Wittmann, L., Protić, S., Bosmans, M., Velden, P.G. van der. Pre-event attachment anxiety and avoidance predict posttraumatic stress symptom severity – Results from a longitudinal population-based study. Journal of Anxiety Disorders: 2024, art. nr. 102796

Postprint version	:	1.0
Journal website	:	https://www.sciencedirect.com/science/article/abs/pii/S0887618523001342
Pubmed link	:	https://pubmed.ncbi.nlm.nih.gov/37980824/
DOI	:	10.1016/j.janxdis.2023.102796

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Pre-event attachment anxiety and avoidance predict posttraumatic stress symptom severity – Results from a longitudinal population-based study

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ABSTRACT

Attachment-related anxiety and avoidance have been identified as risk factors for psychopathology following traumatic events. However, the predictive value of pre-event attachment orientations for PTSD symptoms in the general population remains unclear. Attachment anxiety and avoidance, as well as symptoms of anxiety and depression, were assessed in autumn 2010 (T0) in 270 adult members of a Dutch research panel. PTSD symptoms were assessed in April (T1), August (T2), and December (T3) 2012 for events occurring within one year before T1. The predictive value of attachment orientations for severity and remission of PTSD cluster and total scores was estimated by latent growth curve analyses controlling for gender, age, and pre-event

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psychopathology. Attachment anxiety predicted higher posttraumatic stress severity at T1, while attachment avoidance predicted lower initial posttraumatic stress levels, together adding 7.4 % independently explained variance. Higher attachment anxiety was related to more remission of PTSD total scores (6.0 % independently explained variance) which might be understood as an effect of regression to the mean. In conclusion, insecure attachment orientation predicts PTSD symptoms in the general population. Our results advocate the significance of pre-traumatic factors for the prediction of posttraumatic stress and the consideration of attachment orientations in clinical work with trauma survivors.

1. Introduction

1.1 Traumatic events and posttraumatic psychopathology

Recent cross-country general population surveys report a lifetime prevalence of exposure to potentially traumatic events (PTE) of around 70% (Benjet et al., 2016; Duckers et al., 2016). However, only a minority of trauma-exposed individuals eventually develop posttraumatic stress disorder (Kessler et al., 2017). Seminal meta-analyses reported that peri- and posttraumatic factors such as peritraumatic dissociation or social support are the most relevant predictors of posttraumatic stress development, as compared to pre-trauma predictors (Brewin et al., 2000; Ozer et al., 2003). However, advances in prospective research methodology including pre-event assessment of pre-trauma predictors strongly advocate the assumption that the significance of pre-trauma factors has been underestimated by retrospective assessments (Danese et al., 2017; DiGangi et al., 2013; Scheeringa, 2021; van der Velden et al., 2016). So far, childhood traumatic events and pre-trauma psychiatric morbidity are the most prominent examples of pre-trauma risk factors for post-traumatic psychopathology (Baldwin et al., 2019; Gradus et al., 2022; van der Velden et al., 2022). However, prospective research on the predictive value of pre-event personality traits for the development of psychopathology after PTE is scarce (van der Velden et al., 2022). A salient example is trait-like attachment orientations.

1.2 Attachment

Attachment is an essential human behavioral system, activated by stress, separation, or danger, and has the purpose of providing survival, comfort, and safety (Bowlby, 1973). The attachment system interacts with other behavioral systems such as exploration and fear and aims at securing the availability of the caregiver in times of need (e.g., danger). This availability is pursued by behaviors such as smiling, clinging, and crying on the infant's side and evokes reciprocated behaviors on the side of the parent such as touching, holding, and soothing. During the childhood attachment figure's availability, sensitivity, and responsivity are internalized into an inner feeling of security represented through the internal working models of self and others (IWMs). As noticed by Sharp et al. (2012), internal working models show similarities with the concept of cognitive schemas within a social information processing approach. After transformation and reorganization during the transitional phase of adolescence, IWMs eventually result in relatively stable patterns of relational expectations, emotions, and behaviors (Fraley & Shaver, 2000), which are generalized to relations with other attachment figures, such as romantic partners. Specifically, holding accessible working models of successful proximity-seeking attempts (i.e., attachment figures were available, responsive, and predictable) would lead to a secure attachment pattern, with the expectations and trust that attachment figures will provide security in times of need. Parental physical and emotional unavailability and failure to provide comfort and safety would result in the development of one of several specific insecure attachment patterns (see below).

Two different approaches with respect to the conceptualization and assessment of individual differences in attachment dimensions can be observed (Mikulincer & Shaver, 2003; Mikulincer, Shaver & Pereg, 2003). The first one mainly focuses on the child-parent attachment relationship. It differentiates four attachment styles in childhood, based on indicators of the infant's behavior organization with respect to attachment figure (typically using observation methods, such as Strange Situation Procedure; Ainsworth et al., 1978), or the quality (e.g., positivity/negativity, coherency) of underlying IWMs in adulthood (frequently assessed with the Adult Attachment Interview; George et al., 1985). These attachment styles are: secure or autonomous (positive IWMs), anxious-ambivalent or preoccupied (negative IWM of self but positive IWM of others), avoidant or dismissing (positive IWM of self but negative IWM of others), and disorganized or fearful (negative IWMs). Another approach was mainly applied for assessing attachment relationships between adults (typically romantic attachment). Here, individual differences in attachment orientations are mostly assessed by self-report measures of attachment-related anxiety and avoidance (Brennan, Clark, & Shaver, 1998). Attachment anxiety and avoidance capture specific attachment regulatory strategies in times of stress which are closely related to IWMs (Mikulincer & Shaver, 2003). Compared to a secure attachment orientation (low attachment anxiety and avoidance) which makes an individual comfortable with both intimacy and autonomy (which corresponds with a secure attachment style), higher attachment anxiety (an indicator of a negative IWM of self) describes increased worries that the attachment figure will not be available and caring in times of need and leads to the usage of hyperactivating regulatory strategies (i.e., excessive communication of the need for support combined with lack of trust that support will be available). On the other hand, attachment avoidance (as an indicator of a negative IWM of other) reflects a lack of trust and reliance in attachment figures' capacities to help and indicates frequent use of deactivating strategies (i.e., avoiding contact and handling distress on one's own).

