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# Relationships between adverse childhood experiences, attachment, resilience, psychological distress and trauma among forensic mental health populations

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## ABSTRACT

There has been an association between adverse childhood experiences (ACEs), attachment style and resilience with later life psychological distress, yet this area remains under-researched among forensic mental health populations. The current study aimed to explore predictive relationships between ACEs, attachment and resilience and later-life psychological distress and trauma in a sample with a history of forensic mental health service use. A total of 128 participants completed six questionnaires relating to these factors: The Adverse Childhood Experiences International Questionnaire (ACE-IQ); the Vulnerable Attachment Scale Questionnaire (VASQ); the Child and Youth Resilience Measure (CYRM); the Resilience Research Centre Adult Resilience Measure (RRC-ARM); the Clinical Outcomes in Routine Evaluation-10 (CORE-10); and the International Trauma Questionnaire (ITQ). ACEs were found to be highly prevalent and significant correlations were found between lower levels of adult resilience and insecure attachment, and increased psychological distress and trauma symptoms. Attachment style was found to mediate some of these relationships. The findings support a model in which higher ACEs may lead to insecure attachment style and low resilience in the forensic mental health population, thereby resulting in higher levels of later life psychological distress and trauma. Attachment and resilience may be important factors to consider for preventative and reactive interventions within forensic mental health care.

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**KEYWORDS** Adverse childhood experiences; trauma; psychological distress; attachment; forensic; mental health

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## Introduction

The prevalence of Adverse Childhood Experiences (ACEs) in the general population is high, with some studies indicating 50%–66% of individuals have experienced at least one ACE (Campbell et al., 2016; Felitti et al., 1998). ACEs and subsequent physical and mental health difficulties in adulthood are well evidenced (Felitti et al., 1998; Dube et al., 2001; Merrick et al., 2017). ACEs, including abuse, neglect or chaotic living circumstances, have been associated with numerous problems including mood disorder (Chapman et al., 2004); suicide attempts, self-harming behaviours, and drug use (Dube et al., 2001; Friestad et al., 2014); depression, anxiety, personality disorder and post-traumatic stress disorder (PTSD; Bierer et al., 2003; Carr et al., 2013; Lindert et al., 2014).

ACEs correlate with offending behaviours (Craig et al., 2017), where childhood adversity is more prevalent in adult and young offenders (Baglivio et al., 2014; Dierkhising et al., 2013; Levenson et al., 2015; Matsuura et al., 2013; Messina & Grella, 2006). Studies of ACE prevalence in populations with offending histories report disproportionate exposure to childhood adversity compared with the general population. Levenson et al. (2015) found that rates of four or more ACEs in a population of women with sexual offence histories were far higher than the general female population (41% vs. 15%: Centers for Disease Control and Prevention (CDCP), 2016) and that they were more likely than non-offenders to have been sexually abused, to have experienced emotional neglect, or had a family member imprisoned during their childhood. Increased rates of ACEs (compared to community samples) are also found in men (Levenson et al., 2015), and young people (Baglivio et al., 2014; Matsuura et al., 2013), with offending histories, as well as prison samples (Bowen et al., 2018; Ford et al., 2019; Stinson et al., 2016).

Mental health inpatient populations also present with disproportionate rates of childhood adversity (Alvarez et al., 2011; Shack et al., 2004). ACEs are associated with psychosis (Morgan & Fisher, 2007; Read et al., 2005), severe depressive disorders, personality disorders and anxiety in this population (Bierer et al., 2003; Chapman et al., 2004; Edwards et al., 2003; McLean & Gallop, 2003).

Research with individuals who have offending histories and also use mental health inpatient services remains limited. This subpopulation often has particularly severe and enduring mental health difficulties, alongside histories of interpersonal violence or other criminal behaviours (Stinson et al., 2016). Individuals within secure care often demonstrate more complex needs, exhibit high-risk behaviours and present chronic difficulties unmitigated by intervention and support (Joint Commissioning Panel for Mental Health (CPMH), 2013).

Studies of forensic inpatient populations show higher rates of childhood adversity than in the general population (Bruce & Laporte, 2015; McKenna et al., 2019). Those in forensic settings often have higher rates of certain types of ACEs compared to others, such as abuse and neglect, which remains true across settings, e.g. inpatients with sexual offence histories (Stinson & Becker, 2011), secure care for people with intellectual disabilities (Stinson & Robbins, 2014), and secure female inpatient units (Beck et al., 2017). Higher adverse experiences correlate with earlier hospitalisation or arrest in forensic mental health samples (Stinson et al., 2016) and increase the risk for suicidality in male and female adult forensic inpatients (Clements-Nolle et al., 2009; Dudeck et al., 2016).

Determining the factors which protect against the serious consequences of childhood adversity is a priority in order to develop effective psychological interventions. Supportive relationships and resilience have been found to buffer the effects of early adversity; even in individuals with four or more ACEs (Crouch et al., 2019; Hughes et al., 2018).

Attachment theory (Bowlby, 1980) provides some explanation for this, as individuals who experience early trauma are more likely to demonstrate insecure attachment styles in adulthood (Grady et al., 2017; Taussig & Culhane, 2010) which is associated with mental health problems (Dube et al., 2003). Insecure attachment is associated with increased criminality, and limited emotional or behavioural regulation (Bogaerts et al., 2005; Rosenberg et al., 2007). Macinnes et al. (2016) found that childhood trauma and insecure attachment significantly predicted psychological distress and violence risk among forensic inpatient service users. Such evidence suggests that attachment theory has important implications for working with and supporting individuals who use forensic mental health services.

