possible with NHS trust staff being unaware of any developments and with little idea of a reliable timetable for when the full set of data would be available if at all. This also required a significant number of hours spent having to navigate a new electronic patient record system as the previous one used by the trust was compromised. To meet this challenge, I and the assistant psychologists within the service spent a significant amount of time gathering the data already recorded from the veterans who were referred to the service and assessed in the months after the attack to make up for the comparative lack of data from those referred before. This reduced the sample available from the initially intended several hundred to the eventual 302. This reduced sample limited my ability to include covariates such as the GAD-7 and PHQ-9 and required a redesign of the study to look solely at alcohol use as a mediating variable and not levels of anger as measured by the DAR-II (Forbes et al., 2014) as was initially intended in the research proposal.

A further challenge in the study came from the use of path analysis and Mplus. This

required going beyond the statistics taught on the DClinPsy course and developing my understanding of more complex statistical techniques at the time unfamiliar to me. Practically, this involved completing online courses in SEM (Bauer & Curran, 2022) as well as learning how to become competent in Mplus software, including more specialist techniques such as the use of Monte Carlo simulations. Though this took significant effort, much of the statistics revolved around the application of linear and multiple regression equations and so stemmed from broadly familiar areas of analysis. The decision was made to use path analyses rather than a SEM with manifest or latent variables as research gathered from the literature review did not give clear conclusions indicating that any specific PTSD symptoms were not related to functional impairment and so adding in any restrictions to the model by eliminating one of the paths would not have been theoretically justified.

Reflections

Regarding what I would have done differently, the lack of service user input especially for the empirical study is something I would like to have remedied as getting the perspective of the veterans themselves regarding how they view the connection between their PTSD symptoms and the impact it has on various aspects of their life would add a much-needed qualitative aspect to a quantitative study. The potentially rich level of detail that could be provided by incorporating the veteran perspective would warrant the development of a new study using a mixed methods approach to get the full benefit. However, dissemination of the study's findings to veteran focus groups and veteran-related organisations will likely form part of the post-submission stage of this thesis and will provide some information regarding the service-user perspective.

Conclusions

A strong motivator for this study came from my own desire to show that research projects generating PBE can be achieved in clinical settings, can result in meaningful findings, and given their proximity to the very services that can make use of the findings, can help establish a mutually supportive link between PBE and EBP. My hope is that this

thesis can help provide a foundation for further research on the diagnosis and treatment of the mental health difficulties faced by military veterans and personnel.

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Appendices

Appendix A – Table of PTSD Measures

PTSD Measure	Reference	No. of Studies
Clinician-administered PTSD scale (CAPS)	Blake, D. D., Weathers, F. W., Nagy, L. M., Kaloupek, D. G., Gusman, F. D., Charney, D. S., & Keane, T. M. (1995). The development of a clinician-administered PTSD scale. Journal of traumatic stress, 8, 75-90.	19
Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)	Weathers, F. W., Bovin, M. J., Lee, D. J., Sloan, D. M., Schnurr, P. P., Kaloupek, D. G., Keane, T. M., & Marx, B. P. (2018). The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5): Development and initial psychometric evaluation in military veterans. Psychological assessment, 30(3), 383–395. https://doi.org/10.1037/pas0000486	1
Davidson Trauma Scale (DTS)	McDonald, S. D., Beckham, J. C., Morey, R. A., & Calhoun, P. S. (2009). The validity and diagnostic efficiency of the Davidson Trauma Scale in military veterans who have served since September 11th, 2001. Journal of anxiety disorders, 23(2), 247–255. https://doi.org/10.1016/j.janxdis.2008.07.007	2
Impact of events scale (IES)	Weiss DS, Marmar CR. The impact of event scale – revised. In: Wilson JP, Keane TM, editors. Assessing psychological trauma and PTSD. New York: Guilford Press; 1997. pp. 399–411.	1
Impact of events scale-revised (IES-R)	Beck, J. G., Grant, D. M., Read, J. P., Clapp, J. D., Coffey, S. F., Miller, L. M., & Palyo, S. A. (2008). The impact of event scale-revised: psychometric properties in a sample of motor vehicle accident survivors. Journal of anxiety disorders, 22(2), 187–198. https://doi.org/10.1016/j.janxdis.2007.02.007	2
Mississippi scale for combat-related PTSD (M-PTSD)	Sloan, P., Arsenault, L., Hilsenroth, M., & Harvill, L. (1995). Use of the Mississippi scale for combat-related PTSD in detecting war-related, non-combat stress symptomatology. Journal of clinical psychology, 51(6), 799–801. https://doi.org/10.1002/1097-4679(199511)51:6<799::aid-jclp2270510611>3.0.co;2-c	3
PTSD Checklist (PCL or PCL-C)	Miles, J. N., Marshall, G. N., & Schell, T. L. (2008). Spanish and English versions of the PTSD Checklist–Civilian version (PCL-C): Testing for differential item functioning. Journal of Traumatic Stress: Official	9

	Publication of The International Society for Traumatic Stress Studies, 21(4), 369-376.	
PTSD Checklist for DSM-5 (PCL-5)	Blevins, C. A., Weathers, F. W., Davis, M. T., Witte, T. K., & Domino, J. L. (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. Journal of traumatic stress, 28(6), 489-498.	16
PTSD Checklist - Military Version (PCL-M)	Yarvis, J. S., Yoon, E., Ameuke, M., Simien-Turner, S., & Landers, G. (2012). Assessment of PTSD in older veterans: The posttraumatic stress disorder checklist: Military version (PCL-M). Advances in Social Work, 13(1), 185-202.	18
PTSD Checklist - Specific Stressor Version (PCL-S)	Hoge, C. W., Riviere, L. A., Wilk, J. E., Herrell, R. K., & Weathers, F. W. (2014). The prevalence of post-traumatic stress disorder (PTSD) in US combat soldiers: a head-to-head comparison of DSM-5 versus DSM-IV-TR symptom criteria with the PTSD checklist. The Lancet Psychiatry, 1(4), 269-277.	2
Purdue PTSD Scale (PPTSDS)	Hendrix, C. C., Anelli, L. M., Gibbs, J. P., & Fournier, D. G. (1994). Validation of the Purdue Post-Traumatic Stress Scale on a sample of Vietnam veterans. Journal of traumatic stress, 7(2), 311–318. https://doi.org/10.1007/BF02102951	1
Posttraumatic Stress Scale (PSS or EARAT)	Foa, E. B., & Tolin, D. F. (2000). Comparison of the PTSD Symptom Scale-Interview Version and the Clinician-Administered PTSD scale. Journal of traumatic stress, 13(2), 181–191. https://doi.org/10.1023/A:1007781909213	2
PTSD Symptom Scale Interview (PSS-I)	Foa, E. B., Riggs, D. S., Dancu, C. V., & Rothbaum, B. O. (1993). PTSD Symptom Scale-Interview Version. Journal of Traumatic Stress.	1
PTSD Inventory (PTSD-I)	Foa, E., Riggs, D.S., Dancu, C.V., & Rothbaum, B.O. (1993). Reliability and validity of a brief instrument for assessing post-traumatic stress disorder. Journal of Traumatic Stress, 6(4), 459-473.	4
Trauma Symptom Inventory A (TSI-A)	Briere, J. (1995). Trauma Symptom Inventory professional manual. Psychological Assessment Resources.	1

