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Research paper

Childhood trauma and suicide risk: Investigating the role of adult attachment

Jasmine K. Maydom [a], Charley Blackwell [a], Daryl B. O'Connor [b,*]

[a] School of Medicine, Division of Psychological and Social Medicine, University of Leeds, UK
[b] School of Psychology, University of Leeds, UK

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ABSTRACT

Background: Suicide is a leading cause of death globally and a serious public health concern. Childhood trauma has been found to be associated with adult suicide vulnerability. Recent research has turned attention to investigating the role of attachment in the context of the childhood trauma-adult suicide relationship. The current study investigated for the first time whether attachment influences and moderates the childhood trauma-suicidality relationship, using a daily diary design, in the general population.

Methods: 481 participants completed questionnaires assessing experiences of childhood trauma, attachment patterns, and history of suicidality. 243 participants continued to a daily diary phase where measures of daily stress, defeat and entrapment were completed for 7 consecutive days.

Results: Higher levels of childhood trauma were associated with a history of suicide ideation and attempt and also higher levels of daily defeat, entrapment and stress during the 7 day study. Similarly, higher levels of attachment anxiety and avoidance were associated with a history of suicide ideation and attempt together with higher levels of daily defeat, entrapment and stress. However, the effects of childhood trauma on suicide history and on daily suicide vulnerability factors were not moderated by attachment anxiety or avoidance.

Limitations: The measure of childhood trauma was a retrospective self-report tool that may be influenced by memory biases.

Conclusions: Childhood trauma and insecure attachment are implicated in adult suicide risk. Interventions aimed at mitigating the negative effects of childhood trauma and insecure attachment should also incorporate components that target modifiable risk factors such as defeat, entrapment and stress.

1. Introduction

Suicide has a devastating impact on individuals, families and communities, and is a serious global public health issue. The estimated lifetime prevalence of suicidal ideation and attempts are 9.2 % and 2.7 % respectively, with approximately 700,000 people dying by suicide each year (WHO, 2021). As a result, for many decades, there has been considerable scientific effort aimed at better understanding the causes of suicidal behaviour. Recent research has shown that childhood trauma is an important risk factor associated with suicide behaviour (Angelakis et al., 2019; O'Connor et al., 2020a, 2020b; Zatti et al., 2017).

Trauma exposed young people have been found to be twice as likely to develop a mental health condition compared to non-trauma exposed young people and they have also an increased risk of suicide (Gartland et al., 2022; Lewis et al., 2019; Marshall et al., 2013). Marshall et al. (2013) found that moderate and severe childhood trauma were associated with suicide attempts in a prospective cohort study of those who use illicit drugs. A meta-analysis of longitudinal studies found that sexual and emotional abuse and physical neglect were associated with suicide attempts later in life (Zatti et al., 2017). Other work has shown that approximately 80 % of individuals who have previously attempted to end their own lives have reported experiencing at least one moderate to severe type of childhood trauma (O'Connor et al., 2018; 2020). However, the mechanisms of action that help explain how childhood trauma influences adult suicide risk are less clear.

The integrated motivational-volitional (IMV) model of suicide behaviour (O'Connor and Kirtley, 2018) details a theoretical basis for examining suicide risk factors; more specifically, it outlines factors involved in suicide ideation development, and key variables involved in the transition from suicide ideation to suicide behaviour. One of the

* Corresponding author at: School of Psychology, University of Leeds, Leeds LS2 9JT, UK.
E-mail address: d.b.oconnor@leeds.ac.uk (D.B. O'Connor).

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central tenets of the IMV model is that background, 'pre-motivational' factors (e.g., childhood trauma) lead to suicidal ideation through their impact on motivational phase factors (i.e., defeat and entrapment). Feelings of defeat and entrapment are located within the motivational stage of the model and have been shown to play an important role in understanding adult suicide risk (e.g., Branley-Bell et al., 2019; Dhingra et al., 2015). However, there is a lack of evidence linking childhood trauma to *daily* feelings of defeat and entrapment or whether childhood trauma also influences *daily* stress levels. In the latter case, there is growing body of work showing that fluctuations in within-person daily stressors are important to understanding the adverse effects of childhood trauma on mental and physical health outcomes (e.g., Berhe et al., 2023; van Nierop et al., 2018). In addition, in order to capture short term variability in indicators of adult suicide risk (such as daily defeat and entrapment), daily diary-type methods are recommended where participants provide data at short time intervals (Davidson et al., 2017; Stenzel et al., 2020).