Resilience is another factor which may protect against the effects of early trauma. Resilience refers to the 'ability to maintain or regain mental health, despite experiencing adversity' (Herrman et al., 2011, p. 259). Whilst supportive relationships and strong attachments contribute to the concept of 'resilience', studies measuring resilience as a factor in and of itself suggest it moderates the impact of ACEs and is associated with greater wellbeing, reduced psychological distress and reduced depressive symptoms regardless of childhood adversity (Hughes et al., 2018). Even in adults with four or more ACEs, higher resilience was associated with decreased mental distress, self-harm and suicidal ideation (Hughes et al., 2018).

Given the high prevalence of ACEs among forensic mental health populations, along with the complex risks and needs with which they present, understanding the relationship between ACEs, trauma and psychological distress in adulthood, and determining the potential of protective factors like attachment and resilience is essential to being able to effectively support and provide treatment for this group. The aim of this study was to explore these relationships in people who have used both forensic and mental health

services. To the knowledge of the authors, no study has yet sought to examine these specific processes in this particular population. The current study aimed to test the following hypotheses:

- (1) Number of ACEs and insecure attachment styles will predict levels of psychological distress and symptoms of trauma.
- (2) Levels of resilience will predict symptoms of trauma and psychological distress.

## Method

### Setting

The study was conducted across several settings: Low/medium secure forensic mental health hospitals, an independent support organisation, and online recruitment from the general population. In total, eight settings were approached with five contributing to data collection.

### Participants

Participants ( $N = 128$ ) were primarily recruited online via the recruitment site [www.prolific.co](http://www.prolific.co) ( $N = 100$ ). A further 27 participants were recruited from an independent hospital and one from independent support services. Inclusion criteria stipulated adults aged 18 or over, able to provide informed consent with no significant communication difficulties could participate. It was also stipulated that they must be current inpatients in forensic care, or have past forensic histories and mental health difficulties. Finally, individuals within inpatient settings were excluded if participation would be detrimental to their wellbeing, as assessed by their clinical team. Warnings about the sensitive nature of some study questions were included in online recruitment materials to ensure participants considered their wellbeing before proceeding, and provided informed consent to take part.

Most respondents were male ( $N = 75$ , 58.6%), with a predominant age range of between 25 and 39 years old. Ethnicity was predominantly Caucasian ( $N = 106$ , 82.8%). Sample characteristics were similar to previous studies with regard to ethnicity, gender and age (Macinnes et al., 2016). Gender was represented more equally in the present study. Further demographic information is provided in [Table 1](#).

Of those who had previously or were currently using inpatient mental health services ( $N = 86$ ), 30 participants were admitted to hospital once (34.88%), 30 had three or more admissions (34.88%) and 25 had two admissions (29.07%). One participant did not disclose this information (1.16%). Information on types of admission is shown in [Table 2](#).

**Table 1.** Participant demographics.

		Number (% of total sample)
Gender	Male	75 (58.59%)
	Female	52 (40.63%)
	Other	1 (0.78%)
Age	18–24	9 (7.03%)
	25–39	62 (48.44%)
	40–60	48 (37.50%)
	60+	9 (7.03%)
Ethnicity	Caucasian	106 (82.81%)
	Other ethnicity	22 (17.19%)
Civic status	Single	61 (47.66%)
	Married	29 (22.66%)
	Living as a couple	18 (14.06%)
	Divorced or separated	13 (10.16%)
	Widowed	4 (3.13%)
	Other	2 (1.56%)
	Prefer not to say	1 (0.78%)
Inpatient status	Current inpatient	27 (21.09%)
	Past inpatient	59 (46.1%)
	No inpatient admissions	42 (32.81%)
Employment status	Employed	36 (28.13%)
	Self-employed	28 (21.88%)
	Retired	4 (3.13%)
	Unemployed	55 (42.96%)
	Non-paid/volunteer	5 (3.91%)
Education	Postgraduate degree	5 (3.91%)
	College/University completed	59 (46.09%)
	Secondary/High school completed	57 (44.53%)
	Primary school completed	6 (4.69%)
	No formal schooling	1 (0.78%)

**Table 2.** Service-types for participants with histories of inpatient admissions.

Service type	Number (% of past/current inpatient sample, <i>N</i> = 86)
Low/Medium Secure	31 (36.05%)
Acute Mental Health Ward	31 (36.05%)
Psychiatric Intensive Care Unit (PICU)	3 (3.48%)
Rehabilitation and Recovery Services	21 (24.42%)

## Measures

Six measures were administered to participants via Qualtrics (Qualtrics, Inc, 2020) allowing for offline collection using a secure iPad. This method allowed for ease of collection and managing the data volume needed for analyses. It also facilitated remote survey completion; a necessity during the COVID-19 pandemic. It was also essential to utilise an 'offline' questionnaire to comply with site rules and regulations around internet use for inpatient wards, which was met through the use of Qualtrics.

The six measures were compiled into one survey and administered using the iPad, individually, on inpatient wards and included demographic data questions. The same survey was used for online recruitment, through the website prolific.co, whereby the survey was amended to include additional questions to capture data on inpatient histories and adding to the overall sample characteristics information.

### ***Adverse childhood experiences***

The ACE IQ (World Health Organization, 2018) is a 42-item measure designed for international use with individuals aged 18 upwards, covering adversities such as physical, sexual and emotional abuse, neglect, peer violence, family dysfunction, community and collective violence. The questionnaire is valid and reliable, with good internal consistency (Cronbach's alpha = 0.83) and test-retest reliability (ICC = 0.90; Ho et al., 2019; Kidman et al., 2019).