Appendix B – Table of Functional Impairment Measures

Functional Impairment Measure	Reference	No. of Studies
Short Form Health Survey Questionnaire (SF-36)	Ware, J. E., Jr, Kosinski, M., & Gandek, B. (2005). SF-36 health survey: Manual and interpretation guide. Lincoln, RI: QualityMetric Incorporated.	7
Conflict Tactics Scale (CTS)	Straus, M. A. (1979). Measuring intrafamily conflict and violence: The Conflict Tactics (CT) Scales. Journal of Marriage and the Family, 41(1), 75–88. https://doi.org/10.2307/351733	5
Quality of Life Inventory (QOLI)	Frisch, M. B., Cornell, J., Villanueva, M., & Retzlaff, P. J. (1992). Clinical validation of the Quality of Life Inventory. A measure of life satisfaction for use in treatment planning and outcome assessment. Psychological Assessment, 4(1), 92–101. https://doi.org/10.1037/1040-3590.4.1.92	5
Dyadic Adjustment Scale (DAS)	Carey, M. P., Spector, I. P., Lantinga, L. J., & Krauss, D. J. (1993). Reliability of the Dyadic Adjustment Scale. Psychological Assessment, 5(2), 238–240. https://doi.org/10.1037/1040-3590.5.2.238	4
Female Sexual Function Index (FSFI)	Wiegel, M., Meston, C., & Rosen, R. (2005). The female sexual function index (FSFI): cross-validation and development of clinical cutoff scores. Journal of sex & marital therapy, 31(1), 1–20. https://doi.org/10.1080/00926230590475206	4
Kansas Marital Satisfaction Scale (KMS)	Schumm, W. R., Paff-Bergen, L. A., Hatch, R. C., Obiorah, F. C., Copeland, J. M., Meens, L. D., & Bugaighis, M. A. (1986). Concurrent and Discriminant Validity of the Kansas Marital Satisfaction Scale. Journal of Marriage and Family, 48(2), 381–387. https://doi.org/10.2307/352405	4
Relationship Assessment Scale (RAS)	Hendrick, S. S., Dicke, A., & Hendrick, C. (1998). The Relationship Assessment Scale. Journal of Social and Personal Relationships, 15(1), 137–142. https://doi.org/10.1177/0265407598151009	3
Social Adjustment Scale-Self Report (SAS-SR)	Rzepa, S.R., Weissman, M. (2014). Social Adjustment Scale Self-Report (SAS-SR). In: Michalos, A.C. (eds) Encyclopedia of Quality of Life and Well-Being Research. Springer, Dordrecht. https://doi.org/10.1007/978-94-007-0753-5_2730	3
Abbreviated Dyadic Adjustment Scale (ADAS or DAS-7)	Hunsley, J., Best, M., Lefebvre, M., & Vito, D. (2001). The seven-item short form of the Dyadic Adjustment Scale: Further evidence for construct validity. American Journal of	2

	Family Therapy, 29(4), 325–335. https://doi.org/10.1080/01926180152588734	
Family Adaptability and Cohesion Evaluation Scales III (FACES III)	Bazo-Alvarez, J. C., Bazo-Alvarez, O. A., Aguila, J., Peralta, F., Mormontoy, W., & Bennett, I. M. (2016). Propiedades psicométricas de la escala de funcionalidad familiar FACES-III: un estudio en adolescentes peruanos [Psychometric properties of the third version of family adaptability and cohesion evaluation scales (FACES-III): a study of peruvian adolescents]. Revista peruana de medicina experimental y salud publica, 33(3), 462–470. https://doi.org/10.17843/rpmesp.2016.333.2299	2
Index of Sexual Satisfaction (ISS)	Mark, K. P., Herbenick, D., Fortenberry, J. D., Sanders, S., & Reece, M. (2014). A psychometric comparison of three scales and a single-item measure to assess sexual satisfaction. Journal of sex research, 51(2), 159–169. https://doi.org/10.1080/00224499.2013.816261	2
Inventory of Psychosocial Functioning (IPF)	Kleiman, S. E., Bovin, M. J., Black, S. K., Rodriguez, P., Brown, L. G., Brown, M. E., Lunney, C. A., Weathers, F. W., Schnurr, P. P., Spira, J., Keane, T. M., & Marx, B. P. (2020). Psychometric properties of a brief measure of posttraumatic stress disorder-related impairment: The Brief Inventory of Psychosocial Functioning. Psychological services, 17(2), 187–194. https://doi.org/10.1037/ser0000306	2
Kansas Parental Satisfaction Scale (KPSS)	Nitsch, E., Hannon, G., Rickard, E., Houghton, S., & Sharry, J. (2015). Positive parenting: a randomised controlled trial evaluation of the Parents Plus Adolescent Programme in schools. Child and adolescent psychiatry and mental health, 9, 43. https://doi.org/10.1186/s13034-015-0077-0	2
Sexual Satisfaction Scale for Women (SSS-W)	Meston, C., & Trapnell, P. (2005). Development and validation of a five-factor sexual satisfaction and distress scale for women: the Sexual Satisfaction Scale for Women (SSS-W). The journal of sexual medicine, 2(1), 66–81. https://doi.org/10.1111/j.1743-6109.2005.20107.x	2
Short Form Health Survey Questionnaire (SF-8)	Namjoo, S., Mirzaei, M., Foroughan, M., & Ghaedamini Harouni, G. (2021). Psychometric properties of the Short Form-8 Health Survey (SF-8) among diabetes and non-diabetes Iranian older people. Health promotion perspectives, 11(3), 337–343. https://doi.org/10.34172/hpp.2021.43	2

Short Form Health Survey Questionnaire (SF-12)	Huo, T., Guo, Y., Shenkman, E., & Muller, K. (2018). Assessing the reliability of the short form 12 (SF-12) health survey in adults with mental health conditions: a report from the wellness incentive and navigation (WIN) study. Health and quality of life outcomes, 16(1), 34. https://doi.org/10.1186/s12955-018-0858-2	2
International Index of Erectile Function (IIEF)	Rosen, R. C., Cappelleri, J. C., & Gendrano, N., 3rd (2002). The International Index of Erectile Function (IIEF): a state-of-the-science review. International journal of impotence research, 14(4), 226–244. https://doi.org/10.1038/sj.ijir.3900857	2
Family Assessment Device (FAD)	Bishop DS, Epstein NB, Baldwin LM. Structuring a family assessment interview. Can Fam Physician. 1980;26:1534-1537.	2
Family Assessment Device 12-item General Functioning scale (FAD-12)	Epstein, N. B., Baldwin, L. M., & Bishop, D. S. (1984). McMaster Family Assessment Device (FAD) [Database record]. APA PsycTests. https://doi.org/10.1037/t06314-000	2
WHO Disability Assessment Schedule (WHODAS 2.0)	Wawrzyniak, K. M., Finkelman, M., Schatman, M. E., Kulich, R. J., Weed, V. F., Myrta, E., & DiBenedetto, D. J. (2019). The World Health Organization Disability Assessment Schedule-2.0 (WHODAS 2.0) in a chronic pain population being considered for chronic opioid therapy. Journal of pain research, 12, 1855–1862. https://doi.org/10.2147/JPR.S207870	2
Abusive Violence Scale (AVS)	Dokkedahl, S., Kok, R. N., Murphy, S., Kristensen, T. R., Bech-Hansen, D., & Elklit, A. (2019). The psychological subtype of intimate partner violence and its effect on mental health: protocol for a systematic review and meta-analysis. Systematic reviews, 8(1), 198. https://doi.org/10.1186/s13643-019-1118-1	1
Addiction Severity Index (ASI)	McLellan, A. T., Cacciola, J. C., Alterman, A. I., Rikoon, S. H., & Carise, D. (2006). The Addiction Severity Index at 25: origins, contributions and transitions. The American journal on addictions, 15(2), 113–124. https://doi.org/10.1080/10550490500528316	1
Alabama Parenting Questionnaire (APQ-9)	Gross, T. J., Fleming, C. B., Mason, W. A., & Haggerty, K. P. (2017). Alabama Parenting Questionnaire-9: Longitudinal Measurement Invariance Across Parents and Youth During the Transition to High School. Assessment, 24(5), 646–659. https://doi.org/10.1177/1073191115620839	1

Beck Depression Inventory-II (BDI-II)	Beck, A. T., Steer, R. A., & Brown, G. (1996). Beck Depression Inventory–II (BDI-II) [Database record]. APA PsycTests. https://doi.org/10.1037/t00742-000	1
Brief Addiction Monitor (BAM)	Cacciola, J. S., Alterman, A. I., Dephilippis, D., Drapkin, M. L., Valadez, C., Jr, Fala, N. C., Oslin, D., & McKay, J. R. (2013). Development and initial evaluation of the Brief Addiction Monitor (BAM). Journal of substance abuse treatment, 44(3), 256–263. https://doi.org/10.1016/j.jsat.2012.07.013	1
Brief symptom inventory (BSI)	Adawi, M., Zerbetto, R., Re, T. S., Bisharat, B., Mahamid, M., Amital, H., Del Puente, G., & Bragazzi, N. L. (2019). Psychometric properties of the Brief Symptom Inventory in nomophobic subjects: insights from preliminary confirmatory factor, exploratory factor, and clustering analyses in a sample of healthy Italian volunteers. Psychology research and behavior management, 12, 145–154. https://doi.org/10.2147/PRBM.S173282	1
Capacity for intimacy Questionnaire (CIQ)	Zaider, T. I., Heimberg, R. G., & Iida, M. (2010). Anxiety disorders and intimate relationships: a study of daily processes in couples. Journal of abnormal psychology, 119(1), 163–173. https://doi.org/10.1037/a0018473	1
Couple activities scale (CAS)	Harasymchuk, C., Walker, D. L., Muise, A., & Impett, E. A. (2021). Planning date nights that promote closeness: The roles of relationship goals and self-expansion. Journal of social and personal relationships, 38(5), 1692–1709. https://doi.org/10.1177/02654075211000436	1
Couple Communication Skills Scale (CCSS)	Maaß, U., Kühne, F., Heinze, P. E., Ay-Bryson, D. S., & Weck, F. (2022). The concise measurement of clinical communication skills: Validation of a short scale. Frontiers in psychiatry, 13, 977324. https://doi.org/10.3389/fpsyt.2022.977324	1
Communication danger signs scale (CDSS)	Stanley, S. M., & Markman, H. J. (1997). Marriage in the 90s: A nationwide random phone survey. Denver, Co: PREP.	1
Communications Pattern Questionnaire—Short Form (CPQ-S)	Futris, T. G., Campbell, K., Nielsen, R. B., & Burwell, S. R. (2010). The communication patterns questionnaire-short form: A review and assessment. The Family Journal, 18(3), 275-287.	1
Couples satisfaction Index (CSI-4)	Funk, J. L., & Rogge, R. D. (2007). Testing the ruler with item response theory: increasing precision of measurement for relationship satisfaction with the Couples	1

