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Associations of childhood trauma and childhood mental disorder with past-year mental disorder in military and civilian employed men

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ABSTRACT

Childhood factors are pivotal to understanding mental health over the lifespan. However, there is a dearth of research exploring childhood trauma and childhood disorder simultaneously in determining adult mental disorder. We aimed to analyze childhood trauma and childhood disorder in determining past-year disorder in military and civilian employed men aged 18–60 years. Data derived from the 2010 Australian Defence Force (ADF) Mental Health Prevalence and Wellbeing Study, and the 2007 Australian Bureau of Statistics National Survey of Mental Health and Wellbeing were analysed using logistic regression and Generalised Structural Equation Modelling (GSEM). All major findings were consistent across both populations. The association between childhood disorder and past-year disorder remained after controlling for demographics, childhood and adult trauma (and service factors in the ADF). Childhood non-interpersonal trauma was not associated with past-year disorder in either population. The pathway between childhood trauma and past-year disorder was fully mediated by the spectrum of common childhood disorders, but not by childhood anxiety, depression or alcohol use disorders alone. Identification, intervention and prevention of childhood disorders is imperative. Investment in interventions targeting the influence of childhood traumatic events on the whole spectrum of childhood disorder, not only PTSD or anxiety, is a priority.

1. Introduction

Childhood factors are pivotal to understanding mental health over the lifespan. Studies have consistently demonstrated that childhood mental health is key to determining adult mental health (Fryers and Brugha, 2013). In addition, there is a body of literature evidencing the impact of trauma as well as other adverse childhood experiences on adult mental health (Carr et al., 2013; Curran et al., 2016; Dovran et al., 2016), physical health (Gilbert et al., 2015); (Wade et al., 2016); (Felitti et al., 1998), and other social and occupational outcomes (Norman et al., 2012).

Historically, military studies have focused on the relationship between military factors, including deployment, on mental health and particularly PTSD (Creamer et al., 2011). More recently, adverse childhood experiences have also been found to be an important determinant of military health and related health outcomes (Iversen et al., 2007), and potentially as influential as combat experiences on mental health post-deployment (Jones et al., 2013). Some evidence suggests that a higher proportion of those in the military have a history of childhood adversity than those in the general population (Blosnich et al., 2014).

In general populations, the most evidenced childhood predictor of adult mental health is childhood mental disorder, but with limited disorder specificity (Fryers and Brugha, 2013). Furthermore, evidence is emerging that mental disorders are on a continuum and that individuals move between categories of mental disorder over their

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lifespan (Goodkind et al., 2015; McGorry and Nelson, 2016). Therefore, studies attempting to observe the impact of childhood disorder would need to include the spectrum of diagnostic categories. However, there is a dearth of research on the impact of childhood disorder on adult mental health in military populations.

Childhood mental disorders are associated with broad outcomes such as substance abuse, poor psychological and social functioning (Birmaher et al., 1996), low academic achievement, nicotine dependence, unemployment and early parenthood (Fergusson and Woodward, 2002). Given these consistent associations it is somewhat remarkable that so few studies (in either civilian or military populations) have explored both childhood trauma and childhood disorder simultaneously in determining adult health and social outcomes (Fryers and Brugha, 2013).

It has proved very challenging to decipher the impact of trauma by type from that of load. The few studies that have attempted to observe the associations of childhood trauma by type have encountered the problem of clustering, whereby trauma does not occur randomly, rather those who are exposed to childhood trauma are often exposed to multiple types (Finkelhor et al., 2007).

Whilst the majority of military epidemiological studies focus on stress related disorders such as PTSD (Creamer et al., 2011), a study in the UK compared common mental disorders (depression and anxiety) in the military with employed civilians (Goodwin et al., 2015). It was found that even controlling for demographic factors, the proportion of common mental disorders was higher in the military than the general population. However, with no measure for childhood adversity it was unclear if this was related to childhood or military factors.

We are not aware of any comparisons between representative military and civilian samples that have investigated the impact or interplay of childhood trauma and mental disorder on adult mental disorder. It is possible that differences exist in the relationship between childhood factors and adult mental disorder in military and employed civilian populations due to differences in the childhood trauma profiles (ref blinded for peer review), healthy warrior effect (Haley, 1998), differences in military and civilian healthcare services and help-seeking behaviours (Zamorski, 2011) and differences in occupational trauma load. We hypothesised that elucidation of these associations and differences between populations would provide vital clues to early signs relating to risk and resilience and provide vital information to better inform early intervention and prevention strategies.