Moreover, recent research attention has turned to investigating the potential role for attachment style within the context of understanding suicide thoughts and behaviours as well as within the IMV model (e.g., Zortea et al., 2019; Zortea et al., 2020). This work has built on an earlier developmental model that suggested that attachment may play a central role in the emergence of suicidal behaviour (Adam, 1994). Attachment patterns form during childhood as a way to achieve proximity to the primary caregiver (Erozkan, 2016). If a child's attachment behaviour, e.g., crying, is responded to appropriately, most of the time, the child is likely to develop a *secure* attachment pattern whereby they experience others as available, both physically and emotionally (Bowlby, 1988). Insecure attachment develops when children are not responded to appropriately. In other words, an *avoidant* attachment pattern may form when caregivers are unable to respond to their child's needs, and so the child minimises displays of attachment-seeking behaviours. The *anxious* attachment pattern may form through caregivers responding in an inconstant manner, resulting in the child maximising their attachment-seeking behaviours to ensure they get a response. A later insecure '*disorganised*' category was considered by Main and Solomon (1986), and is understood to develop when an child has experienced abuse or trauma, to the extent that the caregiver may become frightening to the child. This is conceptualised as a combination of high levels of both anxious and avoidant attachment (Bartholomew and Horowitz, 1991).

Insecure attachment has been shown to increase the risk of suicidality when controlling for key variables, such as mental health diagnoses, self-esteem, and sociodemographic factors (Palitsky et al., 2013; Zortea et al., 2019). Furthermore, individuals classified as being more securely attached are less likely to experience suicidal ideation or intent, which suggests a secure attachment pattern may act as a protective factor (Palitsky et al., 2013; Zortea et al., 2019). Importantly, traumatic childhood experiences increase the likelihood of developing insecure attachment patterns in adulthood (Fuchshuber et al., 2019; Yumbul et al., 2010); in particular, fearful, preoccupied (anxious) and dismissing (avoidant) attachments (Erozkan, 2016). However, surprisingly, relatively little research has investigated the effects of childhood trauma and (insecure) attachment styles on history of suicidality together in the same study or explored whether attachment moderates the childhood trauma and suicide relationship. Moreover, in the context of the IMV model, there is a paucity of research that has examined whether attachment styles influence *daily* feelings of defeat, entrapment and stress or whether attachment style influences *daily* stress-defeat and *daily* stress-entrapment relationships (known as slopes).

Therefore, taken together, the current study utilised a novel daily diary design to collect data about daily feelings of defeat, entrapment and stress over a 7-day period, alongside the completion of attachment and childhood trauma background measures. Moreover, in order to recruit participants with a range of different experiences and scores on our key variables of interest, we aimed to recruit participants from the general population who had a history of suicide thoughts and behaviours as well as individuals without a history of suicide thoughts and behaviours.

In summary, the current research tested the following hypotheses:

1. Higher levels of childhood trauma, attachment anxiety and attachment avoidance will be associated with a history of suicidality (ideation and attempts).
2. The association between childhood trauma and history of suicidality will be stronger in individuals scoring higher in attachment anxiety and avoidance (i.e. moderated by attachment) compared to those scoring lower.
3. Higher levels of childhood trauma will be associated with higher levels of daily defeat, entrapment and stress and childhood trauma levels will moderate the daily stress-defeat and stress-entrapment slopes, such that these relationships will be stronger in individuals with a history of trauma.
4. Higher levels of attachment anxiety and avoidance will be associated with higher levels of daily defeat, entrapment and stress, and attachment anxiety and avoidance will moderate the daily stress-defeat and stress-entrapment slopes, such that these relationship will be stronger in individuals with higher levels of attachment anxiety and avoidance.
5. The effects of childhood trauma on the daily indicators of suicide will be stronger in individuals who score higher in attachment anxiety and avoidance, compared to those who score lower.
6. The effects of childhood trauma on daily stress-defeat and stress-entrapment slopes will be stronger in individuals who score higher in attachment anxiety and avoidance, compared to those who score lower.

2. Method

2.1. Design and participants

The current study utilised a two-phase approach. Phase one consisted of completion of a cross-sectional survey and phase two involved completion of an online daily diary for 7 consecutive days (before going to bed), both using Online Surveys. All participants were invited to take part in both phases. Four hundred and eighty-nine participants completed the first phase of the study. Of these 481 participants, 312 proceeded to the second daily diary phase of which only 243 participants were included in the analysis (see below). Demographic information for participants is shown in Supplementary Table 1.

The study was powered to detect effects in the daily diary phase. The sample size was determined using a summary-statistics-based power analysis to detect a cross-level effect (Murayama et al., 2022), informed by a previous unpublished study dataset. The power analysis showed that a minimum sample of 236 was required to achieve 80 % power ($t = 2.18$, $df = 140$). Therefore, to account for attrition and drop out between the study phases, the study aimed to recruit 300 participants. To ensure we recruited participants who had a history of suicide thoughts and behaviours as well as individuals without a history of suicide thoughts and behaviours, we used two separate advertising poster campaigns. One poster/advert focused on recruiting participants who had 'been feeling low' recently and a second poster focussed on recruiting participants for a study on 'childhood experiences, relationships and personality'. Recruitment took place between May and November 2021 and the posters were advertised online via social media platforms e.g., Twitter, Facebook and LinkedIn, via websites e.g., Gumtree, Reddit, displayed in public communal areas, around the University campus and via the undergraduate Participant Pool scheme.