	Satisfaction Index. Journal of family psychology, 21(4), 572.	
Crisis Support Scale (CSS)	Elklit, A., Pedersen, S. S., & Jind, L. (2001). The Crisis Support Scale: Psychometric qualities and further validation. Personality and Individual Differences, 31(8), 1291–1302. https://doi.org/10.1016/S0191-8869(00)00220-8	1
Deployment, risk and resilience inventory (DRRI)	Vogt, D., Smith, B. N., King, L. A., King, D. W., Knight, J., & Vasterling, J. J. (2013). Deployment risk and resilience inventory-2 (DRRI-2): an updated tool for assessing psychosocial risk and resilience factors among service members and veterans. Journal of traumatic stress, 26(6), 710–717. https://doi.org/10.1002/jts.21868	1
Desired Changes Questionnaire (DCQ)	LaMotte, A. D., Taft, C. T., Reardon, A. F., & Miller, M. W. (2015). Veterans' PTSD symptoms and their partners' desired changes in key relationship domains. Psychological trauma : theory, research, practice and policy, 7(5), 479–484. https://doi.org/10.1037/tra0000052	1
Family relationships index (FRI)	Margola, D., Fenaroli, V., Sorgente, A., Lanz, M., & Costa, G. (2017). The family relationships index (FRI). European Journal of Psychological Assessment.	1
Fear of Intimacy Scale (FIS)	Descutner, C. J., & Thelen, M. H. (1991). Development and validation of a Fear-of-Intimacy Scale. Psychological assessment: A journal of consulting and clinical psychology, 3(2), 218.	1
Perceived Social Support Questionnaire (F-SozU)	Kliem, S., Mößle, T., Rehbein, F., Hellmann, D. F., Zenger, M., & Brähler, E. (2015). A brief form of the Perceived Social Support Questionnaire (F-SozU) was developed, validated, and standardized. Journal of clinical epidemiology, 68(5), 551-562.	1
Global Assessment of Functioning (GAF)	Aas, I.M. Guidelines for rating Global Assessment of Functioning (GAF). Ann Gen Psychiatry **10**, 2 (2011). https://doi.org/10.1186/1744-859X-10-2	2
Illness Intrusiveness Scale (IIRS)	Devins G. M. (2010). Using the illness intrusiveness ratings scale to understand health-related quality of life in chronic disease. Journal of psychosomatic research, 68(6), 591–602. https://doi.org/10.1016/j.jpsychores.2009.05.006	1
Index of Marital Satisfaction (IMS)	Torkan, H., & Molavi, H. (2009). Psychometrical properties of the Index of Marital Satisfaction (IMS). Journal of psychology.	1

Life Stressors and Social Resources Inventory-Adult Form (LISRES-A)	Moos, R. H., Fenn, C. B., & Billings, A. G. (1988). Life stressors and social resources: an integrated assessment approach. Social science & medicine (1982), 27(9), 999–1002. https://doi.org/10.1016/0277-9536(88)90291-2	1
Longitudinal Interval Follow-up Schedule (LIFE)	Keller, M. B., Lavori, P. W., Friedman, B., Nielsen, E., Endicott, J., McDonald-Scott, P., & Andreasen, N. C. (1987). The Longitudinal Interval Follow-up Evaluation. A comprehensive method for assessing outcome in prospective longitudinal studies. Archives of general psychiatry, 44(6), 540–548. https://doi.org/10.1001/archpsyc.1987.01800180050009	1
MacArthur Community Violence Scale (MCVS)	Cartwright, J. K., Desmarais, S. L., Grimm, K. J., Meade, A. W., & Van Dorn, R. A. (2020). Psychometric Properties of the MacArthur Community Violence Screening Instrument. International Journal of Forensic Mental Health, 19(3), 253-268.	1
Marital coping inventory (MCI)	Cohan, C. L., & Bradbury, T. N. (1994). Assessing responses to recurring problems in marriage: Evaluation of the Marital Coping Inventory. Psychological Assessment, 6(3), 191.	1
Marital Status Inventory (MSI)	Weiss, R. L., & Cerreto, M. C. (1980). The Marital Status Inventory: Development of a measure of dissolution potential. American Journal of Family Therapy, 8(2), 80–85. https://doi.org/10.1080/01926188008250358	1
Multidimensional sexuality questionnaire (MSQ)	Snell Jr, W. E., Fisher, T. D., & Walters, A. S. (1993). The Multidimensional Sexuality Questionnaire: An objective self-report measure of psychological tendencies associated with human sexuality. Annals of sex research, 6(1), 27-55.	1
Navy Quality of Life Survey (NQOLS)	Erbes, C. R. (2011). Couple functioning and PTSD in returning OIF soldiers: Preliminary findings from the Readiness and Resilience in National Guard Soldiers Project. In S. M. Wadsworth & D. Riggs (Eds.), Risk and resilience in U.S. military families (pp. 47–67). Springer Science + Business Media. https://doi.org/10.1007/978-1-4419-7064-0_3	1
Parenting Sense of Competence Scale (PSOC)	Gibaud-Wallston, J., & Wandersman, L. P. (1978). Parenting Sense of Competence Scale (PSOC) [Database record]. APA PsycTests. https://doi.org/10.1037/t01311-000	1
Parenting Stress Index-Short Form (PSI-SF)	Reitman, D., Currier, R. O., & Stickle, T. R. (2002). A critical evaluation of the Parenting Stress Index-Short Form (PSI-SF) in a head	1

	start population. Journal of Clinical Child and Adolescent Psychology, 31(3), 384-392.	
Personal Assessment of Intimacy in Relationships (PAIR)	Moore, K. A., McCabe, M. P., & Stockdale, J. E. (1998). Factor analysis of the Personal Assessment of Intimacy in Relationships Scale (PAIR): Engagement, communication and shared friendships. Sexual and Marital Therapy, 13(4), 361-368.	1
Premature Ejaculation Diagnostic Tool (PEDT)	Tang, D. D., Li, C., Peng, D. W., & Zhang, X. S. (2018). Validity of premature ejaculation diagnostic tool and its association with International Index of Erectile Function-15 in Chinese men with evidence-based-defined premature ejaculation. Asian journal of andrology, 20(1), 19–23. https://doi.org/10.4103/aja.aja_9_17	1
Primary care evaluation of mental disorders (PRIME-MD)	Tamburrino, M. B., Lynch, D. J., Nagel, R. W., & Smith, M. K. (2009). Primary care evaluation of mental disorders (PRIME-MD) screening for minor depressive disorder in primary care. Primary care companion to the Journal of clinical psychiatry, 11(6), 339–343. https://doi.org/10.4088/PCC.08.m00711	1
Quality of Life Enjoyment and Satisfaction Questionnaire-Short Form (Q-LES-Q-SF)	Riendeau, R. P., Sullivan, J. L., Meterko, M., Stolzmann, K., Williamson, A. K., Miller, C. J., Kim, B., & Bauer, M. S. (2018). Factor structure of the Q-LES-Q short form in an enrolled mental health clinic population. Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation, 27(11), 2953–2964. https://doi.org/10.1007/s11136-018-1963-8	1
Relationship Problems Scale (RPS)	Riggs, D. S. (1993). Relationship Problems and Dating Aggression: A Potential Treatment Target. Journal of Interpersonal Violence, 8(1), 18–35. https://doi.org/10.1177/088626093008001002	1
Revised Conflict Tactics Scale (CTS2)	Straus, M. A., Hamby, S. L., Boney-McCoy, S. U. E., & Sugarman, D. B. (1996). The revised conflict tactics scales (CTS2) development and preliminary psychometric data. Journal of family issues, 17(3), 283-316.	1
Satisfaction With Life Scale (SWLS)	Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. Journal of personality assessment, 49(1), 71-75.	1
Self Disclosure Index (SDI)	Fisher, N., & Choi, S. I. (2013). What Are College Students Afraid of Disclosing and to Whom? An Adaptation and Extension of the Self-Disclosure Index. Journal of Asia Pacific Counseling, 3(2).	1