In this current study we set out to investigate childhood trauma and mental disorder as determinants of past-year mental disorder in Australian Defence Force (ADF) and employed civilians. More specifically, in both populations, we aimed to examine the association of childhood trauma and mental disorder with past-year mental disorder, to examine whether the impact of childhood trauma is independent of childhood disorder, and vice versa, to examine and compare mediator pathways from childhood trauma to past-year disorder and finally to investigate whether the associations between childhood factors and past-year disorder were independent of military factors in the ADF.

There is evidence of important gender differences within military populations (Rona et al., 2007). There is also evidence of differences in the association between childhood trauma and disorder according to gender in military and civilian populations (Evans et al., 2018). Unfortunately, there were insufficient female responders in the ADF for us to be able to conduct a meaningful separate analysis. Therefore, as in other studies (Dorresteijn et al., 2019), we limited this analysis to men. Furthermore, as the ADF is an employed population we compared ADF males between the ages of 18 and 60 with male employed civilians, of the same age range.

2. Methods

The Joint Health Command Low-Risk Ethical Review Panel provided ethical approval for this analysis.

2.1. Australian Defence Force (ADF) sample

All ADF personnel were invited to participate in the 2010 ADF Mental Health Prevalence and Wellbeing Study (MHPWS). All recruitment and assessments were conducted between April 2010 and January 2011. The MHPWS employed a two-phase design to estimate the prevalence of ICD-10 mental disorders across all serving regular ADF personnel (Van Hooff et al., 2014). This two-phase design is well accepted for investigating mental disorder prevalence (Dunn et al., 1999).

- At Phase 1 all serving ADF personnel (N = 50049), excluding trainees and reservists, were invited to complete a self-report questionnaire to investigate levels of psychological and physical symptoms, which is economical of time and resources.
- At Phase 2 a stratified sub-sample of Phase 1 respondents were selected to complete the World Mental Health Initiative Version of the Composite International Diagnostic Interview version 3.0 (CIDI) (Kessler and Ustun, 2004) which is a more accurate but costly and time-consuming structured diagnostic interview, to examine mental disorder prevalence.

In all, 24481 participants provided usable data at Phase 1, including basic demographics, the K10 (Kessler Distress Scale), (Andrews and Slade, 2001) the Posttraumatic Stress Disorder Checklist (PCL) (Ventureyra et al., 2002) and the Alcohol Use Disorders Identification Test (AUDIT) (Conigrave et al., 1995). Fifteen percent of the eligible participants from Phase 1 were stratified and selected for participation in Phase 2. Participants were selected for Phase 2 with the joint aims of ensuring sufficient power within key demographic groups and of ensuring that participants had a reasonable chance of a positive diagnosis. Therefore, eligibility for Phase 2, was based on Service, sex, and scores on the PCL and AUDIT.

Detailed descriptions of stratification procedures and weighting are available elsewhere (Van Hooff et al., 2014). In summary, mental disorder prevalence estimates were derived using a robust two stage weighting process which attenuated the impact of low response rates, as well as any selection and responder bias. In the first step a weight was assigned which was equal to the inverse of the probability of being selected for an interview. This accounted for the differential probability of being selected for Phase 2, based on scores on the PCL and Audit (band) sex and service. In the second step, weights were applied to correct for differential non-response to the survey. A representative value or 'weight' was applied to each survey responder, using known characteristics about each individual in the population, in this case, age, sex, rank and medical fitness, to indicate how many 'like' individuals in the entire population (based on those characteristics) each responder represented. These two weights were combined to give each responder a single weight within the data, enabling data from responders to be adjusted so that it was representative of the entire ADF.

For the purposes of this study, output for men was achieved by post-stratification to adjust the weights so that known population totals were reproduced by the estimates. A total of 43207 (86.3%) of the ADF were men aged 18–60. Of these, 1356 had a CIDI interview. Weights were applied to this data to estimate prevalence rates across all regular ADF men aged 18–60.