Participants were excluded from the study if they did not understand English, were under 18, or had attempted suicide or experienced thoughts to end their life within the last 4 weeks. To minimise participant drop-out and improve diary protocol adherence, the daily diaries were brief, and links to the diaries were text messaged to participants at

6 pm each day. We elected not to use an app-delivered platform as it was felt that downloading and registering an app can act as an additional barrier to taking part in a study. Following study completion, participants were presented with the option to be entered into a prize draw offering the chance to win one of 10 x £20 shopping vouchers. The study was preregistered on 12th June 2021 after data collection had commenced (in May 2021) but prior to the end of recruitment in November 2021(https://aspredicted.org/blind.php?x=6HH_9LN). Moreover, and importantly, preregistration was completed before the research team viewed the data and before any analyses were conducted. Ethical approval was gained from the University Department's Ethics Committee on the 18th May 2021 (PSYC-270).

2.2. Background measures (phase 1)

The background questionnaire included questions on age, sex, ethnic background as well as the measures below.

2.2.1. Childhood trauma questionnaire (CTQ; Bernstein et al., 2003)

The CTQ is a widely used 28-item self-report inventory used to gain information about history of childhood abuse or neglect. The questionnaire includes five scales which assess different types of trauma: emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. Participant responses are provided on a Likert-scale format, with responses ranging from 1 (never true) to 5 (very often true). The range of possible total CTQ scores was 25–125, with the greater the score indicating a greater history of childhood trauma. The scale has been shown to have good psychometric properties (Bernstein et al., 2003). The internal reliability for the total CTQ in the current sample was $\alpha = 0.95$.

2.2.2. Suicide history questions (adapted from the adult psychiatric morbidity survey (APMS; McManus et al., 2016).

The APMS (McManus et al., 2016) is a general population survey used to collect data on the prevalence of treated and untreated mental health problems in adults. Two items from this survey were used due to their ability to discriminate between those who have had thoughts to end their life, and those who have acted on these thoughts: 'Have you ever seriously thought of taking your life, but not actually attempted to do so?' and 'Have you ever made an attempt to take your life, by taking an overdose of tablets or in some other way?'. Response options were 'yes', 'no', or 'prefer not to say'. These questions have been widely used in suicide research (Cleare et al., 2018; O'Connor et al., 2021a, 2021b; Wetherall et al., 2018). Suicide ideation and attempt responses were recoded into a yes/no dichotomy by allocating participants who chose the 'prefer not to say' option to the 'no' category.

2.2.3. The experiences in close relationships-relationship structures (ecr-rs; fraley et al., 2011)

Attachment styles were assessed using the 9-item ECR-RS questionnaire (Fraley et al., 2011). See supplementary materials for the rationale for using this measure. Three items measure attachment anxiety e.g., "I often worry that this person doesn't really care for me", and six measure attachment avoidance e.g., "I prefer not to show this person how I feel deep down". Responses are provided on a seven-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), and nine items are repeated four times to assess attachment avoidance and anxiety in relation to four key attachment figures: mother or mother-like figure; father or father-like figure; best friend and partner. If not in a dating or marital relationship, participants are asked to think of a former partner or relationship they would like to have with someone. Attachment anxiety and avoidance scores are generated by averaging the anxiety and avoidance scores across the four relationship domains (Fraley, 2014). Cronbach's alpha for attachment anxiety and avoidance in relation to the mother are 0.87 and 0.94 respectively, in relation to the father are 0.91 and 0.93 respectively, in relation to the romantic partner are 0.92 and 0.90 respectively, and in relation to the best friend are 0.93 and 0.90 respectively.

2.3. Daily diary measures

2.3.1. Defeat and entrapment

Defeat and entrapment were assessed using single items: "To what extent have you felt trapped today?" and "To what extent have you felt defeated today?". Responses were given on a five-point Likert scale ranging from 1 (not at all/very little), to 5 (extremely). Both items possess good face validity and have been used successfully in previous research (O'Connor et al., 2020a).

2.3.2. Perceived stress scale-brief (PSS-Brief; Cohen et al., 1983)

This 4-item measure was amended to measure perceived stress over the day, rather than the past month (e.g., "Today, I felt unable to control the important things in your life"). Responses are provided on a five-point Likert-scale from 1 (never) to 5 (often), and total stress scores generated by summing the four items. Internal consistency has shown to be good in research using a similar population (O'Connor et al., 2020a). The internal reliability for the scale in the current sample was $\omega = 0.95$.