Social Acknowledgment as a Victim or Survivor Questionnaire (SAQ)	Maercker, A., & Müller, J. (2004). Social acknowledgment as a victim or survivor: a scale to measure a recovery factor of PTSD. Journal of traumatic stress, 17(4), 345–351. https://doi.org/10.1023/B:JOTS.0000038484.15488.3d	1
Trait Anger Scale (TAS)	Deffenbacher, J. L., Oetting, E. R., Thwaites, G. A., Lynch, R. S., Baker, D. A., Stark, R. S., ... & Eiswerth-Cox, L. (1996). State–trait anger theory and the utility of the trait anger scale. Journal of Counseling Psychology, 43(2), 131.	1
Family Environment Scale (FES)	Loveland-Cherry, C. J., Youngblut, J. M., & Leidy, N. W. (1989). A psychometric analysis of the Family Environment Scale. Nursing Research, 38(5), 262-266.	1
Veterans RAND 12-item Health Survey (VR-12)	Selim, A. J., Rothendler, J. A., Qian, S. X., Bailey, H. M., & Kazis, L. E. (2022). The History and Applications of the Veterans RAND 12-Item Health Survey (VR-12). The Journal of ambulatory care management, 45(3), 161–170. https://doi.org/10.1097/JAC.0000000000000420	1
Veterans short form-36 (VR-36)	Sprenkle, M. D., Niewoehner, D. E., Nelson, D. B., & Nichol, K. L. (2004). The Veterans Short Form 36 questionnaire is predictive of mortality and health-care utilization in a population of veterans with a self-reported diagnosis of asthma or COPD. Chest, 126(1), 81–89. https://doi.org/10.1378/chest.126.1.81	1
Walter Reed Aggression Scale (WRA-4)	Ashwick, R., Syed, S., & Murphy, D. (2018). Exploring Demographics and Health as Predictors of Risk-Taking in UK Help-Seeking Veterans. Healthcare (Basel, Switzerland), 6(2), 58. https://doi.org/10.3390/healthcare6020058	1
WHO-Five Wellbeing Index (WHO-5)	Omani-Samani, R., Maroufizadeh, S., Almasi-Hashiani, A., Sepidarkish, M., & Amini, P. (2019). The WHO-5 Well-Being Index: A Validation Study in People with Infertility. Iranian journal of public health, 48(11), 2058–2064.	1
WHO Quality of Life BREF (WHOQOL-BREF)	Vahedi S. (2010). World Health Organization Quality-of-Life Scale (WHOQOL-BREF): Analyses of Their Item Response Theory Properties Based on the Graded Responses Model. Iranian journal of psychiatry, 5(4), 140–153.	1
Work and Social Adjustment Scale (WSAS)	Mundt, J. C., Marks, I. M., Shear, M. K., & Greist, J. M. (2002). The Work and Social Adjustment Scale: a simple measure of impairment in functioning. The British Journal of Psychiatry, 180(5), 461-464.	1

Appendix C – Search Terms

("veteran*"[Title/Abstract] OR "Military"[Title/Abstract] OR "Armed forces"[Title/Abstract] OR "POW"[Title/Abstract] OR "soldier*"[Title/Abstract] OR "Army"[Title/Abstract] OR "Air Force"[Title/Abstract] OR "Navy"[Title/Abstract] OR "Naval"[Title/Abstract]) AND ("PTSD"[Title/Abstract] OR "post traumatic stress disorder"[Title/Abstract] OR "post traumatic stress disorder"[Title/Abstract] OR "Posttraumatic stress disorder"[Title/Abstract]) AND ((("function*"[Title/Abstract] OR "impair*"[Title/Abstract] OR "Social"[Title/Abstract] OR "Psychosocial"[Title/Abstract] OR "Interpersonal"[Title/Abstract] OR "relationship*"[Title/Abstract] OR "Occupational"[Title/Abstract]) AND ("impair*"[Title/Abstract] OR "function*"[Title/Abstract] OR "difficult*"[Title/Abstract])) OR "Quality of life"[Title/Abstract])

Appendix D – Registration of Study as a Service Evaluation

NHS
Veterans' Mental Health Transition, Intervention and Liaison Service
London and south east

4th Floor West Wing
St Pancras Hospital
4 St Pancras Way
London, NW1 0PE
Tel: 020 3317 6818

To whom it may concern,

I confirm that Leon Culloty, Trainee Clinical Psychologist, has registered a service evaluation titled 'A service evaluation of a specialist NHS mental health service for UK Armed Forces Veterans looking at PTSD, alcohol, anger, and functional impairment' with the Camden and Islington NHS Foundation Trust.

This will be conducted within the Veterans Mental Health Transition, Intervention and Liaison Service and will form the Main Project/Thesis of Leon's DClinPsy at UCL. As this service evaluation involves the use of retrospective data gathered as part of routine clinical practice, this project does not require NHS REC ethics.

Yours sincerely,

Name: Keisha Fearon

Job Role: Quality Assurance and Compliance Manager

Date: 08.02.2022

Signed: [redacted]

Appendix E – Permission From Head of Service

21/02/2022

NHS
Veterans' Mental Health Transition, Intervention and Liaison Service
London and south east

4th Floor West Wing
St Pancras Hospital
4 St Pancras Way
London, NW1 0PE
Tel: 020 3317 6818

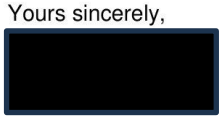
To whom it may concern,

I give permission for Leon Culloty to use data from the NHS Veterans' Mental Health Transition, Intervention and Liaison service for his DClinPsy Main Project/Thesis at the University College London entitled 'A service evaluation of a specialist NHS mental health service for UK Armed Forces Veterans looking at PTSD, alcohol, anger, and functional impairment'.

This data consists of psychological measures that clients routinely fill out at the point of their assessment. These measures are the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5); Alcohol Use Disorders Identification Test (AUDIT), Dimensions of Anger Reactions-R (DAR-R); Work and Social Adjustment Scale (WSAS); Patient Health Questionnaire-9 (PHQ-9); and Generalized Anxiety Disorder-7 (GAD-7).

This data also includes descriptive information that clients provide on their referral form - namely, nationality, ethnicity, date of birth, religion, gender, military branch, date of military enlistment and date of military discharge. This data will be anonymised such that identifiable information such as names and NHS numbers are omitted.

Yours sincerely,



Dr Sue Ferrier
Consultant Clinical Psychologist
Head of the Veterans' Mental Health and Well Being Service

Appendix F – The PTSD Checklist for DSM-5 (PCL-5)

In the past month, how much were you bothered by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again *(as if you were actually back there reliving it)*?	0	1	2	3	4
4. Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience *(for example, heart pounding, trouble breathing, sweating)*?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience *(for example, people, places, conversations, activities, objects, or situations)*?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world *(for example, having thoughts such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)*?	0	1	2	3	4
10. Blaming yourself or someone else for the stressful experience or what happened after it?	0	1	2	3	4
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	0	1	2	3	4
12. Loss of interest in activities that you used to enjoy?	0	1	2	3	4
13. Feeling distant or cut off from other people?	0	1	2	3	4
14. Trouble experiencing positive feelings *(for example, being unable to feel happiness or have loving feelings for people close to you)*?	0	1	2	3	4
15. Irritable behavior, angry outbursts, or acting aggressively?	0	1	2	3	4
16. Taking too many risks or doing things that could cause you harm?	0	1	2	3	4
17. Being "superalert" or watchful or on guard?	0	1	2	3	4
18. Feeling jumpy or easily startled?	0	1	2	3	4
19. Having difficulty concentrating?	0	1	2	3	4
20. Trouble falling or staying asleep?	0	1	2	3	4