As shown by Bartholomew (1990), both research traditions could be easily connected. This makes sense as adult romantic attachment orientations are assumed to be a continuation of child-parent attachment styles. The three insecure attachment styles (anxious-ambivalent/preoccupied, avoidant/dismissing, and disorganized/fearful) would be reflected through the following attachment orientations or dimensions: high anxiety and low avoidance, low anxiety and high avoidance, and both high anxiety and avoidance, respectively. In the absence of a generally accepted terminology that allows to differentiate between both research traditions, we will refer to the first approach (assessing parent-child attachment) as attachment styles and to the second one (assessing adult romantic attachment) as attachment orientation.

1.3. Trauma and the attachment system

Insecure attachment may be a risk factor for the development of psychopathology after traumatic events. Namely, negative IWMs resulting in negative self-evaluation and constant fear of abandonment (anxious attachment orientation or preoccupied attachment style) and negative evaluation of others and lack of social support (avoidant attachment orientation or dismissive attachment style), as well as less effective regulatory (i.e., hyperactivating and deactivating) strategies that may interfere with processing the traumatic experience and recovering from it, increasing the vulnerability to PTSD symptomatology (Mikulincer et al., 2015). A meta-analysis by Woodhouse et al. (2015) reported that insecure attachment styles and orientations were associated with higher PTSD symptom load, while secure attachment styles and orientations were linked to lower PTSD symptoms. A systematic literature review by Barazzone et al. (2019) indicated that the impact of interpersonal traumatic events may be specifically linked to the attachment system and that anxious attachment orientations/preoccupied attachment style are of greater relevance as a risk factor for PTSD as compared to avoidant attachment orientations/dismissive attachment style. Based on their review of the literature, Mikulincer et al. (2015) conclude that insecure attachment

orientations predict the development of PTSD symptoms. Furthermore, they summarize evidence according to which securely attached individuals may experience more recovery from PTSD and may respond stronger to treatment. This is in line with a study of 975 male veterans which reported that attachment anxiety and avoidance at age 55 partially mediated increases in PTSD symptoms between age 37 and 61 (Franz et al., 2014).

However, the majority of available studies on the role of attachment style and/or orientation in predicting the effects of PTE on mental health rely on cross-sectional designs, preventing causal interpretation of obtained results. Furthermore, almost all available evidence is based on retrospective (post-trauma) attachment assessments, implying potential biases due to distorted recall or spontaneous or trauma-induced changes within attachment styles and orientations.

To the best of our knowledge, only three longitudinal studies analyzed the effects of attachment styles and orientations that were assessed before the events on PTSD symptoms, among specific and rather small samples (Ayers et al., 2014; MacDonald et al., 2008; Shallcross et al., 2014). MacDonald et al. (2008) assessed attachment style at the age of 12 months. They found that disorganized attachment style at 12 months was related to higher symptoms of reexperiencing (rate ratio = 2.1) and avoidance (rate ratio = 2.4), but not hyper-arousal, at the age of 8.5 years (n = 78). Ayers et al. (2014) assessed the effects of avoidant attachment orientation during late pregnancy on PTSD symptoms three months postpartum. Avoidant attachment orientation explained 12.3 % of the variance in postpartum PTSD symptoms. This effect accounted for 21.3 % of the variance in PTSD symptoms among women (n = 21) after operative birth, but was non-significant among women (n = 36) after vaginal birth. As PTSD levels were not reported, it remains unclear if this is possibly due to a reduced range in PTSD scores in the latter group. Shallcross et al. (2014) examined attachment orientations (anxiety and avoidance) among undergraduate students at the beginning of a two-month study period (n =174). They found that both attachment orientations together predicted 11 % of variance in PTSD symptoms two months later and this relation was mediated by social resources.

A central methodological limitation of these studies is that none of them controlled for pre-event psychopathology. Clearly, a relevant predictor should contribute to the explanation of variance for mental health problems after a PTE, above and beyond already pre-existing mental health problems. Also, neither of these studies included samples of the general adult population nor applied longitudinal assessments of PTSD symptoms. Further shortcomings consist of the rather small sample sizes as well as short follow-up intervals in two of the three studies, respectively.

Therefore, the present study aims at testing the predictive value of pre-event attachment orientations, i.e., attachment anxiety and avoidance, for the development of repeatedly assessed PTSD symptoms 18–24 months later, controlling for pre-event psychopathology in a large adult subsample of a representative Dutch research panel. Based on the summarized evidence from prospective studies, it was hypothesized that pre-event insecure attachment orientations independently predict higher PTSD symptom severity assessed 18 months later. Based on findings that attachment orientations predict remission of posttraumatic stress (Mikulincer et al., 2015) and mediate the relationship between longitudinally assessed PTSD symptoms (Franz et al., 2014) it was hypothesized that insecure attachment orientations (i.e., high attachment anxiety and/or avoidance) predict smaller remission in PTSD symptom load over the following eight months period. Given that MacDonald et al. (2008) found the relation between attachment variables and the different PTSD clusters to be non-homogenous, it was decided to consider the relation of attachment orientations with both PTSD total and cluster scores.