2.2. Australian Bureau of Statistics (ABS) civilian sample

The 2007 Australian Bureau of Statistics (ABS) National Survey of Mental Health and Wellbeing (NSMHWB) was based on a stratified, multistage area probability sample of residents, 16–85 years of age, across all states and territories in Australia (Slade et al., 2009). Person weights were calibrated to independent estimates of population benchmarks in order to minimise sampling error of estimates and non-response bias. Population benchmarks were obtained from the 2006 Australian Census, as well as from the 2007 Australian Survey of

Education and Work. This allowed weighting of the sample according to the probability of being selected, so that the final sample of 8841 represented the estimated population of Australian adults.

For the purposes of this study, all employed males aged 18–60 were selected. As this was the civilian sample, those who said they had served in the ADF, received a Department of Veterans' Affairs (DVA) pension or experienced combat exposure were then excluded. A of a total of 4.67 million (CI 4.54 – 4.79 million) of the ABS sample were civilian employed men aged 18–60. Of these 2120 had a CIDI interview. Person and replicate weights were applied to this data to ensure that subpopulation weighting was correct to estimate prevalence rates across all civilian employed men aged 18–60.

2.3. Measures

Both the ADF and ABS studies utilized the CIDI (Kessler and Ustun, 2004) which consists of a structured diagnostic assessment of lifetime, 12-month and 30-day ICD-10 disorder. Past-year disorder was assessed based on standard CIDI algorithms with ICD hierarchical rules applied. Past-year disorder included dysthymia, hypomania, mild, moderate or severe depressive episode, social phobia, OCD, GAD, agoraphobia, panic attack, panic disorder, PTSD, alcohol abuse and dependence. Childhood disorder was defined as any disorder with age of onset below age 18 and was coded by number of disorder types (single or multiple). Disorder types were then categorised as any depression (mild, moderate or severe depressive episode), any anxiety (social phobia, OCD, GAD, agoraphobia, panic attack, panic disorder, PTSD) and any alcohol use disorder (abuse or dependence).

As a part of the CIDI interview, respondents were asked if they had experienced any of the CIDI criterion A1 events listed in the CIDI 3.0. To determine age at onset of each experience, respondents were asked how old they were when it first happened to them. For the purposes of this study we defined childhood trauma as those with age of onset below 18. As per Forbes et al. (2011), types of childhood trauma were classified as non-interpersonal trauma (exposed to a toxic chemical, life-threatening automobile accident, other life-threatening accident, man-made disaster, life-threatening illness, major natural disaster) and interpersonal trauma (sexual assault, raped, stalked, beaten by spouse/romantic partner, beaten by parents /guardian as a child, badly beaten by anyone else, kidnapped or held captive, mugged/held up or threatened with a weapon) (Forbes et al., 2011). These are abbreviations of the questions from the CIDI (Kessler and Ustun, 2004).

Due to the fact that many who experience childhood trauma experience a number of types (Finkelhor et al., 2009), childhood trauma was analysed by mutually exclusive category, as per a previous study (Syed Sheriff et al., 2018). These categories were 'non-interpersonal' trauma (without interpersonal trauma), 'interpersonal' trauma (without non-interpersonal trauma) and 'both non-interpersonal and interpersonal' trauma. As our aim was to compare different childhood trauma profiles with no childhood trauma, those who reported trauma in childhood but not either childhood interpersonal nor non-interpersonal trauma were categorized as 'unclassified' (child had life threatening illness/injury, combat, refugee, peacekeeper, purposefully injured/tortured/killed someone, other traumatic event, unarmed civilian in a place of conflict, accidentally injured/killed someone, lived as a civilian in a place of ongoing terror, experience don't want to talk about, saw atrocities or carnage, someone close had traumatic experience, witness serious physical fights at home as a child, someone close died, saw someone badly injured). The mutually exclusive categories were therefore exhaustive of the lifetime trauma types asked about in the CIDI. Adult trauma refers to the number of trauma types first experienced aged 18 or over.

In the ABS, prior to the formal mental health diagnostic interview, socio-demographic information was collected, including age, education and relationship status. In the ADF, information regarding age, education and relationship status was available from the self-report questionnaire.

In the ADF, information regarding Service characteristics was available from ADF administrative data. Military ranks were grouped into three categories: other ranks (Private to Corporal equivalents), Non-Commissioned Officers (Sergeant to Warrant Officer equivalents) and Commissioned Officers (Lieutenant to General equivalents). Information regarding previous deployment was available from the self-report questionnaire.

