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Longitudinal associations between five factor model and impulsive personality traits and PTSD symptoms: Findings from the AURORA study

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ABSTRACT

We used data from the Advancing Understanding of Recovery after Trauma (AURORA) study to investigate prospective links between five factor model and impulsive personality traits and PTSD symptoms at baseline (N = 2943), three-months post-trauma (N = 2400), and one-year post-trauma (N = 1591) in individuals recruited from emergency departments within 72 h of trauma exposure. Neuroticism and Negative Urgency bore the largest relations ($rs > 0.30$) to nearly all individual PTSD symptoms and symptom total at all time points. Neuroticism was an incremental predictor of every PTSD symptom at each time point. Low Agreeableness and low Conscientiousness were incremental predictors of several PTSD symptoms. These findings highlight personality assessment as an efficient, effective screening tool for PTSD risk.

1. Introduction

Posttraumatic stress disorder (PTSD) involves trauma exposure followed by symptoms across four clusters, including re-experiencing of the traumatic event, avoidance of threat-related stimuli, negative alterations in cognitions and mood, and alterations in arousal and reactivity (American Psychiatric Association [APA], 2013). Among adults in the United States, 60 % of men and 50 % of women experience at least one lifetime Criterion A trauma (e.g., exposure to death, threatened death, or serious injury); however, only about 7–8 % of the United States population will develop PTSD at some point in their lives (Kessler et al., 1995). Given this discrepancy, investigating the factors that contribute to PTSD risk following trauma exposure has been an active area of research. Several risk factors have been identified as associated with the development of PTSD symptoms, including genetic variation (Smoller et al., 2019), female sex (Breslau & Anthony, 2007), lower cognitive ability (Brislin et al., 2022), increased levels of negative affect (Kotov et al., 2010), and lower socioeconomic status (DiGangi et al., 2013; Peverill et al., 2021). Given that PTSD and other trauma and stressor-related disorders are unique among psychiatric conditions in that symptoms are postulated to be directly linked to an event (i.e., Criterion A trauma), identifying risk factors can aid in efforts to screen trauma survivors and identify those in need of early intervention services to prevent the development of this disorder.

1.1. Personality factors

Personality traits are defined as characteristic patterns of emotion, thought, motivation, and behavior exhibited over time. There is long-standing interest in the consideration of individual differences as important factors in the development of psychological distress and impairment following trauma exposure. For example, as early as the 1910s, the Woodworth Psychoneurotic Inventory (WPI) was published (Woodworth, 1919). Originally developed during World War I as a measure of emotional stability among soldiers, the WPI was trialed for risk assessment of "shell shock," a colloquial term used to describe the psychological symptoms exhibited by soldiers after witnessing war (Gibby & Zickar, 2008).

The widely researched Five Factor Model (FFM; McCrae & Costa, 1987) comprises the traits Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness. FFM traits bear large cross-sectional and longitudinal relations to a range of important outcomes (e.g., Beck & Jackson, 2022; Ozer & Benet-Martínez, 2006; Soto, 2019) and mental health symptoms (Waszczuk et al., 2022; Widiger et al., 2018). High Neuroticism (i.e., tendency to experience negative emotions) and, to a lesser extent, low Conscientiousness (i.e., tendency toward a unmotivated, irresponsible, disorganized approach to tasks) and low Extraversion (i.e., tendency toward interpersonal disaffiliation and submissiveness), are associated with indices of internalizing psychopathology like anxiety and depression (Hakulinen et al., 2015; Kampman et al., 2017; Kotov et al., 2010). Low Agreeableness (i.e., tendency

toward exploitativeness and conflict) and, to a lesser extent, low Conscientiousness, are associated with externalizing psychopathology such as aggression and antisocial behavior (e.g., Vize et al., 2019).

