



# Associations Between Interpersonal Trauma and Intolerance of Uncertainty in an International Multi-Site Sample

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## Abstract

Prior psychologically traumatic experiences have been linked to increased risk for mental health conditions. However, there remain questions about the relationship between prior interpersonal trauma, particularly that of neglect and abuse, and transdiagnostic dimensions such as intolerance of uncertainty (IU: the tendency to find uncertainty aversive). To address this gap, we conducted a secondary analysis of survey data from an international multi-site sample ( $n=2510$ ). Questionnaires included: Interpersonal trauma by type (e.g. emotional neglect, physical abuse, psychological abuse, sexual abuse) and IU. The findings revealed that: (1) experiencing different forms of interpersonal trauma was associated with higher IU, and (2) experiencing multiple forms of neglect and abuse was associated with higher IU. When comparing across the interpersonal trauma types and IU, emotional neglect compared to the other types of abuse, was specifically related to higher IU. These effects remained when controlling for broader negative beliefs about the self and others. However, the observed relationships and overall amount of variance explained by IU was rather small. Overall, these findings demonstrate that interpersonal trauma, particularly emotional neglect, is associated with IU. Future longitudinal research is required to examine if, how, and when after adversity, higher IU may emerge.

**Keywords** Trauma History · Emotional Neglect · Psychological Abuse · Physical Abuse · Sexual Abuse · Intolerance of Uncertainty · Questionnaire

## Introduction

Intolerance of uncertainty (IU) has been defined as ‘an individual’s dispositional incapacity to endure the aversive response triggered by the perceived absence of salient, key, or sufficient information, and sustained by the associated perception of uncertainty’ (Carleton, 2016, p. 31). Empirical research has demonstrated that during situations with uncertainty, individuals with higher self-reported IU are more likely to feel threatened and unsafe (Cupid et al., 2021; Peperdine et al., 2018), experience negative emotions such as anxiety and frustration (Morriss et al., 2023), and display greater physiological arousal (Tanovic et al., 2018). IU is a transdiagnostic dimension that confers risk for and maintenance of many different mental health conditions such as anxiety-, stress-, mood-, and schizophrenia-spectrum conditions (Gentes & Ruscio, 2011; Mahoney & McEvoy, 2012; McEvoy & Mahoney, 2011, 2012; Morriss et al., 2024).

There is increasing interest in how risk factors for mental health conditions such as adversity and psychologically

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traumatic experiences (Hogg et al., 2023; McLaughlin & Lambert, 2017; Schimmenti, 2018) relate to IU (Boelen, 2019; Dirican et al., 2023; Hayward et al., 2020; Nickerson et al., 2023). The majority of previous research on this topic has focused on how higher IU may increase risk for and maintenance of post-traumatic stress disorder symptoms (e.g. reexperiencing, hypervigilance, and heightened arousal). For instance, several studies have demonstrated that individuals with higher IU are at greater risk for developing post-traumatic stress disorder symptoms following stressful life experiences (e.g. confrontation with violence, traffic accidents) (Boelen, 2019; Oglesby et al., 2016). Additionally, a handful of studies have shown that IU may maintain post-traumatic stress disorder symptoms after a range of different types of psychologically traumatic events (e.g. forced migration, exposure to war and conflict, other mental health concerns such as psychosis) (Badawi et al., 2022; Fetzner et al., 2013; Hollingsworth et al., 2018; Hunt et al., 2022; Nickerson et al., 2023; Raines et al., 2019; White & Gumley, 2009).