2.4. Analysis

As the data to be compared came from surveys in two different populations, data-merging techniques were not deemed statistically appropriate primarily due to complexities in the poststratification process. All analyses were performed in STATA version 14.2, accounting for complex survey designs by survey weighting, utilising the STATA 'svy' command. Due to the complexities associated with accurately testing results across 2 complex surveys P values were not calculated. The term 'significant' is used to describe differences when the 95% confidence intervals do not overlap. Associations with demographic, service and childhood factors were calculated controlling for demographic factors (age, highest education and current relationship).

Next, logistic regression analyses were utilized to calculate adjusted odds ratios (aORs) for each childhood trauma and disorder variable on past-year disorder controlling for demographics (age, educational attainment and current relationship), and for the number of childhood trauma types (for disorder variables) or the number of childhood disorder types (for trauma variables). This was then repeated also controlling for the number of types of trauma first experienced in adulthood. These analyses were conducted with the same variables in both populations for direct comparison. The analyses were then repeated in the ADF including service variables and a final step was added to control for previous deployment.

In order to assess potential mediation, we utilized Generalized Structural Equation Modelling (GSEM) pathway analysis, as per Acock (2006). The GSEM pathway utilized the link 'logit' and the family 'Bernoulli'. We compared pathways in both populations, in the following three pairs of models. First, the pathway between childhood trauma (number of types) and past-year disorder compared to the same model with childhood anxiety, depression and alcohol use disorders added as mediators. Second, the pathway between childhood trauma (number of types) and past-year disorder controlling for demographics (age, current relationship and educational attainment) compared to the same model with childhood anxiety, depression and alcohol use disorders added as mediators including covariance between the childhood disorders. Third, the pathway between childhood trauma (number of types) and past-year disorder controlling for demographics (age, current relationship and educational attainment) compared to the same model with childhood anxiety, depression and alcohol use disorders and also multiple adult trauma included as mediators. The indirect effect for each mediator was calculated utilizing the 'nlcom' command which calculates nonlinear combinations of estimators and is suitable for use with complex survey designs (StataCorp, 2013). Goodness of Fit estimations were not suitable for this analysis, in most cases due to the joint-normality assumption (StataCorp, 2013).

3. Results

Overall, 21.7% (95% CI: 18.2–25.6) of ADF males and 18.1% (95% CI: 15.2–21.1) of employed civilian males, aged 18–60, had an ICD-10 past-year mental disorder.

In ADF men, past-year disorder was associated with being young and with lower educational attainment. In contrast, in civilian men, past-year disorder was only associated with being single but not with current age or educational attainment. Controlling for demographics, in the ADF, past-year disorder was associated with being in the Airforce

Table 1
Population proportions and associations with past year ICD-10 mental disorder.

Civilian employed males (18–60 years old) Demographics Current age	%	95% CI		aOR	95% CI		%	95% CI		aOR	95% CI	
<25	18.9	18.8	19.0	1.00			15.8	14.3	17.3	1.00		
25–34	36.4	36.2	36.5	0.92	0.46	1.84	24.1	22.2	26.0	1.09	0.66	1.81
35–44	28.1	28.0	28.3	0.64	0.34	1.18	26.7	24.9	28.4	0.92	0.55	1.54
45+	16.6	16.5	16.7	0.38	0.20	0.73	33.5	31.8	35.2	0.80	0.46	1.41
Highest education												
Year 10	11.3	11.2	11.4	1.00			13.6	11.6	15.7	1.00		
Certificate or diploma	38.6	38.4	38.7	0.31	0.15	0.65	41.3	38.9	43.7	0.91	0.56	1.48
Year 11/12	30.3	30.2	30.5	0.28	0.14	0.56	21.9	19.4	24.3	0.75	0.44	1.30
University degree	19.8	19.7	19.9	0.38	0.19	0.75	23.2	21.2	25.3	0.60	0.34	1.05
Current relationship												
Not in significant relationship	24.4	24.2	24.5	1.00			34.5	32.0	37.0	1.00		
Current significant relationship	75.6	75.5	75.8	0.60	0.74	3.41	65.5	63.0	68.0	0.58	0.38	0.89
Childhood TRAUMA Number of types												
Single	24.9	21.3	28.8	1.90	1.22	2.95	23.2	20.6	25.9	2.09	1.13	3.84
Multiple	31.3	27.2	35.8	2.78	1.71	4.51	18.9	16.4	21.4	2.45	1.69	3.55
Category												
Unclassified	16.5	13.9	19.5	1.77	1.09	2.87	17.5	15.2	19.9	2.02	1.20	3.40
Non-interpersonal (without interpersonal)	17.0	13.5	21.3	1.47	0.86	2.50	9.1	7.4	10.8	1.11	0.61	2.05
Interpersonal (without non-interpersonal)	12.3	10.2	14.7	2.48	1.54	3.99	11.7	9.7	13.7	3.29	1.72	6.30
Both interpersonal and non-interpersonal	10.4	7.5	14.2	5.84	2.89	11.82	3.9	2.8	5.1	3.71	1.88	7.32
Childhood DISORDER Number of types												
Single	14.5	12.1	17.2	3.90	2.56	5.93	12.8	10.8	14.8	4.31	2.53	7.35
Multiple	10.9	7.9	14.8	14.53	7.49	28.16	7.9	6.4	9.5	16.84	9.80	28.95
Diagnostic category												
Any anxiety	17.2	13.7	21.2	5.48	3.24	9.26	14.8	12.8	16.8	7.76	4.94	12.19
Any depression	3.9	2.0	7.1	11.90	4.68	30.28	2.3	1.5	3.1	2.60	1.36	4.98
Any alcohol	7.4	5.1	10.6	2.29	1.20	4.38	6.9	5.4	8.5	2.93	1.85	4.62
Service												
Navy	22.1	22.1	22.2	1.00								
Army	52.4	52.3	52.4	1.00	0.62	1.60						
Airforce	25.5	25.5	25.5	0.56	0.36	0.85						
Rank												
Officers	23.7	23.6	23.8	1.00								
Non-commissioned officers	44.8	44.6	44.9	1.25	0.76	2.04						
Other ranks	31.5	31.4	31.7	1.60	0.81	3.15						