A review conducted by Miller (2003) identified high Neuroticism, low Extraversion, and low Conscientiousness as the FFM traits most robustly associated with PTSD across studies. DiGangi and colleagues (2013) conducted a review of prospective longitudinal studies of PTSD and pre-trauma risk factors; for 14 studies of personality and longitudinal PTSD risk, Neuroticism and closely related trait variables (e.g., Negative Affect) were generally predictive of PTSD symptom development at subsequent time points. While these studies have many strengths, there are several limitations worth noting, including limited assessment of personality variables (i.e., only a single variable), use of total PTSD symptom score (instead of individual symptoms), and in some cases, assessment of PTSD symptoms years after the index trauma. Although analyses of symptoms across this extended time frame are valuable, it precludes a more nuanced understanding of PTSD-personality trait relations in the more proximal aftermath of a trauma.

Maples-Keller and colleagues (2021) addressed several of the shortcomings by examining relations between PTSD symptom clusters and the five pathological personality traits in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5) Alternate Model of Personality Disorders (APA, 2013), a pathological variant of the FFM (Sleep et al., 2018). This study cross-sectionally examines a sample of African American women with high rates of trauma exposure and prospectively examines a sample of trauma center patients at 3-month and 6-month following a Criterion A trauma exposure. The study authors found that Negative Affectivity (AMPD analog of high FFM Neuroticism) and Psychoticism (AMPD analog of high Openness) had the strongest associations with PTSD both cross-sectionally and prospectively (Maples-Keller et al., 2021). This finding is consistent with retrospective research on World Trade Center responders that identified Negative Affect, Detachment (AMPD analog of low Extraversion), Psychoticism as the strongest predictors of PTSD symptoms and associated functional impairment (Waszczuk et al., 2018).

Impulsive personality traits have also been linked to PTSD. For example, a cohort study conducted by Blonigen et al. (2012) in a population of female prisoners showed impulsivity and irresponsibility scores had moderative positive associations with PTSD symptom scores, moderated by borderline personality disorder traits. The UPPS (Urgency, Premeditation, Perseverance, Sensation-Seeking) model of impulsivity (Whiteside & Lynam, 2001) decomposes impulsivity into four interrelated aspects of impulsive behavior, including Negative Urgency (i.e., the tendency to behave impulsively when experiencing acute negative emotions), lack of Premeditation, lack of Perseverance, and Sensation-Seeking, with a fifth factor of Positive Urgency added subsequently (Cyders et al., 2007). The original UPPS model was developed to reflect components of the FFM, such that each UPPS trait represents a facet of an FFM domain. Specifically, Negative Urgency reflects the impulsiveness facet of Neuroticism, lack of Premeditation and lack of Perseverance reflect the low deliberation and low self-discipline facets of Conscientiousness, and Sensation-Seeking reflects the excitement seeking facet of Extraversion. This model has provided a framework for investigating differential links between personality traits and psychopathology (e.g., Berg et al., 2015; Bresin, 2019) including PTSD. PTSD symptom clusters tend to bear the largest cross-sectional associations with Negative Urgency (Contractor et al., 2018; Roley et al., 2017), with less consistent but generally positive associations between PTSD symptoms and lack of Perseverance and Sensation-Seeking (Contractor et al., 2016, 2017). Negative Urgency has been characterized by high Neuroticism, low Conscientiousness, and low Agreeableness (Settles et al., 2012), and thus the association between Negative Urgency and PTSD symptom clusters is consistent with previously identified associations between Neuroticism, low Conscientiousness (Miller, 2003), and Negative Affect (Maples-Keller et al., 2021) and PTSD symptoms.

Table 1
Sample demographic characteristics at each time point.

	Baseline	Three months	One year
N	2943	2400	1591
Age (mean, SD)	35.90 (13.29)	36.91 (13.53)	38.01 (13.54)
Gender (*N*, %)			
Male	1120 (38.0 %)	880 (36.7 %)	568 (35.7 %)
Female	1815 (61.7 %)	1517 (63.2 %)	1018 (64.0 %)
Transgender	4 (0.1 %)	2 (0.1 %)	3 (0.2 %)
Other	3 (0.1 %)	1 (0 %)	1 (0.1 %)
Missing	1 (0.1 %)	0 (0 %)	1 (0.1 %)
Race/ethnicity (N, %)			
Hispanic	342 (11.6 %)	255 (10.6 %)	166 (10.4 %)
Non-Hispanic White	1020 (34.6 %)	817 (34.0 %)	567 (35.6 %)
Non-Hispanic Black	1458 (49.5 %)	1226 (51.1 %)	790 (49.7 %)
Non-Hispanic Other	111 (3.8 %)	91 (3.8 %)	61 (3.8 %)
Missing	13 (0.4 %)	11 (0.5 %)	7 (0.4 %)