### ***Complex Trauma and psychological distress***

The International Trauma Questionnaire (ITQ; Cloitre et al., 2018) was used to measure complex trauma. It is a self-report measure of PTSD and CPTSD and is a brief diagnostic tool aligned with new criteria of the 11th version of the International Classification of Diseases (ICD-11). The measure has been validated (Cloitre et al., 2018) with good internal consistency (Cronbach's alpha = 0.79) and factorial and construct validity (Haselgruber et al., 2020; Hyland, Shevlin, et al., 2017).

The CORE-10 (Barkham et al., 2013) was used as an adjunct to the ITQ to measure global distress and as an additional determinant of mental health difficulties that might not be captured with other measures. The CORE-10 includes six problem domain items, three functioning domain items and one risk item; higher scores indicate higher distress. Good internal reliability (Cronbach's alpha = 0.90), and adequate sensitivity and specificity with a cut-off score of 13 (0.92, CI = 0.83–1.0 and 0.72, CI = 0.60–0.83 respectively) are reported (Barkham et al., 2013).

### ***Attachment***

The Vulnerable Attachment Style Questionnaire (VASQ; Bifulco et al., 2003) was used to examine attachment style. The questionnaire identifies a total score, alongside two subscales: 'insecurity' and 'proximity-seeking'. The VASQ is a comprehensive measure of attachment style and has been validated against existing interview-style measures such as the Attachment Style Interview and the Relationships Questionnaire (RQ; Bartholomew &

Horowitz, 1991) with good test–retest reliability for the total score ( $r = 0.65$ ,  $p < 0.001$ ) and internal consistency for both insecurity sub scale (Cronbach's  $\alpha = 0.82$ ) and proximity seeking subscale (Cronbach's  $\alpha = 0.63$ ). The VASQ total score was correlated at  $r = 0.43$  ( $p < .01$ ) with the RQ and with marked insecurity assessed at interview (Bifulco et al., 2003).

## **Resilience**

Two measures of resilience were used to capture both child and adult resilience. The Child and Youth Resilience Measure (CYRM) and Adult Resilience Measure (RRC-ARM; Resilience Research Centre, 2018) are 12 item self-report questionnaires measuring social-ecological resilience. Both stem from a 58-item scale evaluated across numerous contexts, with good internal consistency (CYRM  $\alpha = 0.82$ , ARM  $\alpha = 0.88$ ) and test–retest reliability ( $>0.7$ ; Daigneault et al., 2013; Jefferies et al., 2019). The CYRM was administered retrospectively, replicating the Welsh Adverse Childhood Experiences and Resilience Study (Hughes et al., 2018).

## **Procedure**

Recruitment was conducted in two ways due to COVID-19 restrictions. Initially, clinical teams at the research sites identified participants meeting inclusion criteria for whom participation would not be destabilising, in line with National Research Ethics Service (NRES) guidance. Clinical teams used information sheets to approach participants and discuss the research which were signed to consent to meeting with one of the researchers. A further consent form was signed at the time of study completion with a researcher. Until April 2020 measures were completed with participants at the research sites in person by the lead researcher.

Due to COVID-19 restrictions, recruitment become remote-only in April 2020 and meant the lead researcher was unable to meet with participants on inpatient wards. Online recruitment through Prolific.co was implemented to ensure sample size and study power due to difficulty in recruitment at the existing sites. To match populations where possible, demographic filters were applied to limit the visibility of the study aligned with inclusion criteria, including age and first language. Further filters elicited responses only from participants with prison/jail histories *and* mental health difficulties utilising questions from Prolific's own screening. Remote recruitment at existing research sites continued through digitising participant information and consent forms with participants completing the measures with a member of their care team rather than any of the external researchers.



## Statistical analyses

Analyses were conducted using SPSS 25 (IBM Corp, 2017). Variables were created based on total ACE scores from ACE-IQ, total VASQ scores and total resilience scores for CRYM and RRC-ARM. The ITQ was scored according to guidance (Cloitre et al., 2018); a binary variable was formed: *non diagnosis* (did not meet diagnostic criteria) and *diagnosis* (met criteria for PTSD and CPTSD).<sup>1</sup> On reviewing ACE-IQ data after scoring, it was noted participants had only been presented with three of the four questions within the 'collective violence' category, therefore it is possible ACE scores were underestimated. Retrospective responses for the missed question were collected from 54.7% of the sample ( $N = 70$ ) and reliability analyses considered the implications of this. Cronbach's alpha reached the same acceptable level with and without the omitted question ( $\alpha = .87$ ) suggesting good internal consistency was maintained.

## Results

Descriptive statistics were used to calculate mean scores for each variable except ITQ. Mean number of ACEs was 8.3 (SD 2.72), with 95.31% of the sample having four or more ACEs in total. Mean CORE-10 score for psychological distress was 17.53 (SD 8.86), which was above the clinical cut-off score of 13. Mean scores were calculated for VASQ total (88, SD 10.7), for the insecurity subscale (39.72, SD 8.33) and for the proximity subscale (29.63, SD 4.86) although only total score was used in further analyses. Mean resilience scores were 34 (SD 11.3) and 39.09 (SD 10.44) for CRYM and RRC-ARM respectively. Summaries of scoring for each variable were also produced (see Table 3).

The ACE-IQ scores indicated that all participants reported having experienced parental separation/divorce; 86% childhood emotional abuse ( $N = 110$ ); 85% bullying ( $N = 109$ ); 84% seeing/hearing household member(s) treated violently ( $N = 108$ ); and 83% seeing/hearing community violence ( $N = 106$ ). A full summary of ACE categories is in Table 4.