(rather than the Navy) but was not associated with rank.

In both populations, past-year disorder was associated with both single and multiple types of childhood trauma. However, it was not associated with childhood non-interpersonal trauma (without interpersonal trauma) in either population. In both populations, past-year disorder was associated with all diagnostic categories of childhood disorder (anxiety, depression and alcohol use disorders). Multiple types of childhood disorder had a stronger association with past-year disorder than single types of childhood disorder in both populations (see Table 1).

After controlling for demographics (current age, educational attainment and relationship status) and the number of childhood disorder types, childhood trauma (however specified) no longer had an association with past-year disorder, in either population. In contrast, even after controlling for demographics, the number of childhood trauma types and adult trauma types, childhood disorders (however specified) were all strongly associated with past-year disorder, in both populations. Multiple childhood disorders had a stronger association with past-year disorder than single childhood disorder, in both populations (see Table 2).

In the ADF, controlling for demographics and service factors, all categories of childhood trauma were associated with past-year disorder, with the exception of childhood non-interpersonal trauma. However, controlling for childhood disorder (anxiety, depression and alcohol use disorders), the associations between all categories of childhood trauma and past-year disorder became non-significant. In contrast, when controlling for childhood trauma, all associations between childhood disorder and past-year disorder remained significant. The associations between childhood disorder and past-year disorder remained significant also controlling for adult trauma (number of types) and previous deployment (see Table 3).

3.1. Generalized structural equation modelling

As the results in Table 4 indicate, the first GSEM mediator analyses demonstrated that childhood trauma had a direct association with past-year disorder in both populations. When childhood disorders (anxiety, depression and alcohol use disorders) were introduced as mediators, the relationship between childhood trauma and past-year disorder became non-significant, whereas all mediator pathways were significant. This was the case in both populations. This suggests full mediation. As an additional analysis, we repeated this, adding in each diagnostic category of childhood disorder individually as mediators, and found in each case that a significant relationship remained between childhood trauma and past-year disorder. This suggests that no individual diagnostic category alone fully mediated the relationship between childhood trauma and past-year disorder.

The results of the second GSEM mediator analysis, controlling for demographics (age, current relationship and highest education) and for co-variance between childhood disorders, are demonstrated in Figs. 1 and 2. This also suggested full mediation by childhood disorder, in both populations. We then repeated the same analyses introducing adult trauma as a mediator. The pathway from childhood trauma to past-year disorder via adult trauma was significant in both populations. However, in the ADF (but not civilians) there was a significant mediator pathway between childhood depression and past-year disorder via adult trauma (see Supplementary material: Figures 3 and 4). However, a more detailed discussion of this particular point is beyond the scope of this current paper.