2.4. Data analysis

Full details on treatment of data, data preparation and screening and the statistical analyses are provided in the Supplementary Materials. Data were analysed using IBM SPSS Statistics (Version 26; IBM Corp, 2019) and Hierarchical Linear Modelling (HLM-8; Raudenbush and Congdon, 2021). SPSS was used for analysing the cross-sectional data (Hypothesis 1 and 2). HLM was used to analyse cross-level effects using multilevel models (Hypothesis 3-6), due to the data containing both between-person (level two) and within-person (level one) variables. Age and gender were significantly correlated with childhood trauma and the attachment variables, therefore, all analyses controlled for age and gender. Note to account for multiple comparisons, we adopted a more conservative significance level ($p < 0.01$). Moreover, we only focused on total Childhood Trauma Questionnaire score, and not the 5 individual subscale scores in the analyses, as their inclusion would have dramatically increased the number of comparisons and likelihood of Type 1 errors.

3. Results

3.1. Descriptive statistics

Descriptive statistics for the background and daily diary variables are provided in Table 1. Since hypotheses 1 and 2 were tested using the phase one data ($N = 481$) and hypotheses 3–6 tested using phase one and two data combined ($N = 243$), descriptive statistics are presented for both phases. Inspection of phase one data shows that half of the participants in the study had experienced suicidal ideation, and nearly one fifth had made a suicide attempt, within their lifetime. Participants' relationship-general attachment avoidance score, as averaged across the four key attachment relationships (mother, father, romantic partner and best friend), was higher than that for attachment anxiety. Table 1 indicates that generally, participants who continued to the second study phase had experienced slightly lower levels of trauma, were more securely attached (i.e., less attachment anxiety and avoidance) and reported marginally lower levels of suicidality. Inspection of the phase two means suggest that participants felt, on average, more defeated than trapped, daily.

Hypothesis 1. *Higher levels of childhood trauma, attachment anxiety and attachment avoidance will be associated with a greater history of suicidality (suicidal ideation and attempts).*

Initial correlations found that each of the background variables were

Table 1
Descriptive statistics (means and standard deviations) for variables used in phase one ($N = 481$) and phase two ($N = 243$) analyses.

Variable	Mean	*SD*
Phase one [a]		
Total CTQ score	43.52	17.69
Attachment anxiety	2.58	1.32
Attachment avoidance	3.25	1.11
Suicidal ideation history (%)	50	
Suicide attempt history (%)	18	
Phase two		
Total CTQ score	41.03	16.07
Attachment anxiety	2.44	1.28
Attachment avoidance	3.10	1.07
Suicidal ideation history (%)	44	
Suicide attempt history (%)	14	
Daily defeat [b]	2.22	1.24
Daily entrapment [b]	1.93	1.22
Daily stress [b]	10.14	3.72

[a] Data for phase two participants are also included in phase one reporting.
[b] Level one variables administered daily. Means are the average daily participant score.

significantly correlated with history of suicide ideation and attempt. Specifically, higher levels of childhood trauma were associated with history of suicide ideation ($r_{pb} = 0.413$, $p < 0.001$) and suicide attempt ($r_{pb} = 0.415$, $p < 0.001$). Higher levels of attachment anxiety and attachment avoidance were also found to be associated with suicide ideation ($r_{pb} = 0.405$, $p < 0.001$; $r_{pb} = 0.345$, $p < 0.001$, respectively) and suicide attempt ($r_{pb} = 0.364$, $p < 0.001$; $r_{pb} = 0.350$, $p < 0.001$, respectively).

3.2. Effects of childhood trauma on history of suicidality

Two hierarchical logistic regressions were performed to ascertain the effects of age, gender and childhood trauma on the likelihood of having a history of suicidal ideation or suicide attempt (see Supplementary Table 2a). When childhood trauma was added to the regression, it significantly accounted for 21.3 % (R^2) of the variance in suicide ideation ($\chi^2(3) = 81.44$, $p < 0.001$). Similarly for suicide attempt, when childhood trauma was added to the regression, it significantly explained 25 % (R^2) of the variance in history of suicide attempt, $\chi^2(3) = 77.591$, $p < 0.001$ (see Supplementary Table 2a).

3.3. Effects of attachment anxiety and avoidance on history of suicidality

Further hierarchical logistic regressions were performed to test the effects of age, gender and attachment anxiety and avoidance on the likelihood of having a history of suicidal ideation or suicide attempt. Attachment anxiety significantly accounted for 21.3 % (R^2) of the variance in history of suicide ideation, $\chi^2(3) = 81.179$, $p < 0.001$, and 22.6 % (R^2) of the variance in history of suicide attempt, $\chi^2(3) = 69.575$, $p < 0.001$ (Supplementary Table 2b). Attachment avoidance significantly accounted for 16.2 % (R^2) of the variance in history of suicide ideation, $\chi^2(3) = 60.439$, $p < 0.001$, and 20.6 % (R^2) of the variance in history of suicide attempt, $\chi^2(3) = 63.016$, $p < 0.001$ (Supplementary Table 2b).