PCL-5 (8/14/2013) Weathers, Litz, Keane, Palmieri, Marx, & Schurr – National Center for PTSD

Appendix G – Alcohol Use Disorders Identification Test (AUDIT)

THE ALCOHOL USE DISORDERS IDENTIFICATION TEST

Place the correct answer number in the box on the right

1. How often do you have a drink containing alcohol?

(0) Never (skip to Questions 9 – 10)
(1) Monthly or less
(2) 2 – 4 times a month
(3) 2 – 3 times a week
(4) 4 or more times a week

2. How many drinks containing alcohol do you have on a typical day when you are drinking?

(0) 1 or 2
(1) 3 or 4
(2) 5 or 6
(3) 7, 8 or 9
(4) 10 or more

3. How often do you have 6 or more drinks on one occasion?

(0) Never
(1) Less than monthly
(2) Monthly
(3) Weekly
(4) Daily or almost daily

Skip to Questions 9 & 10 if Total Score for Questions 2 & 3 = 0

4. How often during the last year have you found that you were not able to stop drinking once you had started?

(0) Never
(1) Less than monthly
(2) Monthly
(3) Weekly
(4) Daily or almost daily

5. How often during the last year have you failed to do what was normally expected from you because of drinking?

(0) Never
(1) Less than monthly
(2) Monthly
(3) Weekly
(4) Daily or almost daily

6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?

(0) Never
(1) Less than monthly
(2) Monthly
(3) Weekly
(4) Daily or almost daily

7. How often during the last year have you had a feeling of guilt or remorse after drinking?

(0) Never
(1) Less than monthly
(2) Monthly
(3) Weekly
(4) Daily or almost daily

8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?

(0) Never
(1) Less than monthly
(2) Monthly
(3) Weekly
(4) Daily or almost daily

9. Have you or someone else been injured as a result of your drinking? bv

(0) No
(2) Yes, but not in the last year
(4) Yes, during the last year

10. Has a relative or friend or a doctor or another health worker been concerned about your drinking or suggested you cut down?

(0) No
(2) Yes, but not in the last year
(4) Yes, during the last year

Record total of specific items here

Appendix H – The Work and Social Adjustment Scale (WSAS)

WORK & SOCIAL ADJUSTMENT

People's problems sometimes affect their ability to do certain day-to-day tasks in their lives. To rate your problems look at each section and **determine on the scale provided how much your problem impairs your ability to carry out the activity.**

WORK - if you are retired or choose not to have a job for reasons unrelated to your problem, please tick N/A (not applicable)

0	1	2	3	4	5	6	7	8	**N/A**
Not at all		Slightly		Definitely		Markedly		Very severely. I cannot work	☐

HOME MANAGEMENT – Cleaning, tidying, shopping, cooking, looking after home/children, paying bills etc.

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

SOCIAL LEISURE ACTIVITIES - With other people, e.g. parties, pubs, outings, entertaining etc.

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

PRIVATE LEISURE ACTIVITIES – Done alone, e.g. reading, gardening, sewing, hobbies, walking etc.

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

FAMILY AND RELATIONSHIPS – Form and maintain close relationships with others including the people that I live with.

0	1	2	3	4	5	6	7	8
Not at all		Slightly		Definitely		Markedly		Very severely

Appendix I – Bivariate Correlations

Bivariate correlations on sample without outliers (N=299)

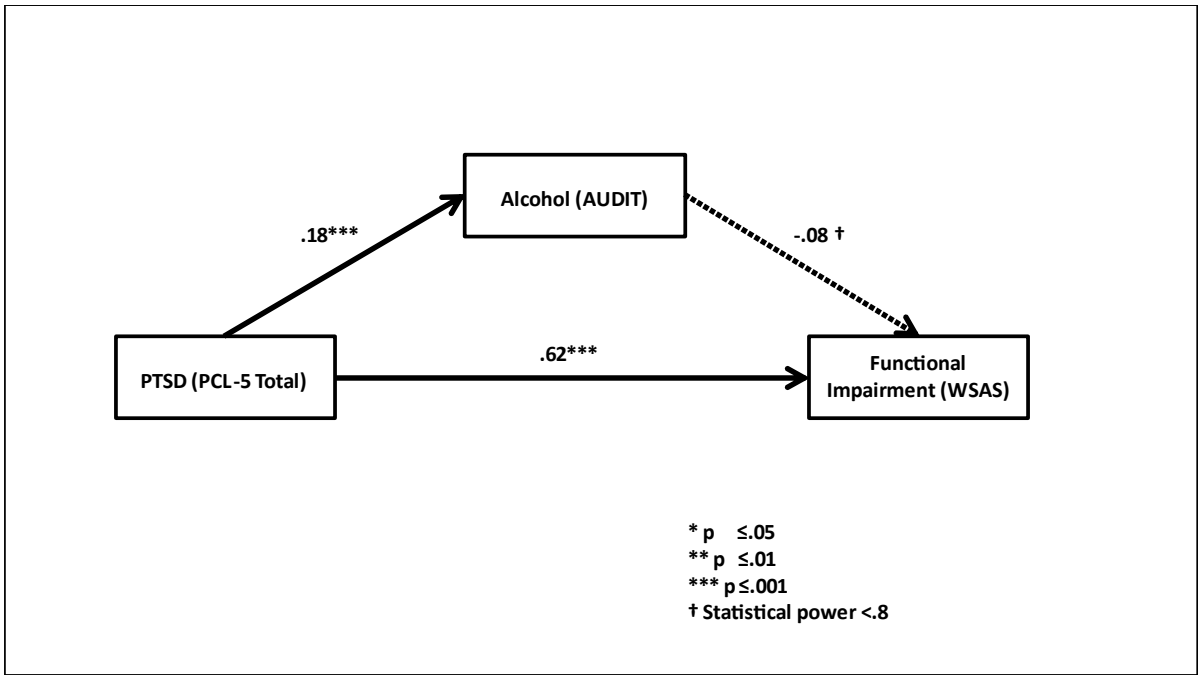
		1	2	3	4	5	6	7	8
1.	Alcohol	--							
2.	Functional Impairment	.02	--						
3.	PTSD	.19***	.60***	--					
4.	Re-experiencing	.14*	.47***	.89***	--				
5.	Avoidance	.13*	.48***	.76***	.69***	--			
6.	NACM	.12*	.60***	.90***	.68***	.62***	--		
7.	Arousal	.25***	.53***	.88***	.72***	.55***	.71***	--	
8.	Age	-.13*	.01	-.02	.05	-.02	-.06	-.03	--
9.	Ethnicity	-.06	.15**	.18***	.24***	.22***	.13*	.08	-.11*

Note. *** $p \leq .001$. ** $p \leq .01$. * $p \leq .05$.

Appendix J – Path Diagrams for all Samples

1.1

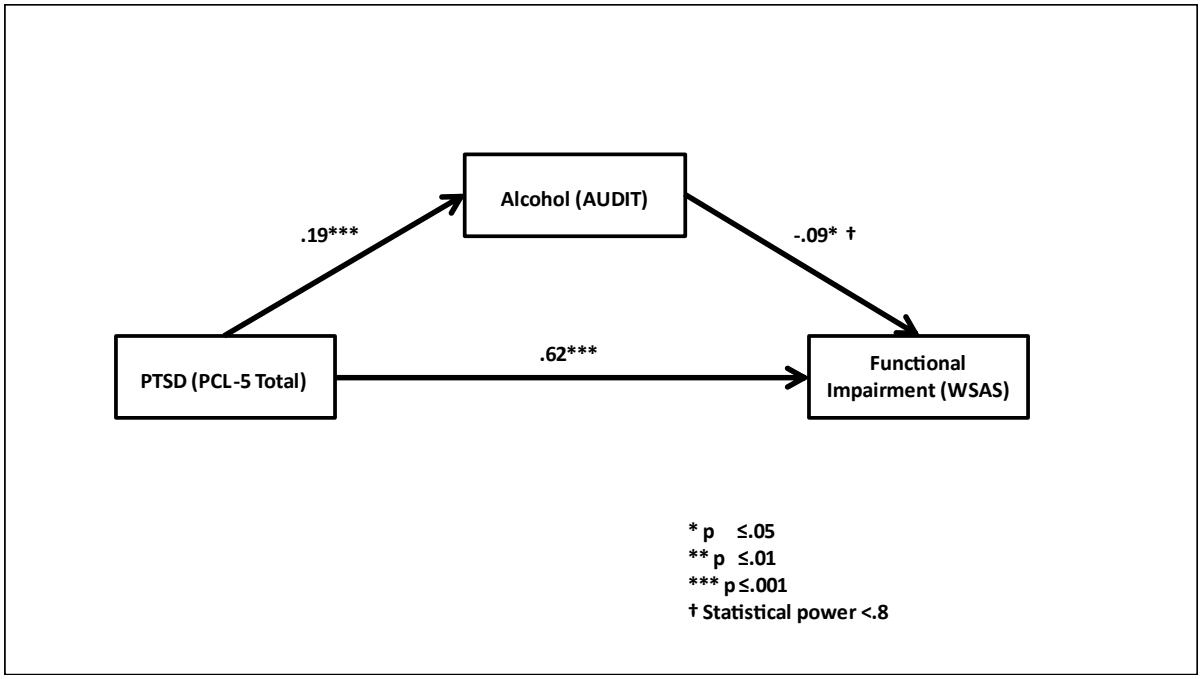
Model 1 PTSD total: path statistics with outliers untransformed and without covariates (N=302)



Note. A dotted line indicates a nonsignificant pathway.