Only a few studies to date have examined how interpersonal traumatic experiences such as neglect and abuse in childhood may contribute to the development of IU (Dirican et al., 2023; Hayward et al., 2020). In young adults, Dirican et al. (2023) found that greater experiences of emotional abuse was associated with higher IU, whereas greater experiences of physical and sexual abuse were not related to IU (Dirican et al., 2023). In another study in adults, Hayward et al. (2020) found that higher IU mediated the relationship between greater early adversity (measured via the risky families and childhood trauma questionnaires) and current psychopathology. Despite this progress, several questions remain on how interpersonal trauma such as neglect and abuse, are associated with IU. Based on the limited existing evidence, it is unclear whether a particular type of interpersonal trauma is related to IU, or whether the number of different types of interpersonal trauma experienced relate to the severity of IU. Secondly, it is unknown whether these relationships between interpersonal trauma and IU are specific, over and above other broader negative affective traits (e.g. negative beliefs about the self and others), which have been associated with interpersonal trauma (Brown et al., 2019; Kouvelis & Kangas, 2021). Addressing these questions is important to establish how experiences of early adversity may shape individual differences in IU, and how this relates to psychological mechanisms within transdiagnostic models of psychopathology (McLaughlin & Lambert, 2017). For example, in McLaughlin & Lambert's (2017) model, childhood trauma is posited as a transdiagnostic construct which underlies change in three different transdiagnostic mechanisms: social information processing, emotion processing (i.e. emotional learning, elevated emotional reactivity, and

emotion regulation difficulties), and accelerated biological ageing. There is substantial overlap between two of these transdiagnostic mechanisms, social information processing and emotion processing, with IU (for review see, Carleton, 2016; Morriss et al., 2021; Tanovic et al., 2018). Research has identified that higher IU is specifically associated with negative interpretation biases for unpredictable social stimuli (Nishikawa et al., 2022; Vives & FeldmanHall, 2018; Wake et al., 2021), alterations in emotional learning (for review see Morriss et al., 2021), heightened emotional reactivity (see special issue, Morriss et al., 2023a, b) and emotion regulation difficulties (for meta-analysis see Sahib et al., 2023). Therefore, it is possible that early adversity may contribute to the development of IU, which in turn increases risk for alterations in social information processing and emotion processing mechanisms that underpin psychopathology.

To date, only two studies have examined relationships between interpersonal trauma and IU (Dirican et al., 2023; Hayward et al., 2020) and to extend this literature, we conducted a secondary analysis of survey data from five international sites with the following variables: four different types of interpersonal trauma (emotional neglect, psychological abuse, physical abuse, and sexual abuse), IU, negative beliefs about self and others. We explored whether: (1) different experiences of interpersonal trauma would relate to higher IU and (2) the number of different types of interpersonal trauma experienced would be associated with higher IU. In the absence of previous research examining the specificity of the relationship between interpersonal trauma and IU (Dirican et al., 2023; Hayward et al., 2020), we also explored whether any relationships between interpersonal trauma and IU were unique, over and above negative beliefs about the self and others. These control variables are appropriate, given that prior research has established relationships between interpersonal trauma and negative beliefs about the self and others (Brown et al., 2019; Kouvelis & Kangas, 2021).

## Method

### Design

The study consisted of an online survey, where participants were recruited from five international sites (Australia; Germany; Hong Kong; United Kingdom; United States). The following variables were measured: experience of interpersonal trauma by type (emotional neglect, physical abuse, psychological abuse, sexual abuse), intolerance of uncertainty, negative beliefs about self; negative beliefs about others.

## Participants

Participants were recruited from Qualtrics using stratified quota sampling. The samples from each site were representative of the general population at each site based on sex assigned at birth, age, and educational attainment. A total of 2510 participants met quota and quality assurance conditions (see Procedure). The number of participants per site was: Australia ( $n=502$ ); Germany ( $n=516$ ); Hong Kong ( $n=445$ ); United Kingdom ( $n=512$ ); United States ( $n=535$ ). Participant demographics across sites: Age ( $M=43.3$  years;  $SD=15.7$ , range 18–89 years), sex assigned at birth (female:  $n=1323$ , 52.7%; male:  $n=1186$ , 47.3%), educational attainment (primary up to age 11 ( $n=47$ , 1.9%), secondary up to age 16 ( $n=615$ , 24.5%), further education up to age 18 ( $n=774$ , 30.8%), bachelor's degree ( $n=786$ , 31.3%), Master's degree ( $n=250$ , 10%), PhD ( $n=38$ , 1.5%). Ethical approval was obtained from each of the five host sites.