Correlational analyses examined relationships between all variables. Distribution of all variables except the VASQ were skewed (Shapiro-Wilk,  $p < .05$ ); therefore, a Spearman's rho correlational analysis was conducted between all variables and CORE-10. A point biserial correlation was conducted between all variables and ITQ scores. Significant positive correlations were found between CORE-10 and attachment, child resilience, adult resilience and ACE total scores ( $p < .05$ ). Significant relationships were found between ITQ classification (*diagnosis* or *non-diagnosis*) and all other variables ( $p < .05$ ), with a higher score on all variables being associated with meeting diagnostic criteria for PTSD or CPTSD.

**Table 3.** Scoring summaries of each variable.

Measure	Scores	Number (% of total sample)
CORE-10	0–5 Healthy	12 (9.38%)
	>5–10 Low level	24 (18.75%)
	>10–15 Mild	15 (11.72%)
	>15–20 Moderate	24 (18.75%)
	>20–25 Moderate-to-severe	30 (23.44%)
VASQ	>25–40 Severe	23 (17.97%)
	<57 ≥57 Vulnerable attachment style	17 (13.28%) 111 (86.72%)
CRYM	≤ 42 Low	99 (77.34%)
	43–49 Moderate	18 (14.06%)
	50–53 High	0 (0%)
	≥54 Exceptional	11 (8.59%)
RRC-ARM	≤42 Low	76 (59.38%)
	43–49 Moderate	28 (21.88%)
	50–53 High	13 (10.16%)
	≥54 Exceptional	11 (8.59%)
ITQ	No Trauma	87 (67.97%)
	PTSD	9 (7.03%)
	CPTSD	32 (25%)
ACEs	0	0 (0%)
	1	1 (0.78%)
	2–3	5 (3.91%)
	4+	122 (95.31%)

**Table 4.** Prevalence of ACEs within the sample.

ACE category	Number (% of total sample)*
Parental Separation Or Divorce	128 (100%)
Emotional Abuse	110 (86%)
Bullying	109 (85%)
Household Member Treated Violently	108 (84%)
Community Violence	106 (83%)
Physical Abuse	101 (79%)
Physical Neglect	77 (60%)
Alcohol or Drug Abuse In Household	65 (51%)
Lived with depressed, suicidal or mentally ill Household Member	65 (51%)
Emotional Neglect	56 (44%)
Sexual Abuse	55 (43%)
Incarcerated Household Member	44 (34%)
Collective Violence	37 (29%)

\*% total more than 100% due to cumulative scoring.

**Hypothesis one:** Number of ACEs and insecure attachment styles will predict levels of psychological distress and symptoms of trauma.

A hierarchical linear regression model tested hypothesis one after meeting all assumptions. CORE-10 was the outcome variable, with model one including total ACE-IQ scores as the first predictor variable and model two adding total VASQ scores as a further predictor variable. Results from the first model

reached statistical significance with an  $R^2$  of 0.54  $F(1, 126) = 7.151$  ( $p < .05$ ), showing higher numbers of ACEs were predictive of greater psychological distress. Inclusion of VASQ in model two led to a statistically significant increase in  $R^2$  of .403  $F(1,125) = 92.849$  ( $p < .05$ ), demonstrating that higher levels of insecure attachment significantly predicted greater psychological distress. In this model ACE-IQ scores had a non-significant coefficient. Multicollinearity assumptions were met ( $VIF = 1.094$ ), suggesting that VASQ scores were more significantly predictive of greater psychological distress than ACEs, or that the effect of ACEs on psychological distress is mediated by attachment style. Both models are in [Table 5](#).

Binomial logistic regression examined the effects of ACEs and insecure attachment on the likelihood participants would meet diagnostic criteria of PTSD or CPTSD, as measured by ITQ.

The model was statistically significant  $X^2(4) = 42.372$ ,  $p < .05$  and explained 39.4% (Nagelkerke  $R^2$ ) of variance in PTSD/CPTSD diagnosis, with 78.9% of cases correctly classified. Sensitivity was 56.1%, specificity was 89.7%. Positive predictive value was 71.9%, negative predictive value was 81.2%. In addition, an ROC curve further illustrated specificity and sensitivity; area under the curve was .831 (95% CI, .761 to .901) demonstrating excellent discrimination (Hosmer et al., 2013). The model ([Table 6](#)) demonstrated that increased number of ACEs and vulnerable attachment style significantly predicted higher likelihood of meeting diagnostic criteria for both PTSD and CPTSD.

**Hypothesis two:** Levels of resilience in childhood/adulthood will predict symptoms of trauma and psychological distress in adulthood.

**Table 5.** Hierarchical linear regression analysis to predict psychological distress.

	Beta	Std.Error	Std.Beta	t	Sig.
Model 1					
ACEs (ACE-IQ)	.754	.282	.232	2.674	.008
Model 2					
ACEs (ACE-IQ)	-20.882	3.826	.037	-5.457	<.001
Attachment (VASQ)	.121	.224	.664	.539	.591
Attachment (VASQ)	.550	0.57		9.636	<.001

$R^2 = 0.54$  for model 1 ( $p = .008$ );  $\Delta R^2 = .403$  for model 2 ( $p < .001$ ).

**Table 6.** Binomial logistic regression predicting likelihood of PTSD or CPTSD diagnosis based on number of ACEs and insecure attachment.