1.2. The current study

In this investigation, we aimed to advance the field by examining longitudinal links between PTSD symptoms and general FFM traits and impulsive traits from the UPPS model. In addition to replicating previous work (e.g., Maples-Keller et al., 2021), this study provides several notable advancements. First, we examined associations between personality and development of PTSD symptoms in one of the largest studies to date on trauma symptoms assessed shortly after and longitudinally following a traumatic event ($N = 2943$). Second, we examined individual PTSD symptoms, rather than solely PTSD total score. This distinction is important given the heterogeneity of PTSD symptoms, which bear differential relations to other indices of psychopathology (e.g., Contractor et al., 2018; Price & Van Stolk-Cooke, 2015) and span physiological (e.g., startle response), affective (e.g., irritability), cognitive (e.g., intrusive memories), and behavioral (e.g., avoidance) indices. Third, we expanded beyond the FFM by examining longitudinal relations between UPPS impulsive personality traits and PTSD symptoms. Fourth, the measurement timepoints allowed us to track progression of PTSD symptoms from baseline to three-months post-trauma to one-year post-trauma. While the baseline PTSD symptoms were not gathered until participants presented to the emergency department immediately post-trauma, the temporal proximity of this report to acute posttraumatic functioning is notable, as most current studies either rely on retrospective report months or even years post-trauma or lack baseline data. Finally, as an additional exploratory analysis, we compared PTSD relations exhibited by several operationalizations of Neuroticism from separate assessment tools to investigate the generalizability of these relations across measures and scale lengths.

2. Methods

2.1. Participants

Participants were 18–74 years old upon enrollment in this study. At the baseline, responses from $N = 2943$[1] were collected. The sample reduced to $N = 2400$ at the three-month time point, and then $N = 1591$[2] at the one-year time point. Demographic information for the samples at each time point is available in Table 1.

[1] The total collected sample size was $N = 2,944$, however the data from one participant was removed for missing responses on all items of the PCL-5 at baseline.

[2] Including 77 participants who were missing at month three but provided one-year data.

2.2. Procedure

Participants were recruited from 19 sites across the United States as part of the Advancing Understanding of Recovery after Trauma (AURORA) study (McLean et al., 2020).[3] The AURORA study was a longitudinal study that aims to understand psychopathology following an acute trauma exposure. This large-scale, multi-site study included neurocognitive, physiological, digital phenotyping, neuroimaging, and genomic assessments with a goal of informing risk models and informing development of preventive and treatment interventions; the present study described in this report focused on personality traits and PTSD using self-report data. In the current wave of data collection, $N = 22{,}814$ potential participants were approached, and $N = 4558$ of these participants were considered eligible based on their medical records and completed screening. A total of $N = 2943$ participants ultimately enrolled in the study and completed assessments at least through week 8 of the study.

Enrollment for AURORA began September 25, 2017, and assessments were completed prior to June 30, 2021. For the purpose of this study, DSM-IV criterion A was used in order to define a traumatic event (APA, 2000). In accordance with this definition, participants were asked if the acute traumatic event they had just experienced and for which they were seeking care in the emergency department was an event for which they had thought they (or a family member or friend) would be killed or seriously injured. Trauma types sustained by participants in the current sample included motor vehicle collision (74.5 %), physical assault (9.2 %), sexual assault (0.6 %), fall from at least 10 feet (1.7 %), non-motorized collision (1.8 %), fall from less than 10 feet or unknown height (5.5 %), poisoning (0.1 %), burns (0.5 %), animal-related (2.1 %), and other (3.9 %).