The study is a secondary analysis of an existing dataset, thus no a priori power analysis was undertaken.

## Questionnaires

Participants completed questionnaires in their native language (i.e. English, German or Chinese). The German and Hong Kong sites used either published translations of questionnaires, or questionnaires that were translated (and back-translated into English by independent researchers) for use in the current study. Participants completed the following questionnaires:

*Experiences of interpersonal trauma.* The four independent questions were developed in prior survey studies (Jansen et al., 2004; Jaya et al., 2017). The questions were used to assess whether participants had experienced any of the following most commonly reported interpersonal trauma types (for example see Bernstein et al., 2003):

1. Did you ever experience any kind of *emotional neglect*? (This means for example that people at home didn't listen to you, that your problems were ignored, that you had the feeling of not being able to find any attention or support from people in your house).
2. Did you ever experience any kind of *psychological abuse*? (This means for example: being sworn at, lesser treatment compared to brothers or sisters, unjustified punishment, blackmail)
3. Did you ever experience any kind of *physical abuse*? (That is, were you beaten, kicked, punched or did you experience any other kind of physical abuse? )
4. Were you ever approached *sexually* against your will? (This means: have you ever been touched sexually by

anyone against your will or were you forced to touch anybody, were you pressured into sexual contact against your will? )

Participants were asked to indicate 'yes' (coded as 1) or 'no' (coded as 0) to each of these questions. Additionally, the number of 'yes' responses were summed to create a trauma index, with higher scores indicating a greater number of different types of interpersonal trauma (min 0, max=4).

*The Intolerance of Uncertainty Scale – 12 items* (IU, (Carleton et al., 2007) consists of 12-items which are rated on a 5-point scale of 1 'not at all typical of me' to 5 'very typical of me' (range 12–60). In the current sample, the Cronbach's alpha was excellent for total IU ( $\alpha=0.93$ ).

*The Brief Core Schema Scales* (BCSS, (Fowler et al., 2006) consists of 24 items which are rated on a 5-point scale (0–4), and contains four subscales, all with six items each: negative beliefs about self, negative beliefs about others, positive beliefs about self and positive beliefs about others. For the purpose of this study, only the two negative subscales were used and Cronbach's alpha for each subscale was excellent ( $>0.85$ ).

## Procedure

Participants were recruited using the Qualtrics recruitment panel, with stratified quota sampling at each site based on age, sex and educational attainment. Participants took part online and completed informed consent and the questionnaires via the Qualtrics survey platform. Participants were reimbursed for their time and effort directly by Qualtrics. To prevent missing data, participants were required to respond to all questions on each page before progressing through the survey. To enhance the accuracy of the data, participants had to correctly respond to five attention checks that were equally distributed through the survey. Participants were excluded if they did not consent to their data being used, dropped out without completing all measures, took less than half of the median completion time, had a geographical location that did not correspond with the stated location, and if they did not fulfil the other stratified quota conditions. Based on these criteria and conditions, 3555 participants were excluded at source by Qualtrics.

## Data Analysis Plan

Statistical analyses were conducted in SPSS 29.0 (SPSS, Inc; Chicago, Illinois). Firstly, descriptive statistics were conducted to assess distributions of trauma history, IU, and negative beliefs about the self and others. Secondly, correlations were conducted to examine relationships between the interpersonal trauma types, trauma index, IU and negative

**Table 1** Summary of correlations

	1	2	3	4	5	6	7	8
<b>1. Emotional Neglect</b>	-							
<b>2. Psychological Abuse</b>	0.56**	-						
<b>3. Physical Abuse</b>	0.38**	0.52**	-					
<b>4. Sexual Abuse</b>	0.31**	0.39**	0.37**	-				
<b>5. Trauma Index</b>	-	-	-	-	-			
<b>6. IU</b>	0.26**	0.25**	0.19**	0.17**	0.29**	-		
<b>7. Negative Beliefs About Self</b>	0.36**	0.34**	0.27**	0.22**	0.40**	0.21**	-	
<b>8. Negative Beliefs About Others</b>	0.23**	0.28**	0.26**	0.18**	0.32**	0.34**	0.48**	-