2. Methods

2.1. Participants and procedure

The present analyses are based on data from studies conducted by the Longitudinal Internet Studies for the Social Sciences (LISS) panel (Scherpenzeel & Das, 2011). The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. Included studies were evaluated and approved by the Board of Overseers, the Internal Review Board of Centerdata until 2014. The LISS panel is based on a traditional probability sample drawn from the Dutch population register of 16 years and older by Statistics Netherlands. The set-up of LISS was funded by the Dutch Research Council (NWO) and managed by Centerdata (Scherpenzeel & Das, 2011). Panel members complete online questionnaires every month, which take about 30 min in total to complete. They receive an incentive of 15 EUR/h and members who do not have a computer or internet access are provided with the necessary equipment at home (for further information see https://www.dataarchive.lissdata.nl/). For the present analyses, data were combined from three studies:

1. "Inter-personal effects of crying (part 1; https://www.dataarchive.lissdata.nl/study_units/view/332)" (data collection in October 2010, 5339 of 7428 (71.9 %) invited panel members completed this survey),
2. "Health (Wave 4; https://www.dataarchive.lissdata.nl/study_units/view/169)" (data collection in November-December 2010, 5665 of 7364 (76.9 %) invited panel members completed this survey), and
3. "Coping self-efficacy after potentially traumatic events (Wave 1–3; https://www.dataarchive.lissdata.nl/study_units/view/454)" (data collection in April, August, and December 2012, of 7495-panel members invited for wave 1, 4905 (65.4 %) completed the third wave).

Combining data from these three projects, complete data on attachment orientations (T0; October 2010), symptoms of anxiety and depression (T0; November-December 2010), as well as PTSD symptom (T1-T3, April, August, and December 2012), is available for 845 panel members. Of these, 52.5 % were excluded as they did not experience a PTE (n = 30), or the reported PTE (see measures section) was more than one year ago and thus potentially occurring before attachment orientations were assessed (n = 347), or because they reported more than one PTE (n = 67). The latter criterion excluded that additional PTEs could have occurred before attachment orientations were assessed as time since the event was only obtained for the worst PTE. Of the remaining 401 panel members, four (1.0 %) had to be excluded as information on trauma history as assessed at T2 and T3 was missing. In order to analyze a homogenous sample experiencing a single PTE, a further 119 (30.0 %) were excluded as they experienced at least one additional PTE between T1 and T3. As the attachment system is assumed to develop during childhood, youth, and adolescence (e.g., Allen, 2008), eight (2.9 %) further panel members below 20 years of age were excluded. Thus, the final sample consisted of 270 panel members (32.0 % of the 845 panel members with required complete data). Socio-demographic and event-related information is presented in Table 1.

[Table 1]

2.2. Measures

2.2.1. Potentially traumatic events

years before April 2012 (T1), between T1 and T2 (April – August 2012), as well as between T2 and T3 (August - December 2012), respondents were administered a trauma and life events exposure list of ten PTEs (serious threat, physical violence, robbery, traffic accident, airplane accident, fire, burglary, serious infection, sexual violence, death of a loved one, and an open category for PTE not listed; cf. Bosmans & van der Velden, 2017). The forty-four events reported in the open category were then recoded into existing or new categories. For this, the category "traffic accident" was transformed into the broader category "accident", and the category "serious infection" was transformed into "serious infection/disease (self)". Two new categories represent "serious infection/disease (significant other)" as well as "suicide attempt significant other / suicide witnessed". The term serious disease refers to heart attacks, cancer diagnoses, and similar medical events. In the present study, we focussed on PTEs, thus excluding other stressful life events such as divorce, loss of contact with children, or severe problems with partners or colleagues.

2.2.2. Symptoms of anxiety and depression

In November-December 2010 (T0), anxiety and depression symptoms were assessed using the five-item Mental Health Inventory (MHI; Means-Christensen et al., 2005; Ware & Sherbourne, 1992). This scale covers symptoms during the past month such as "This past month I felt very anxious" and "I felt depressed and gloomy" on six-point Likert scales ranging from 0 (never) to 5 (continuously). After recoding those items where higher scoring represents higher pathology, the total score was computed and multiplied by four (range 0–100), where lower scores indicate higher anxiety and depression symptom levels (Cronbach's α =.87). A cut-off score of ≤ 59 has been reported to identify respondents with moderate-severe anxiety and depression symptom levels (Driessen, 2011). To improve the readability, the sum scores were subtracted from 100 so that in the presented analyses – in contradiction to the original version – higher scores indicate higher anxiety and depression symptom levels.

2.2.3. Event-related PTSD symptom severity

The severity of PTSD re-experiencing and avoidance symptoms regarding the most recent and stressful event was assessed at T1, T2, and T3 (i.e., April, August, and December 2012) using the original 15-item Impact of Event Scale (IES; Horowitz et al., 1979). The severity of PTSD hyper-arousal symptoms was assessed by applying the six hyper-arousal items of the Impact of Event Scale-Revised (IES-R; Beck et al., 2008; Weiss & Marmar, 1997). The original scoring system of the IES was used, however, for all items (respondents were asked how often they suffered from symptoms in the past week on a 4-point measurement scale, with 0 indicating not at all, 1 indicating rarely, 3 indicating sometimes, and 5 indicating often). This version of the IES(-R) will be referred to as the IES-plus in this study. This approach has been used in previous research (e.g., Pfefferbaum et al., 2003). The benefit of this approach is its comparability with results obtained using the original IES, while still allowing for the measurement of all three symptom clusters of PTSD according to the DSM-IV (APA, 1994). The construct validity and reliability of the Dutch version of the IES were acceptable across different traumatic experiences (van der Ploeg et al., 2004). Cronbach's α coefficients for the IES-plus total and subscale scores in the present sample ranged between.83 and.94. In addition to the absolute score on the complete scale, we also assessed the prevalence of heightened PSS levels according to the original IES scale using a cutoff value of 25, which is commonly used as an indicator of clinically relevant levels of PTSD symptomatology (Chemtob et al., 1997; Horowitz et al., 1993).