Participants were eligible if they (i) presented to the emergency department within 72 h of a traumatic event, (ii) thought they (or a family member or friend) would be killed or seriously injured during the acute traumatic event, (iii) were able to use a smart phone and had possessed a smart phone for over one year, and (iv) they were alert, oriented, and able to provide informed consent and complete enrollment protocols. They were excluded if they (i) could not read or write in English, (ii) experienced an occupational injury or domestic violence as part of the acute traumatic event, (iii) they were in police custody, (iv) they lacked access to email, or (v) they refused to provide their social security number.

While in the emergency department, written informed consent was received from participants prior to interviewer-administered assessment with both self-report questions and biological sample collection. Two-week, eight-week, three-month, six-month, and one-year web-based surveys were sent by text or e-mail for self-completion or through telephone-assisted interview. Participants were reimbursed $60 for the emergency department assessment and $40 for each follow-up. Procedures were approved by each participating site's institutional review board, and all data were HIPAA-consistent.

2.3. Measures

FFM personality traits. FFM personality traits were measured by the Ten Item Personality Inventory (TIPI; Gosling et al., 2003). A recent study by Sleep and colleagues (2021) suggests that despite the brevity of the TIPI, this measure tends to bear positive correlations with substantially longer measures (e.g., 60- to 120-items) in the $r = 0.65$ to 0.88 range. FFM personality data was collected and analyzed at two-weeks post-trauma. The domains Emotional Stability (inter-item $|r| = 0.28$), Extraversion (inter-item $|r| = 0.06$), Openness (inter-item $|r| = 0.09$), Agreeableness (inter-item $|r| = 0.06$), and Conscientiousness (inter-item $|r| = 0.16$) were measured on a seven-point Likert scale (i.e., 1 = strongly disagree to 7 = strongly agree) with two items (one positively worded and one negatively worded) each.[4] Scores were computed by calculating the mean of constituent items following reverse scoring of the negatively worded item. In the present study, the Emotional Stability items were coded to reflect Neuroticism (i.e., low Emotional Stability) by reverse coding the positively worded item instead. Additionally, Neuroticism was also measured at two-weeks post-trauma using the Big Five Inventory (BFI; John & Srivastava, 1999) subscale. Specifically, BFI Neuroticism was calculated as the mean of eight items rated on six-point Likert scale (i.e., 1 = strongly disagree to 6 = strongly agree). This score was calculated as a mean score of the 8 constituent items, following reverse scoring of negatively keyed items ($\alpha = 0.68$) and used in supplemental analyses. TIPI Neuroticism and BFI Neuroticism were correlated at $r = 0.76$. Descriptive statistics for all FFM and UPPS personality traits and PTSD symptoms at each time point are presented in Supplemental Table 1.

Impulsive personality traits. A modified version of the UPPS-P-Short Form (UPPS-P-SF; Cyders et al., 2014) was used to measure impulsive personality traits on a 5-point Likert scale (i.e., 1 = Never to 5 = Very Often) including Negative Urgency (inter-item $r = 0.75$), (lack of) Premeditation (inter-item $r = 0.64$), (lack of) Perseverance (inter-item $r = 0.35$), and Positive Urgency (inter-item $r = 0.71$). In the modified version of the questionnaire, two items were used to assess each subscale, and scores were calculated as a sum of the constituent items. Items assessing the Sensation Seeking subscale were not administered. The UPPS-P-SF was administered at two-weeks. Bivariate correlations between the UPPS-P traits and TIPI FFM traits are presented in Supplemental Table 2.

PTSD symptoms. The 20 individual PTSD symptoms identified by *DSM*-5 (APA, 2013) were measured by the PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2015) immediately following trauma to index PTSD symptoms prior to the traumatic event (i.e., baseline), and then again at two-weeks, eight-weeks, three-months, six-months, and one-year post-trauma using a 4-point Likert scale (i.e., 0 = Not at All to 4 = Extremely). When assessing baseline data, participants were asked to reference their experiences from the 30 days preceding the current trauma. For the three-month and one-year time points, participants were asked to reference their experiences from the previous 30 days. Given the need for efficient screening due to data collection around time of a traumatic event and medical care, skip logic was used at baseline administration. For the present study, items skipped in this manner were recoded as '0'. PTSD symptom data for the current project included data collected at baseline, three months post-trauma, and one-year post-trauma. Finally, consistent with scoring recommendations for this measure, we also computed a PTSD total score for each time point by summing the scores on the 20 constituent PTSD symptoms.