Note: constructs were measured using the four independent questions for the trauma experiences (emotional neglect, psychological abuse, physical abuse, and sexual abuse) and trauma index (number of experiencing different forms of trauma), the IU-12 (IU) and BCSS (negative beliefs about self and others). \*  $p < .01$ ; \*\*  $p < .001$

**Table 2** Summary of partial correlations between the interpersonal trauma types, trauma index, and IU, controlling for negative beliefs about the self and others

	Emotional Neglect	Psychological Abuse	Physical Abuse	Sexual Abuse	Trauma Index
<b>IU</b>	0.12**	0.10**	0.06**	0.07**	0.13**

Note: constructs were measured using the four independent questions for the trauma experiences (emotional neglect, psychological abuse, physical abuse, and sexual abuse) and trauma index (number of experiencing different forms of trauma), the IU-12 (IU) and BCSS (negative beliefs about self and others). \*  $p < .01$ ; \*\*  $p < .001$

beliefs about the self and others. Thirdly, partial correlations were conducted to assess specificity of each interpersonal trauma type and IU, when controlling for negative beliefs about self and others. Fourthly, a hierarchical regression was conducted to assess whether a particular interpersonal trauma type was associated with IU, over and above the others interpersonal trauma types.

In step 1 of the regression analyses, negative beliefs about the self and other were entered as the independent variables and IU was entered as the dependent variable. In step 2, all of the interpersonal trauma types were entered as the independent variables. The significance of the beta weights was examined to address specificity of interpersonal trauma type with IU.

Please see the supplementary material of the hierarchical regression with the following demographic factors included (e.g. international site, sex assigned at birth, and educational attainment).

## Results

### Descriptive Statistics

*Interpersonal trauma by type:* Prevalence in the sample: emotional neglect ( $n = 1077$ , 42.9%), psychological abuse ( $n = 898$ , 35.8%), physical abuse ( $n = 682$ , 27.2%), and sexual abuse ( $n = 619$ , 24.7%).

*Trauma index:* Prevalence of the number of different types of interpersonal trauma experienced per individual: 0 ( $n = 1064$ , 42.4%), 1 ( $n = 468$ , 18.6%), 2, ( $n = 392$ , 15.6%), 3 ( $n = 309$ , 12.3%), 4 ( $n = 274$ , 10.9%).

*IU:* The distribution was typical for community samples ( $M = 33.80$ ,  $SD = 11.06$ , range 12–60).

*Negative beliefs about the self and others:* The distributions of the subscales were typical for community samples (Negative beliefs about self:  $M = 3.51$ ,  $SD = 5.17$ , range 0–24; Negative beliefs about others:  $M = 5.13$ ,  $SD = 6.32$ , range 0–24).

### Correlations

Table 1 displays the correlations between all of the variables of interest. All of the interpersonal trauma types were significantly positively correlated with each other,  $ps < 0.001$ . Each interpersonal trauma type (emotional neglect, psychological abuse, physical abuse, and sexual abuse) and the trauma index was significantly positively correlated with IU,  $ps < 0.001$ . A similar pattern of results was observed for the relationships between each of the interpersonal trauma types and the trauma index, with negative beliefs about the self and others,  $ps < 0.001$ . IU was also significantly positively correlated with the negative beliefs about the self and others,  $ps < 0.001$ .

### Partial Correlations

Table 2 shows the partial correlations between the interpersonal trauma types, trauma index, and IU, controlling for negative beliefs about the self and others. The partial correlations revealed that each of the interpersonal trauma types and the trauma index were significantly positively correlated with IU, even when controlling for negative beliefs about the self and others.

## Hierarchical Regression

Table 3 provides a summary of the statistics from the hierarchical regression analysis. The hierarchical regression revealed that experiencing emotional neglect was specifically related to higher IU, over and above the other types of interpersonal trauma, negative beliefs about self, and negative beliefs about others:  $p < .001$  (see Table 3). In the hierarchical regression, IU was not specifically related to any of the other types of interpersonal trauma,  $ps > 0.05$  (see Table 3).