2.2.4. Attachment

The attachment orientations of anxiety and avoidance were assessed in October 2010 (T0) by applying the short version of the Dutch translation of the Experiences in Close Relationships-Revised scale (ECR-R; Conradi et al., 2006; Fraley et al., 2000), the Experiences in Close Relationship Scale - Short Form (ECR-S; Wei et al., 2007). Attachment anxiety, assessed by six items, such as "My desire to be very close sometimes scares people away", reflects the use of hyperactivating regulatory strategy, i.e., the person's fear of rejection or abandonment, excessive seeking for approval, and distress when attachment figure is unavailable. Another six items, e.g., "I want a close relationship with my partner, but I always withdraw myself", asses the use of deactivating regulatory strategy or attachment avoidance, i.e., fear of dependence, extreme need for self-reliance, and hesitancy to self-disclose. Responses are rated on a 7-point Likert scale ranging from 1 (disagree strongly) to 7 (agree strongly). Internal consistency for anxiety and avoidance subscales was $\alpha = .64$ and $\alpha = .78$, respectively. In order to test for the assumption that the low α-value for anxiety is due to the reduced number of items of the ECR-S in comparison to the original format of the ECR-R (6 vs. 18 items per subscale), we applied the Spearman-Brown correction formula resulting in α-values of. 84 and .91, respectively. The respective values reported by the validation studies from the original and Dutch ECR-R versions (Fairchild & Finney, 2006; Kooiman et al., 2013) range from.92 to.94.

2.3. Analyses

Statistical analyses were performed with IBM SPSS Statistics 28 and IBM SPSS Amos 28 Graphics. Bivariate associations between main study variables were tested by Pearson correlations calculated with AMOS in order to consider latent variables. The predictive value of attachment orientations at T0 for PTSD total and subscale scores at T1-T3 was assessed by latent growth curve analysis (LGCA). Based on structural equation modeling, LGCA estimates two latent variables, the intercept (value at first observation) and the slope (change factor) to predict empirical test scores as repeated over time (for an introduction see Burant, 2016). Here, the following two-step approach was applied. Firstly, unconditional LGCA models for PTSD total and subscale scores compared model fit when applying a linear, quadratic, and square root slope and tested if variances of the intercept and the slope were significant. Given that IES scores dropped mainly between T1 and T2 and only slightly between T2 and T3, a square root slope provided the best model fit and was applied throughout all models. Secondly, conditional models including both attachment dimensions as predictors of the intercept and the slope were constructed for PTSD total and subscale scores. This association was controlled for sociodemographic variables and pre-event psychopathology by including gender, age, and pre-event symptoms of anxiety and depression symptom levels as predictors into the models. While age and gender were entered as manifest variables, latent variables were built for attachment orientations as well as symptoms of anxiety and depression. For this, test halves of these three scales served as indicator variables. Both test halves of the MHI contained items reflecting symptoms of anxiety and depression. For measurement models of latent predictor variables see Fig. 1a.

In order to evaluate the relative contribution of insecure attachment orientations to the variance explained of intercept and slope in LGCA models, analyses were repeated excluding both ECRS subscales from predictor variables. In all conditional models, predictors were allowed to correlate. For the evaluation of model fit, Chi^2 test statistics were complemented by descriptive parameters evaluated according to Schermelleh-Engel et al. (2003).

3. Results

Descriptive statistics for clinical variables are presented in Table 2. Forty-six (17.0 %) panel members scored above the cut-off value for moderate to severe anxiety and depression symptom levels at T0. PTSD severity levels (total and subscale scores) declined from T1 to T3. Clinically relevant levels of posttraumatic stress severity at T1 to T3 were detected in 30.0 %, 21.9 %, and 17.4 % of

participants, respectively. As death of a significant other was the event type reported by the majority (71.9 %) of participants, we tested if this event type was related to the probability of a clinically relevant level of posttraumatic stress. There was no significant association between the presence of clinically elevated posttraumatic stress levels and the death of a close person at any time point (all $Chi^2 \leq 2.3$, all $p > .13$). Bivariate correlations of the main study variables can be found in Table 1 supplemental material.

[Figure 1]

3.1. Unconditional LGCA models

The decrease in all IES (sub-) scales was reflected by a negative mean slope value. The negative correlation between intercept and negative slope in unconditional models (range = - .52 to - .65) showed that individuals with higher symptom load experienced more symptom reduction over time. None of the four models for IES-plus total and subscale scores revealed statistically significant differences between model implied and empirical covariance structure (all Chi^2 (1) ≤ 0.567, all $p \geq .45$). Variances of intercept and slope were significant in all four models, with the exception of a non-significant slope variance ($p = .15$) for the IES hyperarousal subscale.

3.2. Conditional LGCA models

In the conditional model on IES-plus total score (Fig. 1a), all predictor variables significantly contributed to the variance explained ($R^2 = .30$) of the intercept. Higher age, female gender, higher pre-event attachment anxiety, lower pre-event attachment avoidance, and higher pre-event symptoms of anxiety and depression predicted higher posttraumatic stress severity at T1. Results furthermore show that higher pre-event symptoms of anxiety and depression and higher attachment anxiety are significantly associated with a larger decrease of IES-plus scores between T1 and T3 (slope; variance explained 11 %).

As for the prediction of IES-plus intrusion scores at T1 (intercept), all predictors significantly contributed to the variance explained (29 %) with the exception of attachment anxiety (beta =.17, $p = .065$; Fig. 1b). Attachment avoidance was negatively associated with the intercept (beta = - .25, $p < .01$). Higher pre-event symptoms of anxiety and depression were the only significant predictor of a larger decrease of scores between T1 and T3 (slope; $R^2 = .13$).