Hypothesis 2. *The effects of childhood trauma on history of suicidality will be stronger in those scoring higher in attachment anxiety and avoidance (i.e. moderated by attachment) compared to those scoring lower.*

To test the hypothesis whether attachment anxiety and avoidance moderated the relationships between childhood trauma and suicidality, hierarchical logistic regressions were also conducted. In each analysis, childhood trauma was added in the first step, the attachment variable was added second, and the interaction term between childhood trauma and the attachment variable was added in the final step. For the adjusted analyses, an additional first step saw age and gender added to the model. The results of these analyses found that the effects of childhood trauma on history of suicide ideation or attempt were not significantly moderated by attachment anxiety or attachment avoidance in any of the analyses (see Supplementary Tables 3a-d).

Hypothesis 3. *Higher levels of childhood trauma will be associated with higher levels of daily defeat, entrapment and stress, and childhood trauma levels will moderate the daily stress-defeat and stress-entrapment slopes.*

Hierarchical linear modelling was used to test whether childhood trauma was associated with daily levels of defeat, entrapment and stress and whether the daily stress-entrapment or stress-defeat relationships (slopes) were moderated by childhood trauma. The results showed there were significant main effects (β_{01}) of childhood trauma on daily defeat (adjusted, $\beta = 1.556$, $p < 0.001$), entrapment (adjusted, $\beta = 2.451$, $p < 0.001$) and stress (adjusted, $\beta = 6.836$, $p < 0.001$) in the adjusted and unadjusted analyses, such that higher levels of childhood trauma were associated with higher levels of defeat, entrapment and stress at the daily level (see Table 2 & Fig. 1). Next we tested whether childhood trauma moderated the daily stress-defeat and daily stress-entrapment relationships (β_{11}). The results found no significant cross-level moderation effects (see Supplementary Table 4a).

Hypothesis 4. *Higher levels of attachment anxiety and avoidance will be associated with high levels of daily defeat, entrapment and stress, and attachment anxiety and avoidance levels will moderate the stress-defeat and stress-entrapment slopes.*

The results of these analyses showed there were significant main effects (β_{01}) of attachment anxiety on daily defeat (adjusted, $\beta = 1.613$, $p < 0.001$), entrapment (adjusted, $\beta = 2.078$, $p < 0.001$) and stress (adjusted, $\beta = 6.237$, $p < 0.001$) in the adjusted and unadjusted analyses, such that higher levels of attachment anxiety were associated with higher levels of defeat, entrapment and stress at the daily level (see Table 3 & Fig. 1). The results of the cross-level moderation analyses found that attachment anxiety did not significantly moderate the stress-defeat relationship (β_{11}), however, it did significantly moderate the daily stress-entrapment slope ($\beta = 0.176$ $p < 0.001$) (see Supplementary Table 4b). Therefore, this cross-level interaction was decomposed using simple slopes procedures developed by Preacher et al. (2006) using Preacher's calculator (Preacher et al., 2006). The strength of the stress-entrapment slope was assessed at low (mean – 1SD), medium (mean) and high (mean + 1SD) levels of attachment anxiety. However, the simple slopes analyses showed that the slopes were not significant at low ($p = 0.476$), medium ($p = 0.335$), or high ($p = 0.226$) levels of attachment anxiety.

In terms of attachment avoidance, the analyses showed there were significant main effects (β_{01}) of attachment avoidance on daily defeat (adjusted, $\beta = 0.300$, $p < 0.001$), entrapment (adjusted, $\beta = 0.409$, $p < 0.001$) and stress (adjusted, $\beta = 1.150$, $p < 0.001$) in the adjusted and unadjusted analyses, such that higher levels of attachment avoidance were associated with higher levels of defeat, entrapment and stress at the daily level (see Table 4). Next we tested whether attachment avoidance moderated the daily stress-defeat and daily stress-entrapment relationships (β_{11}). The results found no significant cross-level moderation effects (see Supplementary Table 4c).

Hypothesis 5. *The effects of childhood trauma on the daily indicators of suicide risk will be stronger in individuals who score higher on attachment anxiety and avoidance compared to those who score lower.*

Next, we explored whether the relationship between childhood trauma and the daily indicators of suicide risk were moderated by participants' levels of attachment anxiety or avoidance. In these models, we tested whether the level two interactions between attachment anxiety/avoidance and childhood trauma, influenced daily defeat, entrapment and stress. In each analysis, childhood trauma was added in the first step, the attachment variable was added second, and the interaction

Table 2
Hierarchical linear models testing main effects of childhood trauma on daily stress, defeat and entrapment.