	Beta	Std.Error	Wald	df	P	Odds ratio	95% CI for odds ratio	
							Lower	Upper
Attachment	.134	.030	19.438	1	<.001	1.143	1.077	1.213
ACEs	.208	.095	4.791	1	.029	1.231	1.022	1.483
Constant	11.937	2.308	26.749	1	<.001	.000		

Hierarchical linear regressions were conducted to test hypothesis two. Childhood resilience scores (CRYM) were entered into the first model and adult resilience (RRC-ARM) the second, with CORE-10 as the outcome variable. The results of the first model were statistically significant,  $R^2=.159$   $F(1,126) = 23.802$  ( $p < .05$ ), showing higher childhood resilience significantly predicted lower psychological distress. The model was improved by adding adult resilience which explained a further 21% of the variance in CORE-10 scores and was statistically significant,  $R^2=.370$   $F(1,125) = 41.783$  ( $p < .05$ ); both models are in Table 7. When adult resilience was added, childhood resilience was no longer a statistically significant predictor. Assumptions of multicollinearity were met by examining correlation coefficients and tolerance values,  $VIF = 1.435$ , demonstrating an acceptable level of correlation. This suggests another relationship between childhood resilience and adult resilience variables e.g. effect of childhood resilience on psychological distress being explained through adult resilience. Only adult resilience was retained in the final model (Table 7).

A binomial logistic regression examined whether greater childhood or adult resilience predicted likelihood of meeting diagnostic criteria for PTSD or CPTSD. The regression model was statistically significant  $X^2(2) = 23.337$ ,  $p < .05$  explaining 23.3% of variance in diagnostic classification (Nagelkerke  $R^2$ ). Overall, the model classified 75% of cases correctly, with 68% sensitivity and 76.7% specificity. Area under the ROC curve was .762 (95% CI, .672 to .851), an acceptable level of discrimination (Hosmer et al., 2013). Whilst the model was statistically significant, only adult resilience significantly predicted likelihood of meeting diagnostic criteria for PTSD or CPTSD. Simply put, individuals with higher adult resilience were less likely to meet thresholds of PTSD or CPTSD (Table 8).

**Table 7.** Regression model predicting psychological distress based on childhood and adult resilience.

	Beta	Std.Error	Std.Beta	t	Sig.
Model 1	-.313	.064	-.399	-4.879	<.001
Childhood resilience (CYRM)					
Model 2	38.345	2.543	-.550	15.081	<.001
Constant	-.467	.072		-6.464	<.001
Adult resilience (RRC-ARM)					

**Table 8.** Logistic regression predicting likelihood of PTSD or CPTSD diagnosis based on levels of childhood and adult resilience.

	Beta	Std.Error	Wald	df	P	Odds ratio	95% CI for odds ratio	
							Lower	Upper
Childhood resilience	-.042	.024	3.051	1	.081	.959	.914	1.005
Adult resilience	-.071	.025	8.016	1	.005	.931	.887	.978
Constant	3.270	.948	11.901	1	<.001	26.304		

### ***Attachment and resilience as mediating factors***

The regression analyses suggested relationships between ACEs and both psychological distress and ITQ classification which warranted further investigation. Specifically, whether attachment mediated relationship between ACEs and psychological distress, between ACEs and ITQ classification and whether adult resilience mediated relationships between child resilience and CORE-10/ITQ variables. SPSS PROCESS macro version 3.5 (Hayes, 2017), was used to conduct four mediation analyses (model 4). The analysis used 5000 resamples and 95% confidence intervals (CI) to test relationships. The hypothesised models are presented in Figure 1.

The first analysis examined relationships between total ACE scores and CORE-10 scores and whether attachment was a mediator of this relationship. Step 1 of the mediation model (path *a*) was significant  $R^2=.08$ ,  $F(1,126) = 11.8330$ ,  $p < .05$ , as was step 2 (paths *b*, *c*, *c'*)  $R^2=.456$ ,  $F(2,125) = 52.6069$ ,  $p < .05$ , suggesting that a higher number of ACEs was associated with greater psychological distress and insecure attachment, and insecure attachment associated with higher psychological distress. Results are shown in Table 9, and mediation path coefficients in Table 10. The indirect effect tested through bootstrapping indicated a significant mediating effect; the relationship between ACEs and psychological distress was mediated by insecure attachment style  $IE = .6330$  (95% CI = .2028, 1.0983). Dividing indirect effect coefficient by total effect coefficient suggested 87.9% of variance in psychological distress was accounted for by ACE scores *via* insecure attachment styles.

The second analysis used ITQ as its outcome variable, examining whether attachment mediated the relationship between ACEs and likelihood of reaching PTSD/CPTSD diagnosis. Step 1 (path *a*) was significant as above. Step 2 (paths *b*, *c*, *c'*) was also significant with direct effect between ACEs and ITQ  $\beta = .2079$ ,  $S.E=.0950$ ,  $p < .05$  and between attachment and ITQ  $\beta = .1336$ ,  $S.E=.0303$ ,  $p < .05$ . The indirect effect was also significant, suggesting attachment mediates the relationship between ACE scores and likelihood of reaching PTSD or CPTSD diagnostic criteria,  $IE = 1.537$  (95% CI = .0490, .3367). That is, higher number of ACEs results in insecure attachment style leading to greater likelihood of PTSD or CPTSD diagnoses.