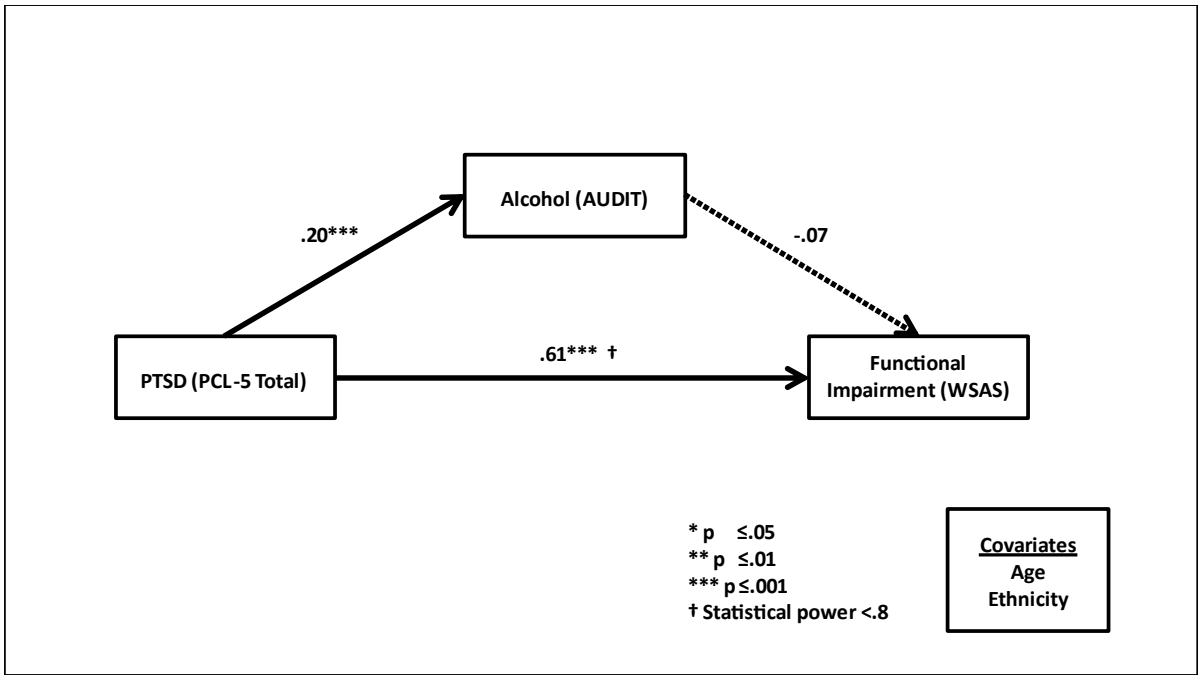
1.2

Model 1 PTSD total: path statistics with outliers transformed and without covariates (N=299)



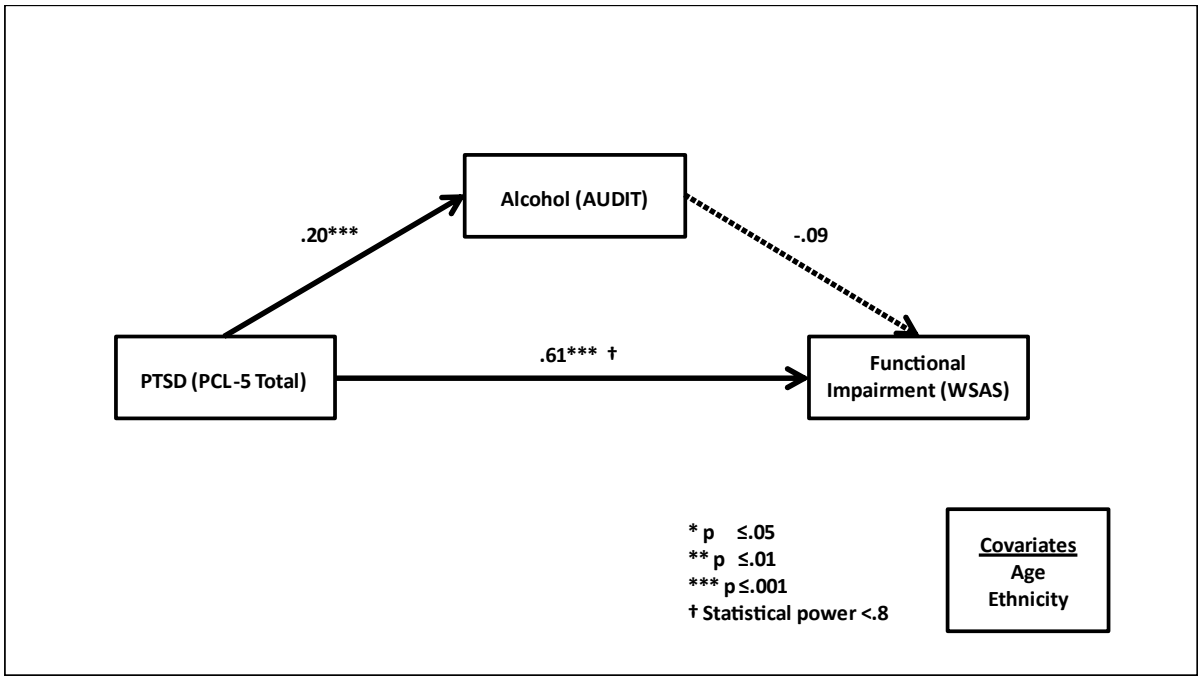
1.3

Model 1 PTSD total: path statistics with outliers untransformed and with covariates (N=302)



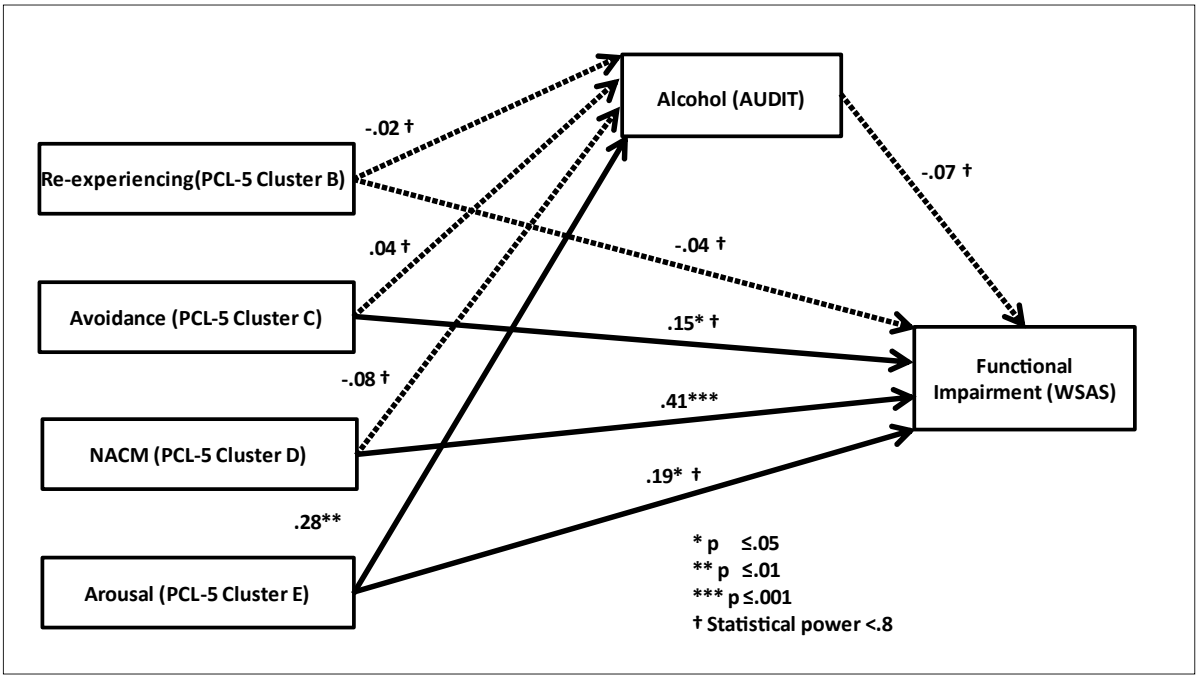
1.4

Model 1 PTSD total: path statistics with outliers transformed and with covariates (N=299)