All predictors significantly contributed to the variance explained (26 %) of the intercept for IES-plus avoidance scores (Fig. 1c; as in both previous models, attachment avoidance was negatively related to the intercept). Higher attachment anxiety proved to be the only significant predictor of the slope (beta = - .30, $p < .05$) indicating that higher attachment anxiety levels are associated with a larger decrease of avoidance symptoms between T1 and T3 ($R^2 = .08$).

[Table 2]

Given the absence of significant variance of the slope of *IES-plus hyper-arousal* scores, only predictors of the intercept were tested by the last model. All predictors significantly contributed to the variance explained (16 %, Fig. 1d). As in all reported models, only attachment avoidance was negatively related to the intercept. The model fit for all four models was excellent.

To examine the unique contribution of attachment anxiety and avoidance, attachment anxiety and avoidance were excluded from the models. Results showed that the explained variance of the intercept without these variables dropped by 7.4 %, 4.7 %, 11.9 % and 2.4 % for IES-plus total, re-experiencing, avoidance, and hyper-arousal score, respectively. The respective numbers of the slope variable were 6.0 %, 2.6 %, and 7.3 % for IES-plus total score trajectory as well as IES reexperiencing and avoidance trajectories, respectively.

4. Discussion

This longitudinal study aimed to test the predictive value of pre-event attachment anxiety and attachment avoidance for the severity and remission of PTSD symptoms in a sample of the Dutch adult general population. In this section, the two hypotheses will be evaluated and methodological aspects of the study as well as implications of its findings will be discussed.

Our results are partially in line with the first hypothesis that pre-event insecure attachment orientations predict higher PTSD symptom severity assessed 18 months later. Attachment anxiety, assessed in October 2010, significantly predicted higher PTSD symptoms of avoidance, hyper-arousal, and PTSD total scores assessed in April 2012 related to events occurring in the previous 12 months. As for PTSD intrusion symptoms, this association did not reach statistical significance ($p = .065$). Importantly, these associations were controlled for sociodemographic variables and pre-event psychopathology. Thus, this study is the fourth prospective study (Ayers et al., 2014; MacDonald et al., 2008; Shallcross et al., 2014) showing that pre-event insecure attachment (here: anxious attachment orientation) is significantly associated with higher PTSD symptom levels at later stages.

The relation between pre-event attachment anxiety and PTSD symptoms may be explained by basic assumptions of attachment theory. Attachment theory assumes that negative self-attributions (negative IWM of self) cause worries that the attachment figures will not be available in times of need. If the traumatic event itself or its consequences as symptoms or functional impairment reinforce negative self-evaluations, the fear of abandonment (non-availability of the attachment figure) may increase. In consequence, individuals with high attachment anxiety may feel restricted in their possibilities to elaborate on the traumatic experience, as such a process might be accompanied by emotional and further reactions which supposedly could drive an attachment figure away.

However, in contradiction to our first hypothesis, attachment avoidance was negatively related to posttraumatic stress levels at T1. This association was significant in all models. Thus, individuals with a more negative IWM of other appear to develop fewer PTSD symptoms. This is in contradiction with the results from two previous prospective studies (Ayers et al., 2014; Shallcross et al., 2014) which found the negative IWM of other to be a risk rather than a protective factor for later posttraumatic stress symptoms. However, it may be plausible to explain these diverging findings by the differences in sample and event-related characteristics. As for Ayers et al.´s (2014) sample of becoming mothers, it can be speculated that the experience of a rewarding emotional relationship with the newborn baby may facilitate recovery from the traumatic experience of the complicated birth by giving meaning and purpose to the endured suffering. Contrarily, an avoidant/dismissing attachment style may counteract the mother-child relationship and thus have predicted the development of posttraumatic stress symptoms. As for the university sample of Shallcross et al. (2014), the most frequently reported worst events involved either a close other being unsupportive or, witnessing someone close to them being emotionally or psychologically mistreated. Such experiences might well reinforce negative IWM of other associated with deactivating strategies such as avoiding contact. This may then reduce the use of available social support which is a well-known protective factor for PTSD (van der Velden et al., 2020).

On the other hand, death of a significant other was the most frequently reported event type in our study. Mikulincer and Shaver (2003) assumed that the death of a significant other is a stronger trigger for a person with higher scores on attachment anxiety, which is related to higher dependence on others and increased hypervigilance to cues of danger and abandonment. Thus, it is plausible to assume that individuals who due to their attachment orientation avoid entering emotionally close relationships may experience interpersonal loss as less traumatic. This interpretation is in accordance with the finding that avoidant attachment orientation was not significantly related to intercept or slope in LGCA for anxiety, depression, grief, and PTSD in a study by Fraley and Bonanno (2004) of 59 bereaved adults. Furthermore, participants with an avoidant attachment orientation even proved to be as resilient as those with a secure attachment pattern (i.e., low values on both attachment anxiety

and avoidance), as opposed to participants with high values in attachment anxiety. Thus, it appears that the "'pseudo-safe' world of avoidant persons" (Mikulincer et al., 1999, p. 839) can serve as an effective defense against repeated suffering from negative relationship experiences, such as loss, yet at the cost of emotional distancing and unavailability.

In contradiction to our second hypothesis, insecure attachment orientations were not related to less symptom recovery over time. Attachment avoidance was not significantly related to the slope, while higher attachment anxiety was significantly negatively related to the slope in the models of PTSD avoidance and total scores and thus predicted more symptom reduction over time. This contradicts previous studies on which our second hypothesis was based (compare Franz et al., 2014; Mikulincer et al., 2015). However, these studies did not assess the influence of pre-event attachment anxiety on mental health at multiple post-event timepoints. This methodological difference is crucial as the finding that pre-event attachment anxiety – as well as pre-event symptoms of anxiety and depression – are negatively related to the slope, needs to be seen in light of the relation between initial PTSD symptoms at T1 (intercept) and their reduction over time (slope). The negative correlation between the intercept and the negative slope indicates that individuals with higher initial PTSD scores show a stronger reduction of PTSD symptoms over time. This phenomenon might be understood by the statistical phenomenon of regression to the mean. Given that individuals with higher attachment anxiety and symptoms of anxiety and depression have higher PTSD scores at T1, they also have a higher chance to show a greater decrease in PTSD scores over time.