Table 2
Regression childhood factors on past-year ICD-10 mental disorder.

	MODEL 1						MODEL 2					
	ADF			ABS			ADF			ABS		
Childhood factors	aOR	95% CI		aOR	95% CI		aOR	95% CI		aOR	95% CI	
Childhood trauma	Childhood disorder (number of types)						Childhood disorder (number of types) and adult trauma (number of types)					
Number of types							All non-significant			All non-significant		
Single	1.35	0.85	2.16	1.67	0.85	3.29						
Multiple	1.34	0.85	2.10	1.32	0.87	2.02						
Category												
Unclassified	1.32	0.79	2.19	1.52	0.94	2.42						
Non-Interpersonal	1.05	0.62	1.79	0.84	0.44	1.63						
Interpersonal	1.49	0.88	2.52	2.30	0.96	5.47						
Both personal and interpersonal	1.89	0.89	3.99	1.15	0.35	3.70						
Childhood disorder	Childhood trauma (number of types)						Childhood trauma (number of types) and adult trauma (number of types)					
Number of types												
Single	3.75	2.46	5.70	4.14	2.35	7.29	3.67	2.31	5.82	3.88	2.18	6.90
Multiple	13.16	6.58	26.33	15.34	8.44	27.89	11.91	5.89	24.09	15.53	8.23	29.32
Type												
Any anxiety	5.35	3.17	9.04	7.22	4.40	11.83	5.35	3.07	9.33	7.36	4.34	12.45
Any depression	11.38	4.40	29.48	2.42	1.23	4.75	8.85	3.24	24.20	2.66	1.32	5.38
Any alcohol	2.24	1.16	4.35	2.72	1.69	4.37	2.42	1.24	4.71	2.34	1.42	3.84

Table 3
ADF regression of childhood factors on past-year ICD-10 mental disorder, controlling for service factors.

		MODEL 1			MODEL 2			MODEL 3			MODEL 4		
Childhood factors		AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
Trauma													
	Type												
	Unclassified	1.82	1.11	2.98	1.33	0.78	2.28	1.10	0.63	1.92	1.35	0.78	2.31
	Non-Interpersonal only	1.44	0.83	2.50	1.01	0.58	1.76	0.97	0.54	1.75	1.06	0.61	1.83
	Interpersonal only	2.48	1.54	4.01	1.54	0.93	2.54	1.13	0.66	1.94	1.56	0.94	2.59
	Both personal and interpersonal	5.89	2.97	11.67	2.29	0.99	5.29	1.78	0.74	4.29	2.28	0.98	5.30
Disorder	**Type**												
	Any anxiety				4.47	2.75	7.26	4.52	2.63	7.78	4.47	2.74	7.30
	Any depression				10.40	4.08	26.48	8.01	2.95	21.77	10.40	4.07	26.53
	Any alcohol				2.08	1.04	4.15	2.13	1.05	4.29	2.13	1.08	4.20
Adult trauma types								1.40	1.27	1.55			
Previous deployment											1.37	0.85	2.20

Table 4
GSEM childhood trauma on past-year ICD-10 mental disorder.

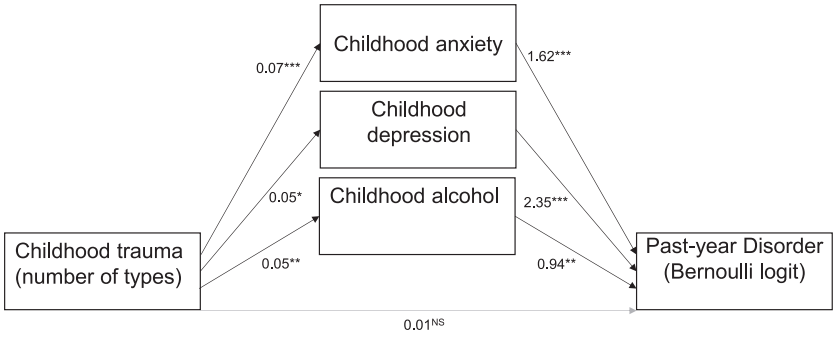
Childhood trauma (count of types) to past-year disorder	ADF males		Civilian employed males	
	B	p	B	p
Unmediated model				
Direct pathway (without mediator in model)	0.26	0	0.29	0
Mediated models				
1. Childhood disorder (Anxiety, Depression and Alcohol)				
Direct pathway (with mediators in model)	1.02	0.761	0.10	0.173
Total pathway via mediator				
Anxiety	0.12	0	0.14	0
Depression	0.11	0.029	0.02	0.03
Alcohol	0.05	0.026	0.04	0.001
2. Childhood ANXIETY alone				
Direct pathway (with mediator in model)	0.14	0.033	0.15	0.039
Total pathway via mediator	0.13	0	0.14	0
3. Childhood DEPRESSION alone				
Direct pathway (with mediator in model)	0.16	0.002	0.26	0
Total pathway via mediator	0.12	0.04	0.03	0.008
4. Childhood ALCOHOL alone				
Direct pathway (with mediator in model)	0.20	0	0.25	0
Total pathway via mediator	0.06	0.028	0.04	0.001