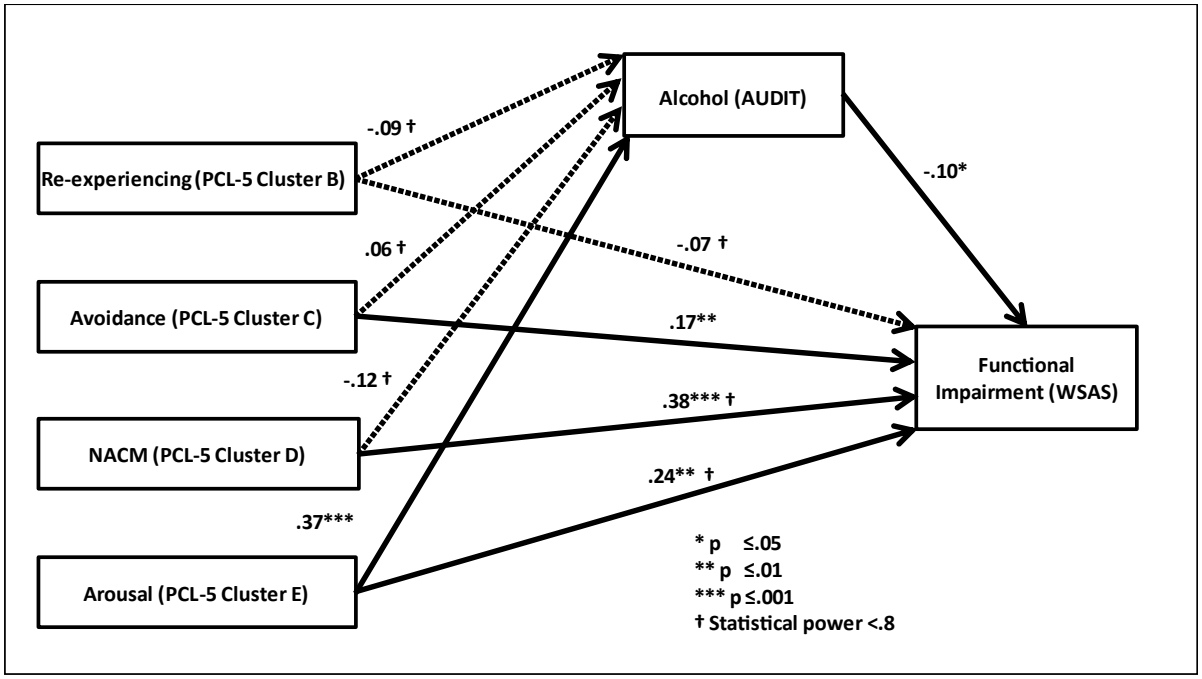
2.1

Model 2 PTSD symptom clusters: path statistics with outliers untransformed and without covariates (N=302)



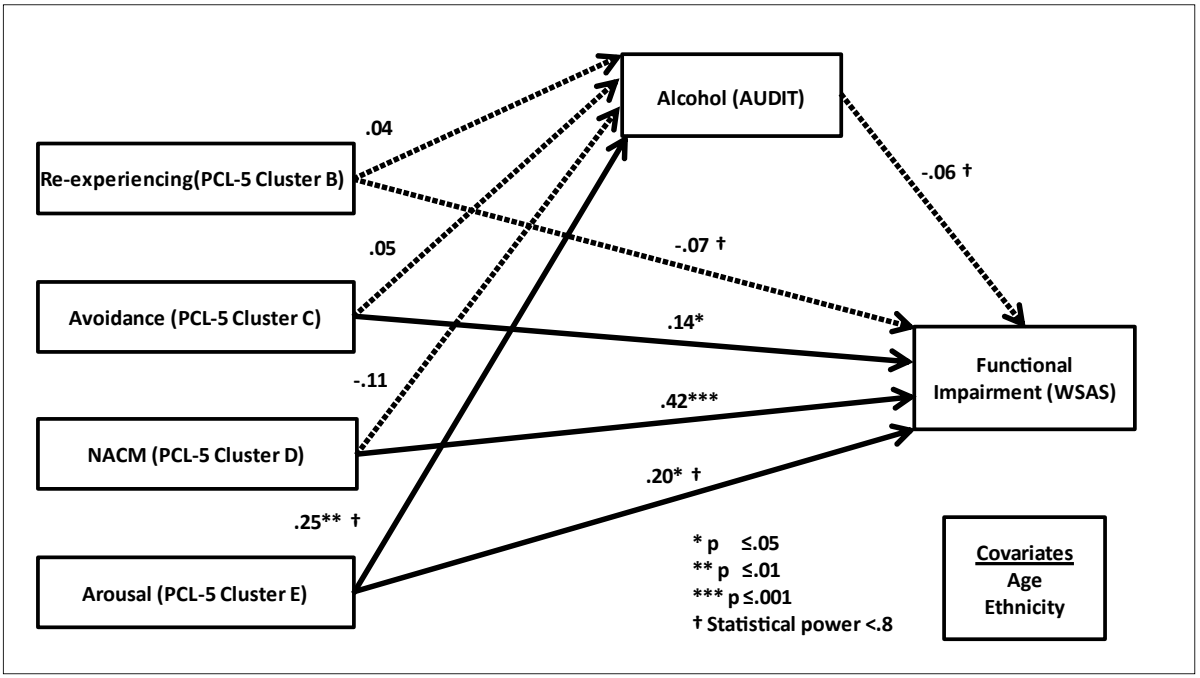
2.2

Model 2 PTSD symptom clusters: path statistics with outliers transformed and without covariates (N=299)



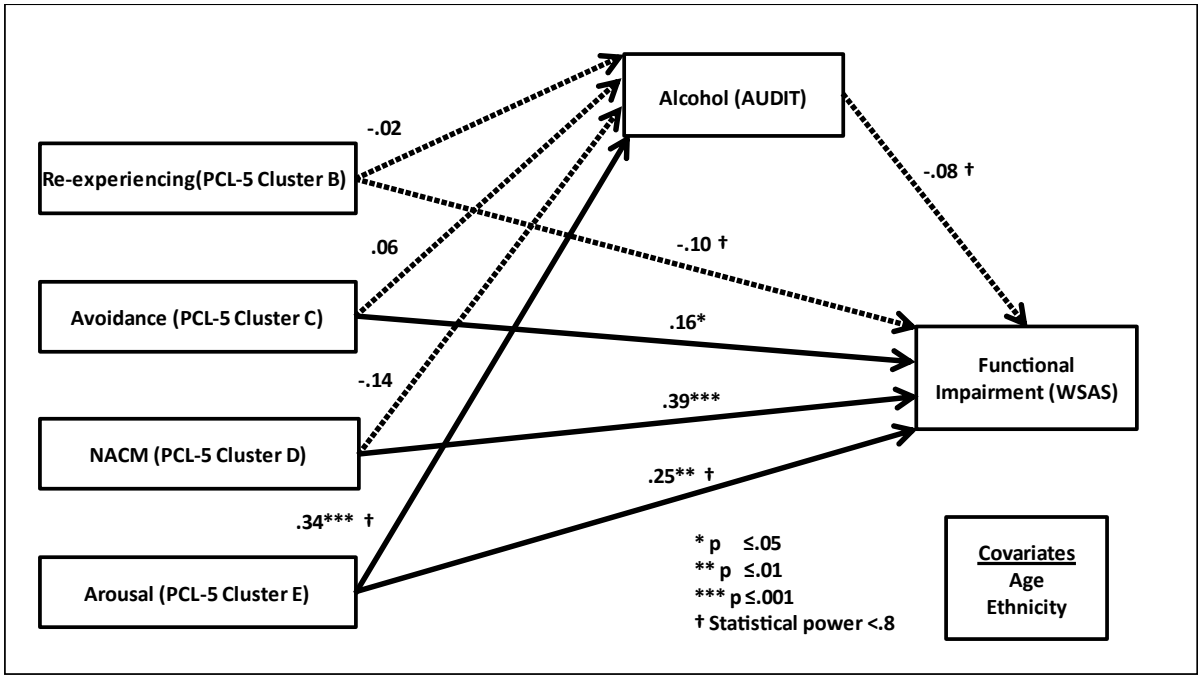
2.3

Model 2 PTSD symptom clusters: path statistics with outliers untransformed and with covariates (N=302)