	Unadjusted (n = 243)				Adjusted for covariates (n = 239)			
Variable		Coeff	SE	p		Coeff	SE	p
Defeat								
Intercept	β_{00}	2.227	0.056	<0.001	β_{00}	2.001	0.288	<0.001
Childhood trauma	β_{01}	1.419	0.395	<0.001	β_{01}	1.556	0.382	<0.001
Gender [a]	_	_	_	_	β_{02}	0.121	0.152	0.427
Age	_	_	_	_	β_{03}	−0.012	0.005	0.008
Entrapment								
Intercept	β_{00}	1.958	0.059	<0.001	β_{00}	2.003	0.304	<0.001
Childhood trauma	β_{01}	2.419	0.402	<0.001	β_{01}	2.451	0.414	<0.001
Gender [a]	_	_	_	_	β_{02}	−0.030	0.160	0.853
Age	_	_	_	_	β_{03}	−0.003	0.005	0.523
Stress								
Intercept	β_{00}	10.195	0.189	<0.001	β_{00}	8.899	0.920	<0.001
Childhood trauma	β_{01}	6.612	1.350	<0.001	β_{01}	6.836	1.348	<0.001
Gender [a]	_	_	_	_	β_{02}	0.707	0.496	0.155
Age	_	_	_	_	β_{03}	−0.044	0.016	0.006

Note. Coeff = coefficient
[a] 1 = males, 2 = females.

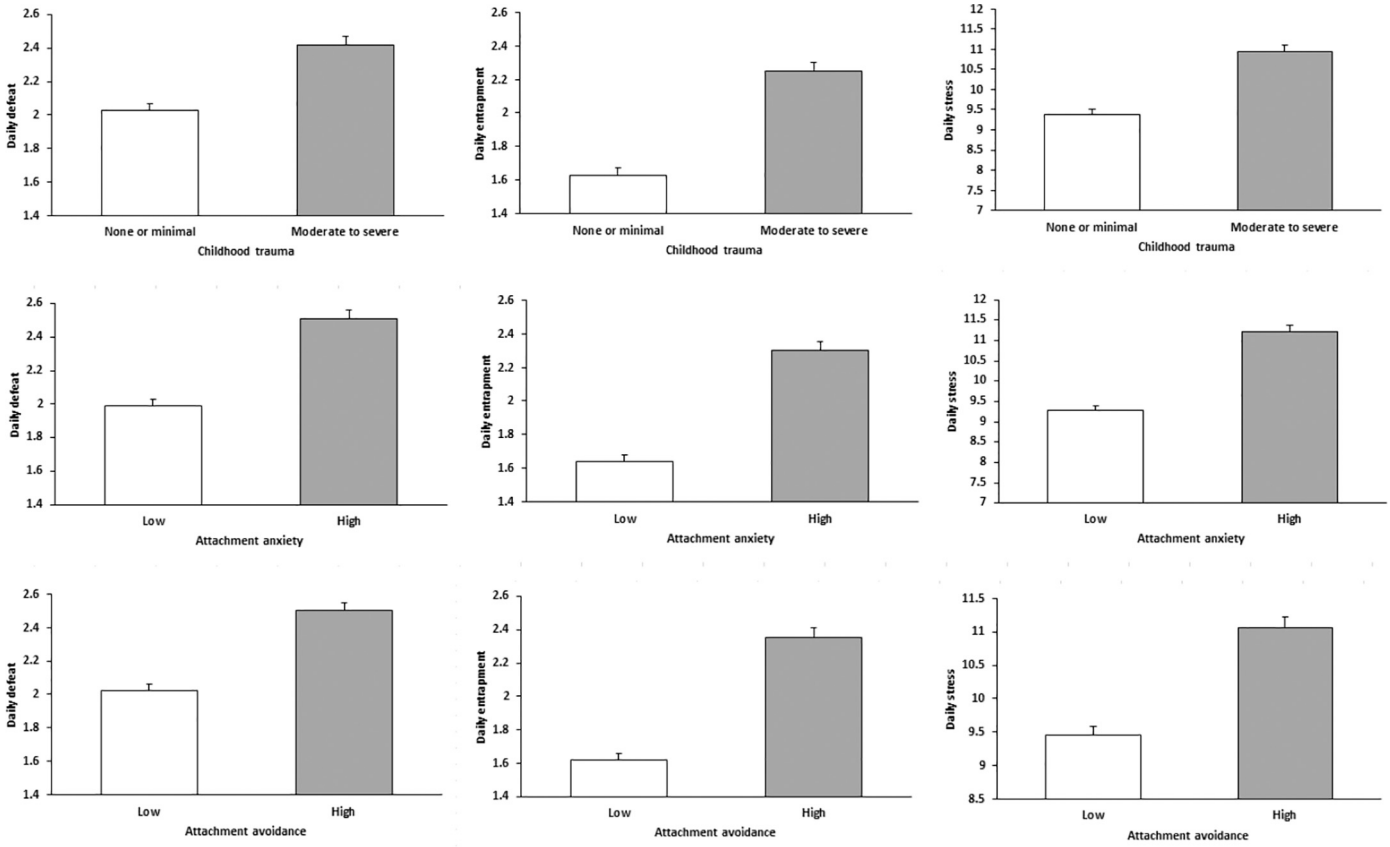

Fig. 1. Effects of childhood trauma, attachment anxiety and avoidance on daily defeat, entrapment and stress across 7 days.
Note: For childhood trauma 'none or minimal' = total Childhood Trauma Questionnaire <37; 'moderate to severe' >37 based on cut-offs reported by Bernstein et al. (2003). For attachment anxiety and avoidance 'low' and 'high' cut-offs were based on a median split (2.25 and 3.25, respectively).

term between childhood trauma and the attachment variable was added in the final step. For the adjusted analyses, an additional step saw age and gender added to the model. The results of these analyses found there were no significant interactions between childhood trauma and attachment anxiety or avoidance to influence daily levels of defeat, entrapment or stress.