A third analysis examined whether adult resilience mediated the relationship between child resilience and psychological distress. Step 1 of the model was significant,  $R^2=.11$ ,  $F(1,126) = 14.9918$ ,  $p < .05$  as was step 2  $R^2=.62$ ,  $F(2,125) = 101.7575$ ,  $p < .05$ . Indirect effect suggested a significant mediating effect of adult resilience,  $IE = .1156$  (95% CI = .0515, .1869), demonstrating that higher child resilience may influence higher adult resilience, leading to lower levels of psychological distress. Mediation coefficient paths are shown in Table 11.

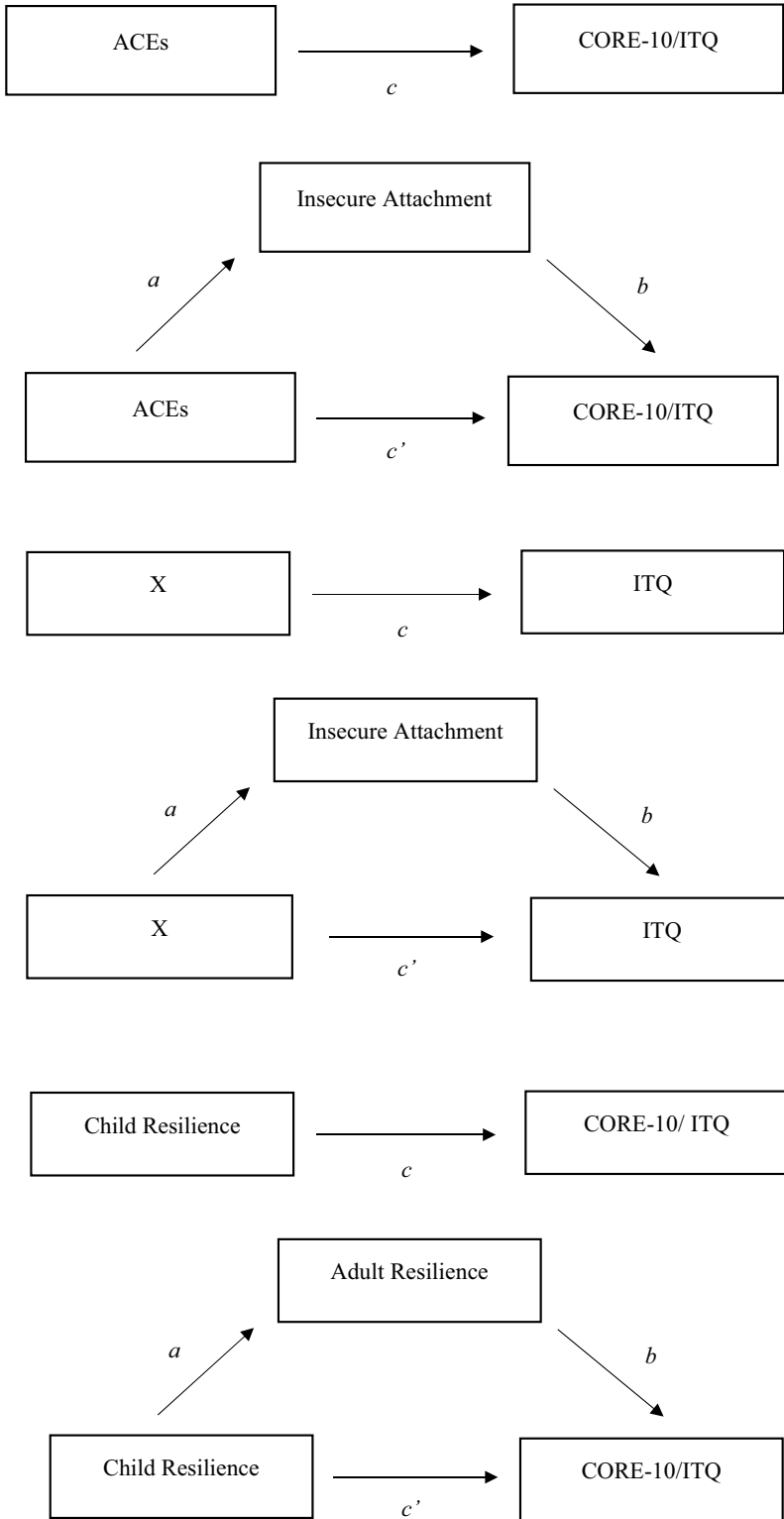


Figure 1. Hypothesised mediation models.

**Table 9.** Final regression model predicting psychological distress based on attachment and adult resilience.

	Beta	Std.error	Std.beta	t	Sig.
Model 1	.559	.054	.675	10.272	<.001
Attachment (VASQ)					
Model 2	1.580	4.354	.536	.363	.717
Constant	.444	.048	-.428	9.176	<.001
Attachment (VASQ)	-.364	.050		-7.334	<.001
Adult Resilience (RRC-ARM)					

$R^2 = 0.456$  for model 1 ( $p < .001$ );  $\Delta R^2 = .164$  for model 2 ( $p < .001$ ).