4. Discussion

It is increasingly recognised that childhood factors are important determinants of adult health, however, the interplay between childhood trauma and childhood disorder and their impact on adult disorder has undergone little systematic investigation in epidemiological population samples. This study is novel in several ways, firstly in exploring the association of childhood mental disorder with past-year disorder in a military population, secondly, in comparing the association of childhood trauma and past-year disorder in the military with a civilian population, and finally in examining and comparing mediator pathways. All major findings were consistent across populations. There was a strong relationship between childhood disorder and past-year disorder, which remained after controlling for demographics as well as childhood and adult trauma in both populations. In the ADF, the significant relationship between childhood disorder and past-year disorder also remained after controlling for service factors, and deployment. Those who experienced childhood non-interpersonal trauma (in the absence of interpersonal trauma) did not have increased odds of past-year disorder in either population. The relationship between childhood trauma and past-year disorder was fully mediated by the full spectrum of childhood disorders (but not by childhood anxiety, depression or alcohol use disorders alone), in both populations.

Our findings are consistent with the wealth of studies that demonstrate that childhood disorder is an important predictor of adult disorder (Fryers and Brugha, 2013; Reef et al., 2009, 2010). They are also consistent with studies that demonstrate the link between adverse childhood experiences and adult disorder in both civilian (Felitti et al., 1998) and military populations (Iversen et al., 2007; Afifi et al., 2014).

Previous studies have investigated the influence of childhood non-interpersonal trauma types such as such as natural disasters on adult mental health with contrasting results. A study of children effected by a



	ß
Total (no mediators)	0.24***
Mediator Analysis	
Total indirect pathway	
Childhood anxiety	0.12***
Childhood depression	0.11*
Childhood alcohol	0.05*

ß co-efficients are shown
*p<0.05, **p<0.01, ***p<0.001

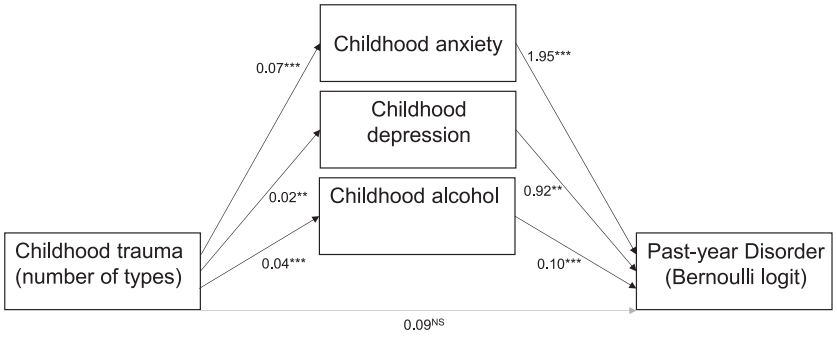
Fig. 1. Military male mediator pathways through childhood disorder, controlling for current age, current relationship, highest education and covariance between childhood disorders.

dam collapse demonstrated initial psychological distress but without longer term psychological consequences into adulthood (Green et al., 1994). In addition, whilst rates of adult PTSD were raised in a study of children subject to a major man-made disaster at a school, there was no impact on other common disorders into adulthood (Morgan et al., 2003; Yule et al., 2000). Of note, however, these studies did not include data regarding other lifetime traumatic experiences, and control groups were selected at follow up, rather than at the time of the disaster (McFarlane and Van Hooff, 2009). In contrast, a more recent analysis of those exposed to the Australian bush fires compared with matched controls selected at the time, demonstrated little difference in overall adult lifetime disorder, and no difference in adult PTSD due to the prevalence of other traumas that affected the controls and disaster survivors (McFarlane and Van Hooff, 2009). This is broadly consistent with our results. However, this does not exclude the possibility that these events might affect the response to future traumatic events.