Hypothesis 6. *The effects of childhood trauma on daily stress-defeat and stress-entrapment slopes will be stronger in individuals who score higher in attachment anxiety and avoidance compared to those who score lower.*

Finally, we investigated whether the level two interactions between childhood trauma and attachment anxiety or avoidance, influenced the daily stress-entrapment or daily stress-defeat slopes. The results of these analyses found no significant interactions.

4. Discussion

The current study found that higher levels of childhood trauma were associated with a history of suicide ideation and attempt and also higher

Table 3
Hierarchical linear models testing main effects of attachment anxiety on daily stress, defeat and entrapment.

	Unadjusted (n = 243)				Adjusted for covariates (n = 239)			
Variable		Coeff	SE	*p*		Coeff	SE	*p*
Defeat								
Intercept	β_{00}	2.228	0.053	<0.001	β_{00}	2.566	0.188	<0.001
Attachment anxiety	β_{01}	1.590	0.243	<0.001	β_{01}	1.613	0.243	<0.001
Gender [a]	_	_	_	_	β_{02}	−0.011	0.146	0.941
Age	_	_	_	_	β_{03}	−0.011	0.004	0.012
Entrapment								
Intercept	β_{00}	1.957	0.056	<0.001	β_{00}	1.947	0.150	<0.001
Attachment anxiety	β_{01}	2.001	0.259	<0.001	β_{01}	2.078	0.270	<0.001
Gender [a]	_	_	_	_	β_{02}	-0.158	0.151	0.298
Age	_	_	_	_	β_{03}	0.000	0.004	0.991
Stress								
Intercept	β_{00}	10.19	0.177	<0.001	β_{00}	11.32	0.452	<0.001
Attachment anxiety	β_{01}	6.337	0.847	<0.001	β_{01}	6.237	0.857	<0.001
Gender [a]	_	_	_	_	β_{02}	0.279	0.459	0.544
Age	_	_	_	_	β_{03}	−0.034	0.014	0.013

Note. β = hierarchical linear modelling symbol; Coeff = coefficient
[a] 1 = males, 2 = females.

Table 4
Hierarchical linear models testing main effects of attachment avoidance daily stress, defeat and entrapment.

	Unadjusted (n = 243)				Adjusted for covariates (n = 239)			
Variable		Coeff	SE	*p*		Coeff	SE	*p*
Defeat								
Intercept	β_{00}	2.228	0.054	<0.001	β_{00}	2.662	0.145	<0.001
Attachment avoidance	β_{01}	0.269	0.053	<0.001	β_{01}	0.300	0.048	<0.001
Gender [a]	_	_	_	_	β_{02}	0.198	0.151	0.190
Age	_	_	_	_	β_{03}	−0.014	0.004	0.002
Entrapment								
Intercept	β_{00}	1.958	0.057	<0.001	β_{00}	2.086	0.163	<0.001
Attachment avoidance	β_{01}	0.402	0.055	<0.001	β_{01}	0.409	0.054	<0.001
Gender [a]	_	_	_	_	β_{02}	0.106	0.155	0.496
Age	_	_	_	_	β_{03}	−0.004	0.005	0.385
Stress								
Intercept	β_{00}	10.190	0.186	<0.001	β_{00}	11.691	0.494	<0.001
Attachment avoidance	β_{01}	1.054	0.180	<0.001	β_{01}	1.150	0.166	<0.001
Gender [a]	_	_	_	_	β_{02}	1.084	0.479	0.025
Age	_	_	_	_	β_{03}	−0.047	0.015	0.002

Note. β = hierarchical linear modelling symbol; Coeff = coefficient
[a] 1 = males, 2 = females.

levels of daily defeat, entrapment and stress during a 7-day investigation. Similarly, higher levels of attachment anxiety and avoidance were also associated with a history of suicide ideation and attempt, together with higher levels of daily defeat, entrapment and stress. However, the effects of childhood trauma on suicide history and on daily indicators of suicide vulnerability (defeat, entrapment and stress) were not moderated by attachment anxiety or avoidance.