It is remarkable that pre-event attachment anxiety and avoidance were significantly related to the intercept (posttraumatic stress severity at T1) in most models even though these models were controlled for sociodemographic and psychopathological markers. However, the consideration of statistical significance should be contrasted with the strength of other predictor variables as well as related effect sizes (variance explained). It needs to be emphasized that attachment anxiety and avoidance were among the weakest predictors in the models related to PTSD re-experiencing as well as hyperarousal symptoms. The contribution to the variance explained of the intercept by both variables was 7.4 % for IES-plus total score and ranged for the three subscales from 2.4 % to 11.9 %. For comparison, in the study by Shallcross et al. (2014) the variance explained for attachment anxiety and avoidance of PTSD symptoms was 11%, however, over a between-assessments interval of two months only. It appears that pre-event attachment orientations are only one piece of the puzzle in understanding the development of PTSD symptoms. One might therefore conclude that pre-event attachment insecurity would play only a minor role in the prediction of later PTE-related psychopathology. Yet, such a conclusion may be premature for two reasons. Firstly, the statistical potential of the ECRS-S to covary with other variables may have been reduced by their rather low reliability (internal consistency) which appears to be a consequence of the application of an extremely short instrument version. The application of a more reliable scale may thus result in stronger predictive values. Secondly, both insecure attachment styles and orientations are well-known predictors of other forms of psychopathology, for instance, symptoms of depression (Spruit et al., 2020). Thus, it would be plausible to expect indirect effects of insecure attachment orientations on posttraumatic stress severity via symptoms of anxiety and depression. However, given that attachment orientations and psychopathology were both assessed at T0, no one-directional pathways between these variables were included in the statistical models.

4.1. Strengths and limitations

To the best of our knowledge, this is the first study testing the predictive value of pre-event assessed attachment anxiety and avoidance for PTSD symptom severity and remission in a large sample of the adult general population. At the same time, sociodemographic variables, as well as pre-event psychopathology, were considered as control variables, and PTSD symptom severity was

assessed longitudinally over an eight-month period. Nevertheless, a range of methodological limitations needs to be considered for any interpretation of our results.

Although the LISS panel is based on a traditional probability sample drawn from the Dutch population register, we cannot claim representativeness for the present sample. This is due to the fact that only a minority of panel members completed all measures combined in the present analyses of which a further 68 % did not meet inclusion criteria, most of them related to PTE occurrence. Nevertheless, some variables closely resemble the Dutch population (e.g., gender: 50.7 % in our study vs. 50.3 % in the Dutch population of 2010 (Statistics Netherlands, 2010) and in the analyses gender and age were treated as control variables.

Ratings of pre-event attachment orientations as well as symptoms of anxiety and depression were obtained prior to the occurrence of the index PTE underlying PTSD severity assessments (T1–3). Given that lifetime trauma history was not assessed we cannot exclude that previous PTE may have had an impact on parameter values of attachment and anxiety/depression at T0. The aim of this study was, however, to test the impact of attachment orientations (independent variable) on posttraumatic stress (T1–3) following PTE occurring after the attachment assessment (T0), and not to explain participants' attachment orientations (as a dependent variable) based on their life histories. As data collection was completed before the introduction of DSM-5 (APA, 2013), PTSD symptoms were assessed by combining two versions of a questionnaire based on previous DSM versions. Also, with ECR-S and MHI, three very short (sub-) scales of 5–6 items were applied. As evident from the reduced internal consistency of the ECR-S subscales, the application of short rating scales can negatively impact reliability. Based on the presented results from the application of the Spearman-Brown correction formula, it can be concluded that the lower reliability was in fact caused by the reduced number of items of the short ECR version. The meaningful and significant associations between study variables support the assumption that assessment reliability was sufficiently high. Also, the way PTEs were assessed did not allow us to test the hypothesis that attachment orientations may play a specific role in the elaboration of man-made traumatic events as compared to non-man-made ones. Some of our results such as the association of attachment avoidance with lower PTSD severity at T1 may be specific to the most frequent event type in our sample (i.e., loss of a loved one) for which we cannot specify if the diagnostic requirement violent or accidental (APA, 2013) was met. There was, however, no significant association between this event type and the presence of elevated symptom levels at any time. Finally, it was outside the aims of this study to control the relationship between attachment orientations and posttraumatic stress symptoms for further personality factors as neuroticism which have been shown to correlate in the low-moderate range with attachment orientations as measured with the ECRS-R (e.g., Baryshnikov et al., 2017; Şengül-İnal et al., 2018).

5. Conclusions

Notwithstanding these limitations, our results are in accordance with further prospective studies and recent reviews emphasizing the significance of pre-event predictors of PTSD (Danese et al., 2017; DiGangi et al., 2013; Gradus et al., 2022; Scheeringa, 2021; van der Velden et al., 2022). In line with the mentioned previous prospective studies, our data provide evidence that attachment-related information may help identify individuals at higher risk for the development of posttraumatic stress symptoms. Further research should shed light on the mechanisms by which anxious attachment orientation is linked to the development of posttraumatic stress. Given that insecure attachment orientations can be effectively addressed by psychotherapy (Buchheim et al., 2017; Taylor et al., 2015), this offers additional treatment options for clinical work with trauma survivors.