2.4. Pre-registration and missing data approach

Analyses for the current project were pre-registered (https://osf.io/zbe32/). The only notable deviation is our approach to missing data, and we forewent the pre-registered approach of listwise deletion. Given the high rate of attrition ($N = 2943$ to $N = 1591$ over 12 months; attrition rate = 46 %), it appeared unlikely that the data met the required MCAR (missing completely at random) assumption for complete case analysis. Thus, full-information maximum likelihood (FIML) procedures were employed to reduce the impact of bias on parameter estimates and retain statistical power. To enable FIML estimation, all analyses described above (i.e., correlations and linear regression) were

[3] AURORA data is available in the NIMH data archive.

[4] Of note, these relatively low reliability values are generally consistent with those found in a systematic review of the psychometric properties of the TIPI (see Thørrisen & Sadeghi, 2023). Moreover, our authorship team worked closely with the AURORA study team to ensure all data was accurately coded and managed.

Table 2
Bivariate correlations between FFM traits and PTSD symptoms.

	Neuroticism			Extraversion			Openness			Agreeableness			Conscientiousness		
PTSD Symptom	*Pre-*	*3m*	*12m*	*Pre-*	*3m*	*12m*	*Pre-*	*3m*	*12m*	*Pre-*	*3m*	*12m*	*Pre-*	*3m*	*12m*
B1/Intrusive Memories	**.27**	**.24**	.19	−.06	−.05	−.03	−.05	−.06	−.06	−.12	−.10	−.06	−.11	−.12	−.09
B2/Nightmares	**.26**	**.27**	**.23**	−.06	−.06	−.04	−.07	−.13	−.10	−.15	−.15	−.17	−.14	−.15	−.14
B3/Flashbacks	**.26**	**.28**	**.23**	−.07	−.07	−.05	−.11	−.12	−.11	−.18	−.19	−.16	−.17	−.18	−.16
B4/Cued Distress	**.30**	**.28**	**.27**	−.07	−.06	−.06	−.09	−.09	−.09	−.15	−.15	−.12	−.16	−.12	−.14
B5/Physio. Distress	**.31**	**.28**	**.25**	−.08	−.08	−.03	−.09	−.12	−.09	−.17	−.17	−.14	**−.20**	−.16	−.13
C1/Internal Avoidance	**.27**	**.26**	**.24**	−.09	−.07	−.05	−.08	−.08	−.10	−.13	−.13	−.13	−.15	−.12	−.14
C2/External Avoidance	**.30**	**.25**	**.24**	−.09	−.06	−.05	−.08	−.06	−.09	−.16	−.11	−.12	−.17	−.12	−.14
D1/Inability to Remember	**.22**	**.24**	**.22**	−.07	−.05	−.02	−.07	−.13	−.14	−.13	−.15	−.14	−.15	−.15	−.16
D2/Negative Beliefs	**.31**	**.35**	**.30**	−.10	−.11	−.07	−.07	−.14	−.12	**−.20**	**−.24**	−.19	−.19	**−.24**	**−.21**
D3/Distorted Cognitions	**.27**	**.30**	**.24**	−.07	−.08	−.03	−.08	−.13	−.11	−.15	−.19	−.14	−.17	**−.20**	−.14
D4/Neg. Emotional State	**.34**	**.34**	**.29**	−.07	−.09	−.08	−.10	−.12	−.10	−.18	−.18	−.16	−.19	**−.21**	−.18
D5/Reduced Interest in Activities	**.30**	**.31**	**.26**	−.10	−.09	−.05	−.15	−.13	−.08	−.19	−.18	−.12	**−.21**	−.19	−.16
D6/Detachment	**.29**	**.34**	**.28**	−.10	−.09	−.07	−.09	−.12	−.08	−.19	**−.23**	−.15	−.17	**−.21**	−.18
D7/ Inability to Experience Pos. Emotions	**.32**	**.37**	**.29**	−.14	−.10	−.08	−.12	−.15	−.14	**−.22**	**−.25**	**−.21**	**−.21**	**−.23**	**−.20**
E1/Irritability	**.33**	**.35**	**.31**	−.05	−.07	−.09	−.13	−.11	−.12	**−.25**	**−.23**	−.19	−.18	−.18	−.17
E2/Recklessness	.19	**.25**	**.21**	−.03	−.06	−.01	−.10	−.15	−.12	**−.21**	**−.24**	**−.21**	−.19	−.19	−.19
E3/Hypervigilance	**.24**	**.24**	**.22**	−.05	−.08	−.09	−.07	−.12	−.09	−.14	−.15	−.11	−.12	−.14	−.11
E4/Exaggerated Startle	**.31**	**.30**	**.27**	−.07	−.07	−.06	−.13	−.15	−.13	−.16	−.18	−.13	**−.20**	−.19	−.15
E5/Concentration Prob.	**.33**	**.34**	**.30**	−.06	−.06	−.04	−.12	−.15	−.14	**−.20**	**−.20**	−.14	**−.20**	**−.22**	−.19
E6/Sleep Disturbance	**.29**	**.25**	**.21**	−.05	−.04	−.05	−.09	−.12	−.08	−.14	−.15	−.07	−.16	−.13	−.10
Total PTSD Symptoms	**.33**	**.36**	**.32**	−.14	−.10	−.06	−.13	−.15	−.13	**−.20**	**−.22**	−.18	**−.22**	**−.20**	**−.20**