The finding that individuals with higher levels of childhood trauma were more likely to have experienced suicide ideation or made a suicide attempt is consistent with previous research. Numerous studies have demonstrated links between experiencing trauma during childhood and increased risk of suicide in adulthood (Angelakis et al., 2019; Felitti et al., 1988; Marshall et al., 2013; O'Connor et al., 2018; O'Connor et al., 2020a; Rogerson et al., 2024; Wang et al., 2022, Zatti et al., 2017). For example, in a meta-analysis of longitudinal studies, Zatti et al. (2017) found that childhood trauma was robustly associated with suicide attempt. Research attention has now turned to investigating the factors that mediate the effects of childhood trauma on suicide ideation and attempt. Recent work has implicated modifiable factors such as sleep, stress, impulsivity and executive functioning (e.g., Rogerson et al., 2023; O'Connor et al., 2021a, 2021b; in press; Tinajero et al., 2020). The findings in this study show that childhood trauma is associated with daily levels of defeat and entrapment and this represents an important extension to the literature. Defeat and entrapment are strongly implicated as key risk factors for suicide in theoretical models of suicide such as the IMV (e.g., Branley-Bell et al., 2019; Wetherall et al., 2022). Therefore, the current findings are noteworthy as they indicate that childhood trauma may increase adult suicide risk by influencing daily levels of defeat and entrapment, as well as stress.

The results of our analyses also showed that insecure attachment, characterised by high levels of attachment anxiety and avoidance, was associated with a history of suicide ideation and attempt. This finding is in keeping with the conclusions of a recent meta-analysis by Zortea et al. (2019) that showed that insecure attachment orientations appear to be vulnerability factors that impair an individual's capacity to cope with relationship issues, thereby increasing suicide risk. Moreover, it is likely that having an impaired capacity to cope will lead to increased levels of stress. Therefore, it may not be surprising, that in the current study, we found that attachment anxiety and avoidance were associated with higher levels of daily stress. Insecurely attached individuals may feel less able to reach out for support, or may not be confident in the reliability of others to help when stressors arise and, therefore, will experience stress more acutely on a day-to-day basis (Gerhardt, 2004).

We also found strong associations between attachment and daily defeat and entrapment. Despite theoretical literature suggesting that poorer attachment will impact how able someone is to cope when faced with setbacks and defeats in life (Sloman et al., 2003), and may foster a strong motivation to escape (Fischer-Mamblona, 2000), empirical

support for this theorising is lacking. Some research has investigated self-defeating patterns (Wei and Ku, 2007; Williams and Schill, 1994) in the context of insecure attachments, however such patterns are considered more of a personality type, rather than defined as a perception of failed struggle, as was the case in this study. Cuenca (2013) and Zortea et al. (2020) highlight the association between insecure attachment and both defeat and entrapment, in students and the general population, however these two studies measured these constructs cross-sectionally. Therefore, the findings of the current study offer a novel addition to the literature and confirm the relationship between attachment anxiety, attachment avoidance and defeat and entrapment in naturalistic daily settings.

There are some limitations of the current study. First, we acknowledge that our measure of childhood trauma is a retrospective self-report tool that may be influenced by social (un)desirability, repression and memory biases. Nevertheless, it is important to note that it has been argued that retrospective self-report tools may be associated with an underestimation of actual occurrence of trauma (Hardt and Rutter, 2004). Second, the sample size could be considered small compared to large scale, epidemiological studies of suicide. However, in terms of detailed daily diary research, this sample size is relatively large and also includes all the strengths of adopting a within-participant, daily diary design (e.g., multiple observations, using each participant as their own control etc.).

Finally, the current findings may have important clinical implications whereby clinicians may be able to use the short-forms of the Childhood Trauma Questionnaire and/or the *Experiences in Close Relationships-Relationship Structures questionnaire* to screen for vulnerability factors and to develop targeted interventions. More specifically, these results suggest that interventions aimed at mitigating the negative impacts of childhood trauma and insecure attachment should also incorporate components that target modifiable risk factors such as defeat, entrapment and stress. An important next step is to investigate the effectiveness of interventions to reduce levels of defeat, entrapment and stress in individuals with a history of childhood trauma and an insecure attachment orientation.

In conclusion, higher levels of childhood trauma and insecure attachment were associated with a history of suicide ideation and attempt later in life and also higher levels of daily defeat, entrapment and stress during a 7-day daily diary investigation. Interventions aimed at mitigating the negative effects of childhood trauma and insecure attachment should also incorporate components that target modifiable risk factors such as defeat, entrapment and stress.

Author contributions

The study was designed and conceptualised by DO'C, JM and CB. JM led on the statistical analyses with supervision from DO'C. DO'C and JM led the drafting of the manuscript but all authors contributed to further drafting, revising and approved the final manuscript for submission.

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CRediT authorship contribution statement

Jasmine K. Maydom: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing, Visualization. **Charley Blackwell:** Data curation, Investigation, Methodology. **Daryl B. O'Connor:** Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Supervision, Visualization, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors have no conflict of interests to declare.

Data availability statement

Data available upon reasonable request.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jad.2024.08.005.

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