**Table 10.** Mediation path coefficients: attachment, ACE scores and psychological distress.

	B (SE)	CI	t	p
Path <i>a</i> : Attachment- ACE scores	1.15 (.33)	(.49, 1.81)	3.44	<.001
Path <i>b</i> : Attachment	.55 (.06)	(.44, .66)	9.63	<.001
Path <i>c</i> : ACEs total	.75 (.28)	(.20, 1.31)	2.67	.009
Path <i>c'</i> : ACEs direct	.12 (.22)	(-.32, .56)	.54	.591
ACEs indirect	.63 (.23)	(.20, 1.10)	n/a	n/a

**Table 11.** Mediation path coefficients: adult resilience, child resilience and psychological distress.

	B (SE)	CI	t	p
Path <i>a</i> : Adult resilience- Child resilience	.51 (.07)	(.44, .75)	7.40	<.001
Path <i>b</i> : Adult resilience	-.47 (.07)	(-.61, -.32)	-6.46	<.001
Path <i>c</i> : Child resilience total	-.31 (.06)	(-.44, -.18)	-4.89	<.001
Path <i>c'</i> : Child resilience direct	-.07 (.07)	(-.21, .06)	-1.13	.262
Child resilience indirect	-.24 (.05)	(-.34, -.15)	n/a	n/a

The final mediation analysis examined the relationship between child resilience and ITQ classification. Adult resilience was a significant mediator of this relationship. Increased child resilience may influence increased adult resilience thus reducing likelihood of reaching PTSD/CPTSD classification  $\beta = -.0711$ ,  $S.E = .0251$ ,  $p < .05$ .

Implications of the missing question in the *collective violence* category of ACE-IQ were considered. ACE-IQ cumulative total scores and frequency scores were re-calculated including additional responses gained retrospectively. A new categorical variable was created to group participants as having 'complete' or 'incomplete' ACE-IQ. A Mann Whitney U-test compared means between the two groups. Scores were similarly distributed (assessed visually using population pyramids) with no significant difference between groups for ACE-IQ total or frequency scores ( $p > .05$ ).

## Discussion

This is the first study to investigate predictive associations between ACEs, attachment and resilience with psychological distress and trauma in forensic mental health populations. The findings from this study will now be discussed as related to the stated hypotheses.

### ***Number of ACEs and insecure attachment styles will predict levels of psychological distress and/or symptoms of trauma***

Both higher numbers of ACEs and insecure attachment significantly predicted increased psychological distress and trauma in our sample. ACEs were no longer a significant predictor of distress when the attachment variable was present, suggesting that attachment style mediates the association between ACEs and psychological distress. This is supported by the results of the mediation analysis where the same relationship was observed. Our findings indicate a possible pathway where increased ACEs result in an insecure attachment style, which in turn increases psychological distress experienced in adulthood. This echoes previous literature where attachment difficulties are demonstrated to be a strong mediator in the associations between childhood adversity and psychological distress or subjective wellbeing in adulthood (Corcoran & McNulty, 2018). Whilst we did not assess individual attachment 'types' using the VASQ, 86.7% scored above the cut-off score, indicating some degree of insecure attachment style. This suggests a higher prevalence of insecure attachment among the current participants than the general population (approximately 40%; Mickelson et al., 1997). Significant relationships between attachment and psychological distress and the mediating effect of attachment on relationships between ACEs and psychological distress is unsurprising, given prior findings that insecure attachment styles associate with poorer outcomes. Viewing close relationships with others as harmful (dismissive attachment style) is associated with violence and offending (Stirpe et al., 2006); insecure attachment is associated with diagnoses of personality disorders (Bakermans-Kranenburg & van IJzendoorn, 2009) and dismissive attachment partially mediates the relationship between childhood adversity and depression/anxiety (Bifulco et al., 2006).

Number of ACEs significantly predicted meeting the threshold for PTSD or CPTSD when included in a logistic regression model with attachment in our sample. This suggests that number of ACEs and insecure attachment styles significantly predict later-life trauma diagnoses, but only attachment is significant in predicting general psychological distress. It is possible that the difference between these models



demonstrates that the study discriminated between severity of psychological distress of participants.

It is unknown if later-life trauma relates specifically to the early life ACEs that are measured here. The ITQ asks respondents to recall a traumatic memory that has had the most impact on them. This could have occurred at any point in the respondents' lifetime. Therefore, we cannot determine whether classification of ITQ scores relate to early experiences or later-life trauma. An alternative pathway might be that ACEs predispose people to experience further traumatic situations later in life, or increase the likelihood of them interpreting situations through a 'trauma lens'. The results here can only be interpreted as consistent with, but not confirmatory of, causal linkages between variables under investigation, given the cross-sectional design used. Additionally, the results reported need to be interpreted with a degree of caution given the limitations of our study, including the relatively small sample size. This has implications for the generalisability of our findings.

### ***Levels of resilience in childhood/adulthood will predict symptoms of trauma and psychological distress in adulthood***

Findings suggest that lower child resilience significantly predicted increased psychological distress but only as a sole predictor. Analysis also suggested that lower childhood resilience significantly predicts meeting diagnostic criteria for PTSD or CPTSD, but not when adult resilience is added. This implies that relationships between child resilience and psychological distress and ITQ classification could be mediated by adult resilience. That is, poor child resilience may predict poor adult resilience, which in turn increases psychological distress experienced and the likelihood of meeting PTSD/CPTSD diagnostic criteria. This implies that increasing individual resilience in adulthood may significantly reduce psychological distress, supporting the findings of Hughes et al. (2018). Indications that adult resilience mediates the relationship between child resilience and psychological distress are important. They suggest that individual sources of resilience during childhood may be pertinent in avoiding poorer mental health and wellbeing via improved adult resilience. This may be useful for the development of future psychological interventions, where focusing on attachment and resilience may be helpful for ameliorating distress and reducing trauma symptoms. However, it is again recommended that these findings and the implications of them are interpreted cautiously given the study limitations. Further research is required to support the claims made here.

### ***Strengths and limitations***

This study has several strengths. It explores an area where research is lacking and provides findings that are useful for understanding the relationships between psychological processes associated with childhood adversity, trauma, mental distress, attachment and resilience. Secondly, it demonstrates clinical relevance which may inform care and support for individuals with histories of childhood adversity. In particular, recognising the predictive nature of childhood adversity, attachment and adult resilience on psychological distress and trauma presentations may inform preventative and reactive interventions. Such information is useful for providers who aim to provide care and treatment for those who use forensic mental health services.