Wittmann, L., Protić, S., Bosmans, M., Velden, P.G. van der. Pre-event attachment anxiety and avoidance predict posttraumatic stress symptom severity – Results from a longitudinal population-based study. Journal of Anxiety Disorders: 2024, art. nr. 102796

Funding

The LISS panel was set up with a grant from the Dutch Research Council (NWO). Maintenance costs are currently provided by the sector plan Social Sciences and Humanities and ODISSEI (https://odissei-data.nl/en/). The surveys on coping self-efficacy were part of a large research project on coping self-efficacy and trauma, granted by the Victim Support Fund (Fonds Slachtofferhulp 13.04.21), The Netherlands.

Declaration of Competing Interest

None.

Data availability

This study was conducted using the open access longitudinal LISS panel. The LISS Data Archive is free to browse. Researchers can download all anonymized archived datasets since 2007 for free after they signed the user statement (see https://www.dataarchive.lissdata.nl/).

Acknowledgments

None.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.janxdis.2023.102796.

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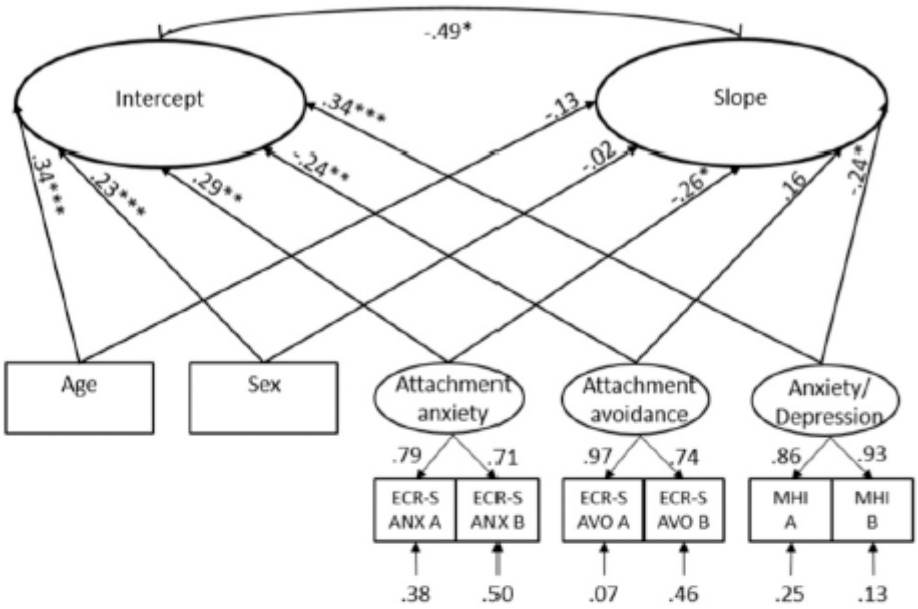
Tables and figures

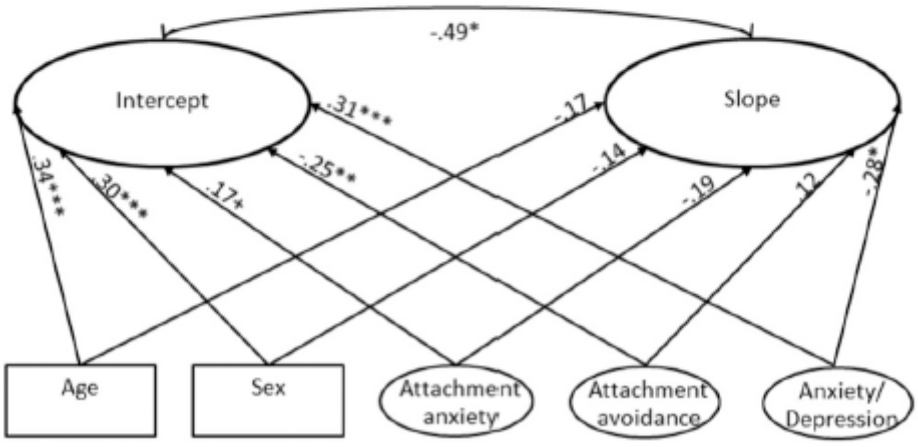
Table 1 Sociodemographic and event characteristics (n = 270).

	N / M	% / SD (Range)
Age (years)	52.8	14.9 (20–88)
Female gender	137	50.7
Civil status		
Married	169	62.6
Separated/Divorced	34	12.6
Widow/er	16	5.9
Never been married	51	18.9
Domestic situation		
Single (lives alone)	64	23.7
Cohabitation with child(ren)	88	32.6
Cohabitation without child(ren)	107	39.6
Single, with child(ren)	11	4.1
Urban character of place of residence		
Very-extremely urban	92	34.1
Slightly-moderately urban	141	52.3
Not urban	37	13.7
Primary occupation		
Paid employment	137	50.7
Retirement	64	23.7
Other	69	25.6
Education level (1 missing values)		
Primary	21	7.8
Secondary	100	37.0
Vocational	127	47.0
University	21	7.8
Dutch background (2 missing values)	239	88.5
Time since event (months)		
1–2	77	28.5
3–6	97	35.9
7–12	96	35.6
Type of event		
Serious threat	7	2.6
Physical violence	4	1.5
Robbery	2	0.7
Accident	14	5.2
Burglary	13	4.8
Serious infection/disease (self)	13	4.8
Serious infection/disease (significant other)	20	7.4
Death significant other	194	71.9
Suicide attempt significant other / suicide witnessed	3	1.1