Note. Correlations ≥ |.20| are **bolded**; pre- = PTSD symptoms reported for the two-week period prior to the index trauma; 3 m = symptoms reported three months after the index trauma; 12 m = symptoms reported 12 months after the index trauma; *B*=re-experiencing of the traumatic event; *C*=avoidance of threat-related stimuli; *D*=negative alterations in cognitions and mood; *E*=alterations in arousal and reactivity.

conducted in a structural equation modeling (SEM) framework using *lavaan* (Version 0.6–15; Rosseel, 2012), R (Version 4.3.2; R Core Team, 2023)[5] and RStudio (Version 2023.09.1 + 494; Posit Team, 2023). Analytic code and results of analyses using listwise deletion are available on OSF (https://osf.io/zbe32/).

2.5. Analytic plan

First, we computed Pearson's correlations between FFM personality traits and PTSD symptoms at three time points: baseline (i.e., measured in the immediate aftermath of the index trauma), 3-months post-index trauma, and one-year post-trauma. We repeated these analyses for UPPS-P personality traits and PTSD symptoms for the same time points. Additionally, we conducted supplementary (i.e. not pre-registered) analyses computing bivariate correlations between PTSD symptoms and four operationalizations of Neuroticism: total TIPI Neuroticism score (i.e., the same two-item operationalization used in the primary analyses), each of the two single items from the TIPI that comprise the total TIPI Neuroticism score, and the total Neuroticism score from the BFI. We used effect size to guide interpretation (rather than statistical significance) based on the standards proposed by Funder and Ozer (2019) – i.e., $r = 0.05$, very small; $r = 0.10$, small; $r = 0.20$, medium; $r = 0.30$, large; $r = 0.40$, very large. Given the parameters of $N = 1591$ to 2493, power = 90 %, and alpha = 0.05, post-hoc sensitivity power analyses indicate that the current study was 90 % powered to detect effect sizes of $r = 0.06$–0.08 or greater (Lakens, 2022). The current sample sizes are also well above the minimum threshold empirically shown to produce stable correlation coefficients (Schönbrodt & Perugini, 2013).