2.4

Model 2 PTSD symptom clusters: path statistics with outliers transformed and with covariates (N=299)


Alcohol (AUDIT)
Re-experiencing(PCL-5 Cluster B)
Avoidance (PCL-5 Cluster C)
NACM (PCL-5 Cluster D)
Arousal (PCL-5 Cluster E)
Functional Impairment (WSAS)
-.02
.06
-.14
.34*** †
-.08 †
-.10 †
.16*
.39***
.25** †
* p ≤.05
** p ≤.01
*** p≤.001
† Statistical power <.8
Covariates
Age
Ethnicity

Appendix K – Path Statistics for Each Model 1

Model 1 PTSD total: path statistics

Paths in model		Unstandardized coefficient (*B*)	Standardized coefficient (β)	95% CI	*p*-value	Power
PTSD → Alcohol	Outliers untransformed/ without covariates	.09	.18	[.08, .28]	.00	.91
	Outliers transformed/ without covariates	.08	.19	[.08, .28]	.00	.91
	Outliers untransformed/ with covariates	.10	.20	[.10, .30]	.00	.95
	Outliers transformed/ with covariates	.09	.20	[.10, .30]	.00	.95
Alcohol → Functional impairment	Outliers untransformed/ without covariates	-.01	-.08	[-.17, .01]	.08	0.41
	Outliers transformed/ without covariates	-.02	-.09	[-.18, -.00]	.03	0.55
	Outliers untransformed/ with covariates	-.01	-.07	[-.16, .01]	.11	1.0
	Outliers transformed/ with covariates	-.02	-.09	[-.18, .00]	.05	1.0
PTSD → Functional impairment	Outliers untransformed/ without covariates	.06	.62	[.53, .69]	.00	1.0
	Outliers transformed/ without covariates	.06	.62	[.53, .70]	.00	1.0
	Outliers untransformed/ with covariates	.06	.61	[.52, .69]	.00	.36
	Outliers transformed/ with covariates	.06	.61	[.52, .69]	.00	.46
PTSD → Alcohol → Functional impairment	Outliers untransformed/ without covariates	-.00	-.03	[-.03, .00]	.11	.20

	Outliers transformed/ without covariates	-.00	-.01	[-.04, -.00]	.06	.30
	Outliers untransformed/ with covariates	-.00	-.01	[-.04, .00]	.13	.95
	Outliers transformed/ with covariates	-.00	-.01	[-.00, .00]	.07	.95

2

Model 2 PTSD symptoms clusters: path statistics

Paths in model	Model	Unstandardized coefficient (*B*)	Standardized coefficient (β)	95% CI	*p*-value	Power
Re-experiencing → Alcohol	Outliers untransformed/ without covariates	-.03	-.02	[-.21, .19]	.84	.06
	Outliers transformed/ without covariates	-.13	-.09	[-.27, .09]	.33	.16
	Outliers untransformed/ with covariates	.07	.04	[-.15, .26]	.64	1.00
	Outliers transformed/ with covariates	-.03	-.02	[-.21, .16]	.80	1.00
Avoidance → Alcohol	Outliers untransformed/ without covariates	.15	.04	[-.10, .19]	.55	.08
	Outliers transformed/ without covariates	.22	.06	[-.08, .20]	.36	.13
	Outliers untransformed/ with covariates	.17	.05	[-.09, .19]	.50	.98
	Outliers transformed/ with covariates	.23	.06	[-.07, .21]	.34	.95
NACM → Alcohol	Outliers untransformed/ without covariates	-.11	-.08	[-.25, .08]	.30	.17

	Outliers transformed/ without covariates	-.14	-.12	[-.28, .04]	.15	.28
	Outliers untransformed/ with covariates	-.14	-.11	[-.28, .05]	.18	1.00
	Outliers transformed/ with covariates	-.17	-.14	[-.31, .02]	.09	1.00
Arousal → Alcohol	Outliers untransformed/ without covariates	.43	.28	[.07, .47]	.00	.90
	Outliers transformed/ without covariates	.56	.37	[.20, .53]	.00	.98
	Outliers untransformed/ with covariates	.39	.25	[.05, .44]	.01	.08
	Outliers transformed/ with covariates	.51	.34	[.18, .50]	.00	.06
Re-experiencing → Functional impairment	Outliers untransformed/ without covariates	-.01	-.04	[-.19, .11]	.61	.08
	Outliers transformed/ without covariates	-.02	-.07	[-.23, .07]	.37	.14
	Outliers untransformed/ with covariates	-.02	-.07	[-.24, .09]	.39	.63
	Outliers transformed/ with covariates	-.03	-.10	[-.26, .05]	.20	.71
Avoidance → Functional impairment	Outliers untransformed/ without covariates	.11	.15	[.02, .27]	.01	.66
	Outliers transformed/ without covariates	.13	.17	[.04, .29]	.00	.74
	Outliers untransformed/ with covariates	.11	.14	[.02, .27]	.02	1.00
	Outliers transformed/ with covariates	.12	.16	[.04, .29]	.01	1.00
NACM → Functional impairment	Outliers untransformed/ without covariates	.11	.41	[.26, .55]	.00	1.00

	Outliers transformed/ without covariates	.10	.38	[.23, .52]	.00	1.00
	Outliers untransformed/ with covariates	.11	.42	[.27, .56]	.00	.82
	Outliers transformed/ with covariates	.10	.39	[.24, .53]	.00	.93
Arousal → Functional impairment	Outliers untransformed/ without covariates	.06	.19	[.02, .36]	.02	.79
	Outliers transformed/ without covariates	.08	.24	[.07, .40]	.00	.90
	Outliers untransformed/ with covariates	.06	.20	[.02, .37]	.02	.27
	Outliers transformed/ with covariates	.08	.25	[.08, .41]	.00	.46
Alcohol → Functional impairment	Outliers untransformed/ without covariates	-.01	-.07	[-.17, .01]	.10	.38
	Outliers transformed/ without covariates	-.02	-.10	[-.19, -.00]	.03	.59
	Outliers untransformed/ with covariates	-.01	-.06	[-.15, .03]	.18	.16
	Outliers transformed/ with covariates	-.02	-.08	[-.17, .00]	.06	.26
Re-experiencing → Alcohol → Functional impairment	Outliers untransformed/ without covariates	.00	.00	[-.01, .02]	.87	.00
	Outliers transformed/ without covariates	.00	.00	[-.00, .04]	.41	.02
	Outliers untransformed/ with covariates	-.00	-.00	[-.03, .00]	.71	.14
	Outliers transformed/ with covariates	.00	.00	[-.01, .02]	.83	.24
Avoidance → Alcohol → Functional impairment	Outliers untransformed/ without covariates	-.00	-.00	[-.02, .00]	.64	.00

	Outliers transformed/ without covariates	-.00	-.00	[-.03, .00]	.44	.01
	Outliers untransformed/ with covariates	-.00	-.00	[-.02, .00]	.63	.09
	Outliers transformed/ with covariates	-.00	-.00	[-.03, .00]	.44	.15
NACM → Alcohol → Functional impairment	Outliers untransformed/ without covariates	.00	.00	[-.00, .03]	.48	.01
	Outliers transformed/ without covariates	.00	.01	[-.00, .04]	.28	.04
	Outliers untransformed/ with covariates	.00	.00	[-.00, .03]	.45	.13
	Outliers transformed/ with covariates	.00	.01	[-.00, .04]	.26	.24
Arousal → Alcohol → Functional impairment	Outliers untransformed/ without covariates	-.00	-.02	[-.06, .00]	.21	.18
	Outliers transformed/ without covariates	-.01	-.03	[-.08, -.00]	.05	.45
	Outliers untransformed/ with covariates	-.00	-.01	[-.06, .00]	.30	.00
	Outliers transformed/ with covariates	-.01	-.03	[-.07, -.00]	.09	.00