Figure 1 Simplified conditional latent growth curve analysis models with attachment anxiety, attachment avoidance, gender, age, and symptoms of anxiety and depression as predictors (n = 270) a: Prediction of intercept and slope of IES-plus total scores including measurement models of latent predictor variables (Chi^2 (27) = 35.783; p = .12; Chi^2/df = 1.33; NFI = .967; CFI = .991; RMSEA = .035; AIC = 135.783; R^2 (Intercept) = .30; R^2 (Slope) = .11). Numbers on the vertical arrows below indicator variables represent measurement errors. b: Prediction of intercept and slope of IES intrusion scores (Chi^2 (27) = 28.284; p = .40; Chi^2/df = 1.05; NFI = .974; CFI = .999; RMSEA = .013; AIC = 128.284; R^2 (Intercept) = .29; R^2 (Slope) = .13)



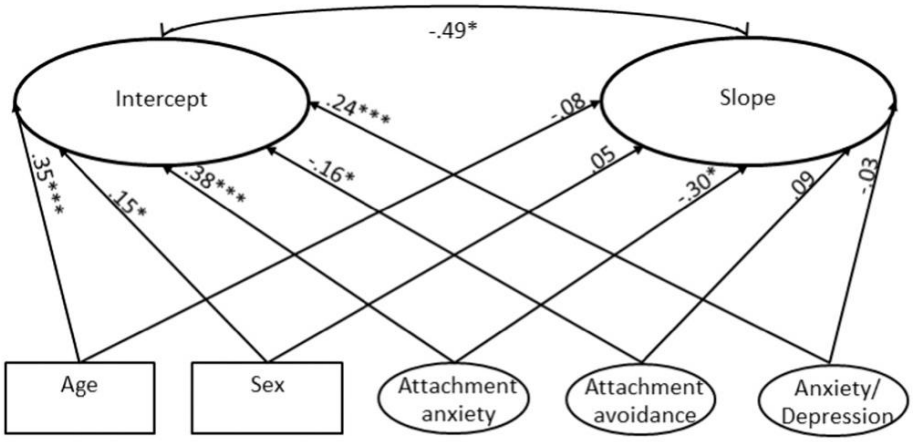
a



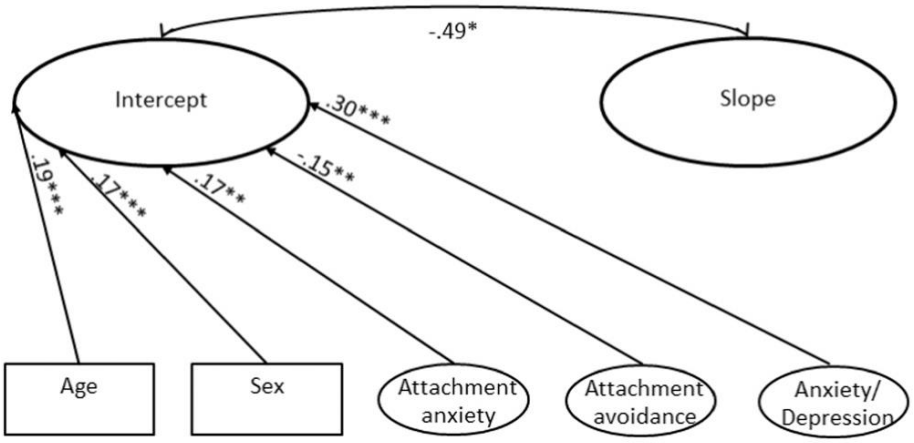
b

Figure 1 (continued)

*Simplified conditional latent growth curve analysis models with attachment anxiety, attachment avoidance, gender, age, and symptoms of anxiety and depression as predictors (n = 270) c: Prediction of intercept and slope of IES avoidance scores (Chi^2 (27) = 45.880; p = .01; Chi^2/ df = 1.70; NFI = .954; CFI = .980; RMSEA = .051; AIC = 145,880; R^2 (Intercept) = .26; R^2 (Slope) = .08) d: Prediction of intercept of IES hyper-arousal scores (Chi^2 (32) = 48.779; p = .03; Chi^2/df = 1.52; NFI = .949; CFI = .981; RMSEA = .044; AIC = 138.779; R^2 (Intercept) = .16) Note: Numbers on one-directional arrows represent standardized regression weights. Numbers on bi-directional arrows represent correlation coefficients. Correlations between intercept and slope refer to the correlation between their residuals not explained by the two predictors. Correlations between predictor variables are not shown. Gender was coded 0 = male, 1 = female. ECR-S ANX A/B: test halves (each 3 items) of the Experiences in Close Relationship Scale - Short Form Attachment Anxiety subscale; ECR-S AVO A/B: test halves (each 3 items) of the Experiences in Close Relationship Scale - Short Form Attachment Avoidance subscale; MHI A/B: test halves (each 2–3 items) of the Mental Health Inventory.+ = p < .1; * = p < .05; * * = p < .01; * ** = p < .001.*



c



d

Table 2 Clinical sample characteristics (n = 270).

Variable	Assessment time point	M	SD	Min	Max
IES-plus total score	04/2012	21.3	20.4	0	79
	08/2012	15.8	18.2	0	95
	12/2012	14.1	18.4	0	91
IES-plus intrusion score	04/2012	10.8	9.4	0	35
	08/2012	7.8	8.7	0	35
	12/2012	6.8	8.3	0	35
IES-plus avoidance score	04/2012	6.4	7.1	0	36
	08/2012	5.1	6.8	0	38
	12/2012	4.7	7.1	0	38
IES-plus hyperarousal score	04/2012	4.1	6.0	0	30
	08/2012	2.9	5.0	0	24
	12/2012	2.6	4.7	0	26
ECR-S attachment anxiety	10/2010	18.2	6.1	6	38
ECR-S attachment avoidance	10/2010	14.8	6.4	6	42
MHI	11–12/2010	74.1	16.3	12	100

Note: ECR-S = Experiences in Close Relationship Scale - Short Form; IES-plus = Impact of Event Scale Plus; MHI = Mental Health Inventory