## Discussion

We examined relationships between interpersonal trauma and IU in a representative general population adult sample across five international sites. We were interested in whether the type and frequency of different interpersonal traumas was related to the severity of IU, over and above other broader negative beliefs about the self and others, to determine the specificity of effects. We observed: (1) that experiencing different forms (e.g. emotional neglect, psychological abuse, physical abuse, and sexual abuse) of interpersonal trauma was associated with higher IU, and (2) that greater frequency of experiencing different forms of interpersonal trauma was associated with higher IU. When comparing across the interpersonal trauma types and IU, emotional neglect compared to the other types of abuse, was specifically related to higher IU. All of these effects remained when controlling for broader negative beliefs about the self and others, which have been commonly associated with interpersonal trauma (Brown et al., 2019; Kouvelis & Kangas, 2021).

The study revealed two key findings about the type of interpersonal trauma experienced and the frequency of different types of interpersonal trauma experienced. Firstly, experiencing different forms of interpersonal trauma (emotional neglect, psychological abuse, physical abuse, sexual

abuse) was associated with higher IU. Secondly, greater frequency of experiencing different forms of interpersonal trauma was related to higher IU. The relationship between frequency of different types of interpersonal trauma and IU was linear, with those who had experienced the most different types of interpersonal trauma having the highest mean IU scores (see supplementary Fig. 1). These findings are in line with a previous study that measured childhood adversity more broadly (i.e. used the risky families and childhood trauma questionnaires) and found that it was associated with individual differences in IU (Hayward et al., 2020). The relationship between the cumulation of interpersonal trauma and IU supports contemporary transdiagnostic models of psychopathology in which childhood trauma is proposed to underlie change in transdiagnostic mechanisms including social-information and emotion processing (McLaughlin & Lambert, 2017), which clearly overlap with IU (for review see, Carleton, 2016; Tanovic et al., 2018). Future research is needed to determine whether the severity and frequency of trauma, and diversity of exposure to different trauma types, predicts higher IU, and in turn risk for psychopathology (see Hogg et al., 2023).

The observed unique relationship between emotional neglect and IU, is consistent with previous research in young adults (Dirican et al., 2023). In particular, Dirican et al. (2023) found that greater experiences of emotional abuse) was specifically associated with higher IU, when controlling for experiences of physical and sexual abuse, and age. The reason that IU is specifically related to emotional neglect, but not psychological, physical, or sexual abuse is not entirely clear. However, we can speculate that acts of emotional neglect may be ambiguous in their presentation and cause, compared to other forms of interpersonal trauma, as the central feature of emotional neglect is the absence of care, whereas with the other forms of interpersonal trauma there is direct harm. Thus, when faced with emotional neglect, individuals may develop an aversion and a motivation to resolve the uncertainty, hence higher IU.

**Table 3** Summary of hierarchical regression analysis

Predictors	IU					
	$R^2$	$F$	$DF$	$\Delta R^2$	$\beta$	95% CI
<b>Step 1.</b>	0.19**	308.5	2, 2504			
Negative beliefs about self					0.31**	[0.59, 0.76]
Negative beliefs about others					0.19**	[0.26, 0.41]
<b>Step 2.</b>		12.31	4, 2500	0.016**		
Negative beliefs about self					0.26**	[0.48, 0.66]
Negative beliefs about others					0.17**	[0.23, 0.38]
Emotional Neglect					0.09**	[1.04, 2.99]
Psychological Abuse					0.04	[-0.15, 2.02]
Physical Abuse					0.006	[-0.90, 1.21]
Sexual Abuse					0.03	[-0.16, 1.83]

Note: constructs were measured using the four independent questions for the trauma experiences (emotional neglect, psychological abuse, physical abuse, and sexual abuse), the IU-12 (IU) and BCSS (negative beliefs about self and others). \*  $p < .01$ ; \*\*  $p < .001$