There are several limitations which should be acknowledged. The ACE-IQ is a relatively new tool still undergoing validation testing across numerous countries (World Health Organization, 2018). This was chosen for the comprehensive range of ACEs included, including some which other measures have omitted. This was important, several additional adversities of relevance have been highlighted since the original ACEs study (Felitti et al., 1998). Whilst early piloting and validation studies have demonstrated good internal consistency and test-retest reliability, validation within the UK is unexplored. The use of the ACE-IQ in the UK and with forensic mental health populations, as well as interpretation of results, should be done with some caution.

Data collection with the ITQ may also limit study findings. Due to the use of ITQ as a brief diagnostic tool, data was scored and recorded as a dichotomous variable. Whilst providing clinically relevant data, it provides limited information regarding what specific symptoms are, their severity or duration. It is inferred through ITQ that diagnosis of either PTSD or CPTSD is associated with greater impairment, however unlike a continuous variable such as CORE-10, this cannot be demonstrated in a scaled manner. Thus, hypotheses around the roles of childhood adversity, resilience and attachment in heightening or reducing trauma symptoms are not explicitly examined but rather implied by findings.

Additional limitations include the relatively small sample size and the limited generalisability of our findings as a result of such. A further limitation relates to comparisons drawn between our sample, a higher-risk and potentially more vulnerable population, and the general population. The current study did not include a control group, nor were samples matched when comparing with results from community studies. As such, direct statistical comparisons cannot be made. Differences between this study and other research discussed should be interpreted with this in mind. It should also be noted that further, larger scale studies are needed to examine whether associations found in this study are typical and generalisable to the wider population of those with forensic mental health backgrounds.

Finally, the cross-sectional nature of this study only allows for testing the predictive power of variables such as ACEs and resilience in a statistical sense, not in the true causal sense.

### ***Implications and recommendations for future research***

The main implication of this study is its clinical relevance to understanding predictive relationships between ACEs, adult resilience and attachment and later-life psychological distress and trauma responses. Further work of longitudinal design would be required to establish a specific and consistent temporal sequence for these associations. The broader literature on ACEs and their predictability of mental health-related outcomes suffers from a lack of highly controlled longitudinal designs (Liming & Grube, 2018). By learning more about direction of associations, we can consider current methods of supporting forensic mental health service users and enhancing effectiveness of interventions. This study also highlights the mediating role of attachment, already explored as a partial mediator of the relationship between childhood adversity and depression or anxiety (Bifulco et al., 2006), suggesting secure relationships may be vital to positive mental wellbeing. Significantly, the ability to build relationships is not only a predictor of outcomes (McCabe & Priebe, 2004) but aids understanding of emotional regulation and engagement with services (Gumley et al., 2014), and therefore should be a key target for future psychological interventions.

The study also draws attention to high prevalence rate of ACEs within forensic mental health populations, particularly compared to the general population. This is in itself striking, suggesting more research is needed to gather overall prevalence rates within this particular group. Utilising qualitative and quantitative data would also lend a more holistic perspective on how early adversity, attachment and resilience relate to poorer mental health in adulthood and mitigate some limitations posed by using statistical and diagnostic measures. The findings further support the need for forensic mental health services to adopt a trauma-informed approach to the care and treatment that they provide.

Trauma and adversity have been found to underpin most if not all of the mental health and behavioural presentations with which people access forensic services, including psychosis (Bentall et al., 2012), personality problems (Porter et al., 2020), violence (Baron & Forde, 2020), and self-harm (Brodsky & Stanley, 2008). Yet despite this, and the growing recognition of the need for trauma informed services, it has been argued that the application of trauma informed care in forensic services has been gradual (Cartwright et al., 2022) and that the medical model is still the dominant paradigm (Jackson-Blott et al., 2019). Conceptualising people's difficulties through this lens runs the risk of services failing to provide treatment that addresses the root causes of

people's difficulties, and at worst exacerbates them (Lawrence et al., 2021). Our findings further support the need for trauma informed, relational support for forensic mental health populations, and to move away from perspective of 'what is wrong with this person?' to a more trauma-informed approach of 'what has happened to this person?' (Rahim, 2014; Sweeney et al., 2016, 2018). The Power Threat Meaning Framework (Johnstone & Boyle, 2018) is a model for conceptualising service users' difficulties by explicitly asking this particular question. To date, few studies have been conducted that evaluate the use of this model for those with forensic mental health-related needs. Our findings suggest that this may be beneficial for future research and clinical practice to pursue.

## Conclusion

Individuals with forensic backgrounds and mental health difficulties have high levels of adverse childhood experiences compared to the general population. As a result, they are more likely to experience severe psychological distress, have more vulnerable or insecure attachment styles and lower levels of resilience in adulthood. Further work is needed to explore these relationships, including defining resilience more clearly and considering the role of attachment in greater depth. The current study makes significant steps towards these goals demonstrating that the role of childhood adversity in relation to mental health difficulties in adulthood, alongside factors such as attachment style and resilience, should be considered routinely within forensic mental health services and consistently used to inform interventions and support.

## Note

1. Initial classification was of three categories, however due to low cell counts restricting analysis, *diagnosis* category was collapsed to include scores reaching both PTSD and CPTSD cut-off.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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## Date availability statement

The data that supports the findings of this study are available from the corresponding author upon reasonable request.

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