The full mediation of the association of childhood trauma with adult disorder through childhood disorder has not been demonstrated previously. Some studies have found partially mediating effects of clusters of post-traumatic stress symptoms on specific adult disorders (Schierholz et al., 2016; Watt et al., 2012). Whilst these findings are broadly consistent with ours, we have been able to extend this considerably by discovering that this pathway is not mediated by a single type of childhood disorder alone, but by the whole range of common mental disorders. Therefore, any increased support for those with childhood disorder should include all common mental disorders, and not PTSD alone. When adult trauma was added to the analysis, the mediation pathway between childhood depression and adult trauma was significant only in the military population. This finding is both novel and concerning and implies that those already vulnerable to mental disorder due to childhood depression, are also at a higher risk due to adult trauma, in the military population only. This suggests that civilian men, with a history of childhood depression in the context of childhood trauma, may be in a better position to avoid damaging trauma as adults than men in the military. This finding warrants further investigation.

4.1. Limitations

- The main predictor variables utilized in this analysis were childhood



	ß
Total (no mediators)	0.27***
Mediator Analysis	
Total indirect pathway	
Childhood anxiety	0.14***
Childhood depression	0.02*
Childhood alcohol	0.04**

ß co-efficients are shown
*p<0.05, **p<0.01, ***p<0.001

Fig. 2. Civilian employed male mediator pathways through childhood disorder, controlling for current age, current relationship, highest education and covariance between childhood disorders.

experiences recalled from adulthood, thus rendering the responses vulnerable to autobiographical bias. However, it appears that such retrospective reporting of childhood experiences is more prone to false negatives than positives and that it does have good reliability if well defined (Hardt and Rutter, 2004), as in this study.

- There may appear to be a low response rate in the ADF sample. However, in contrast to most surveys, the demographic and health status of the ADF members who did not respond at each stage was known. This was accounted for in the back-weighting of the sample to minimise any error. Thus, the two-stage weighting process, combined with a 48.9% response rate and oversampling based on scores of the PCL and AUDIT, enabled this analysis to minimise the chance of random error and provide confidence that the estimates were as representative as possible of all current-serving regular ADF men between 18 and 60 years of age.
- As our aim was to compare the male military and civilian employed populations, only male employed civilian subjects were included. Therefore, the poorer functioning unemployed male civilian population, who may have had higher rates of traumatic childhood experiences, were not included in this analysis.
- We did not have a measure of other types of childhood adversity such as neglect.

4.2. Conclusion

The major findings of this study were consistent across two large epidemiological datasets. Both of these datasets provided detailed interview data on lifetime disorder and trauma. In addition, we were able to examine the influence of a whole range of childhood traumatic experiences whilst also including the other major determinant of adult disorder, namely childhood disorder. We were also able to include a wide spectrum of childhood disorders. The classification of people into mutually exclusive categories according to the types of trauma experienced as children allowed the disentangling of trauma type from trauma load, which has been a particular challenge for research on childhood trauma (Finkelhor et al., 2007).

The major findings of this research have important clinical and epidemiological implications. First, childhood disorders have a direct and significant association with adult disorder. This provides a prime opportunity for early intervention and prevention, thus reinforcing the long-term benefits of interventions to monitor and support those with a history of childhood disorder and particularly multiple types of disorder. Second, that the impact of childhood trauma depends on the childhood trauma profile. For example, those who have experienced only childhood trauma that is not interpersonal in nature, have similar odds of adult disorder as those who have not experienced any childhood trauma. Therefore, it is essential to fully assess childhood trauma profile in order to determine the risk of adult disorder. Third, research concentrating on post-traumatic symptoms or PTSD alone when examining the longer-term impact of childhood trauma obfuscates appreciation of the full picture. Our research demonstrates that the pathway from childhood trauma to adult disorder is fully mediated by the spectrum of childhood disorders, opening up a useful additional avenue for intervention.

Given the novel insights provided by our analysis, more nuanced analyses of the influence of childhood factors on specific adult disorders and other health related outcomes, would be of interest. In particular the influence of childhood factors on the impact of adult trauma on mental disorder warrants further investigation.

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Conflict of interest

None

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