Relatedly, children who experience trauma, including emotional abuse, often present with insecure attachment styles (e.g., ambivalent and avoidant) to primary caregivers in childhood (Riggs, 2019), which has shown to contribute to uncertainty when building relationships in adulthood (Liem & Boudewyn, 1999; Riggs & Kaminski, 2019). Future studies may further explore the influence of emotional abuse in the context of early life attachment on IU, given that insecure attachment styles have been associated with the development of IU in adult life (Zdebik et al., 2018). Overall, prior research suggests that exposure to emotional abuse/neglect may be a pathway to the development of higher IU, which in turn might confer greater risk for the development and maintenance of psychopathology symptoms across mental health conditions, but particularly anxiety-related conditions (e.g. emotional neglect is associated with greater diagnosis of anxiety-related conditions, see Hogg et al., 2023). Although, this would need to be established in future longitudinal research.

We also demonstrated the specificity of the interpersonal trauma and IU relationships by controlling for both negative beliefs about self and others, as well as key demographic factors (see supplementary material). This is important as it sheds light on how risk factors for mental health conditions such as adversity and psychologically traumatic experiences (Hogg et al., 2023; McLaughlin & Lambert, 2017; Schimmenti, 2018) specifically relate to IU. These findings sit alongside recent research demonstrating the specificity of IU as a risk factor for both developing and maintaining psychopathology symptoms (particularly post-traumatic stress disorder symptoms) following stressful life experiences (Boelen, 2019; Oglesby et al., 2016). Taken together, this body of research highlights that higher IU may emerge as an adaptive feature in response to or during periods of trauma, to keep the individual safe, although in the long-term higher IU may present challenges for mental health. Promisingly, clinical research has shown that IU is malleable, such that current evidence-based therapeutic interventions are able to reduce IU (for meta-analysis see, Miller & McGuire, 2023). Future experimental research is needed to identify the conditions under which high IU may emerge and determine whether interventions that specifically target IU might reduce psychopathology symptoms across a range of mental health conditions.

There are several limitations of the study that warrant consideration. Firstly, the effect sizes from the partial correlations of the trauma index and different interpersonal trauma types were small (0.06-0.13), and the change in  $r$  squared from the regression with emotional neglect indicates that less than 2% of variance in IU was explained when incorporating the other trauma types into the model. Therefore, the findings need to be interpreted with caution, with regards to

the importance of interpersonal trauma experiences and IU. Secondly, we cannot rule out that the lack of specific relationships between psychological/physical/sexual abuse with IU may be due to lower variability of these types of interpersonal trauma within the sample. Thirdly, we only used four questions to measure interpersonal trauma, and although these were based on previous studies (Janssen et al., 2004; Jaya et al., 2017), further research would benefit from using established, psychometric measures of trauma, that can examine the frequency and intensity of past interpersonal trauma, such as the Childhood Trauma Questionnaire (Bernstein et al., 2003) or the Trauma History Questionnaire (Hooper et al., 2011). In future research it will be important to examine whether the specificity of this relationship still exists after controlling for other negative affective traits (e.g. higher-order such as neuroticism; lower-order such as anxiety sensitivity). Lastly, although nationally representative general population adults were recruited across the five international sites, the cross-sectional design limits any conclusions around causality, and the findings may not generalise to different clinical populations. Future research might usefully test the trauma/IU relationship in a range of mental health conditions, including people with anxiety-, stress-, mood- and schizophrenia-spectrum conditions.

In conclusion, our findings suggest that experiences of interpersonal trauma across a variety of categories and the frequency of experiencing different forms of interpersonal trauma is related to IU. Furthermore, emotional neglect is specifically associated with higher IU, over and above other interpersonal trauma types. Future longitudinal research is required to examine if, how, and when after adversity, higher IU may emerge.

**Supplementary Information** The online version contains supplementary material available at <https://doi.org/10.1007/s10608-024-10552-3>.

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## Declarations

**Ethics Approval** Ethical approval was obtained from all five study sites and informed consent to take part in the research was obtained for all study participants.

**Conflicts of Interest** All authors confirm there are no financial or non-financial conflicts of interest to declare.

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