Second, we computed a series of regression models using FFM personality traits as simultaneous predictors of PTSD symptoms. We ran 42 regression models – 21 PTSD variables (i.e., 20 symptoms + PTSD total score) * two time points (three-months and one-year post-trauma). We implemented a Benjamini-Hochberg Procedure (BHP) to control False Discovery Rate (FDR), and we considered each of these two time points to be a family of tests. For each family of tests, we used a BHP to determine statistical significance with a 5 % FDR (i.e., $p = 0.05$) to correct for 105 tests at each time point – five predictors * 21 PTSD variables. Finally, as an additional exploratory analysis not included in pre-registration, we ran two additional regression models where we controlled for baseline PTSD while using the FFM traits as predictors of PTSD at the three-months post-index-trauma and one-year post-index-trauma timepoints. We used $p < 0.005$ to determine the statistical significance of the predictors in these exploratory models. For each regression model, we present unstandardized and standardized beta values, standard errors, and p values from the z-test[6] for the statistical significance of each predictor.

3. Results

3.1. Bivariate relations

Five factor model. Bivariate relations between the baseline FFM traits and individual PTSD symptoms and total PTSD score at each of the three timepoints (baseline, three-month post-index trauma, one-year post-index trauma) are shown in Table 2. FFM personality trait relations with total PTSD score tended to be larger than those with individual PTSD symptoms. FFM-PTSD relations were of similar magnitude at baseline and the three-month timepoint, and somewhat smaller at one-year timepoint. Neuroticism exhibited medium-to-large, positive associations with nearly every PTSD symptom and total PTSD score at each timepoint. The largest relations observed in terms of absolute magnitude were Neuroticism's relations to total PTSD at each time point (rs = 0.32–0.36), and Neuroticism's associations with inability to experience positive emotions ($r = 0.37$), irritability ($r = 0.35$), and negative beliefs ($r = 0.35$) at the three-month timepoint. In fact, in nearly every case, Neuroticism bore the largest relation in terms of absolute magnitude to every PTSD symptom and total PTSD at every time point. The exception to this trend was the negative association between Agreeableness and recklessness at the baseline timepoint ($r = -0.21$)

[5] The following packages were employed in addition to base R and *lavaan*: *foreign* (Version 0.8–85; R Core Team, 2023), *psych* (Version 2.3.6; Revelle, 2023), and *tidyverse* (Version 2.0.0, Wickham et al., 2019).

[6] The pre-registration stated that t and p values would be reported; however, *lavaan* employs z-tests for significance of predictors.

Table 3
Bivariate correlations between UPPS-P traits and PTSD symptoms.

	Negative Urgency			(Lack of) Premeditation			(Lack of) Perseverance			Positive Urgency		
PTSD Symptom	*Pre-*	*3m*	*12m*	*Pre-*	*3m*	*12m*	*Pre-*	*3m*	*12m*	*Pre-*	*3m*	*12m*
B1/Intrusive Memories	**.25**	**.36**	**.30**	−.15	**−.28**	**−.22**	**−.21**	**−.35**	**−.28**	**.24**	**.33**	**.26**
B2/Nightmares	**.28**	**.37**	**.34**	−.14	**−.25**	**−.21**	**−.20**	**−.30**	**−.27**	**.30**	**.35**	**.33**
B3/Flashbacks	**.33**	**.41**	**.38**	−.17	**−.25**	**−.20**	**−.20**	**−.32**	**−.25**	**.35**	**.41**	**.37**
B4/Cued Distress	**.31**	**.40**	**.36**	−.18	**−.31**	**−.20**	**−.21**	**−.37**	**−.28**	**.29**	**.36**	**.34**
B5/Physio. Distress	**.33**	**.39**	**.33**	−.15	**−.28**	**−.20**	**−.20**	**−.31**	**−.27**	**.32**	**.38**	**.33**
C1/Internal Avoidance	**.29**	**.37**	**.37**	−.17	**−.28**	**−.24**	**−.22**	**−.34**	**−.29**	**.26**	**.33**	**.34**
C2/External Avoidance	**.31**	**.38**	**.35**	−.17	**−.31**	**−.22**	**−.20**	**−.35**	**−.28**	**.29**	**.34**	**.33**
D1/Inability to Remember	**.25**	**.35**	**.34**	−.14	**−.23**	−.18	−.18	**−.26**	**−.24**	**.26**	**.34**	**.32**
D2/Negative Beliefs	**.33**	**.45**	**.41**	−.13	**−.24**	−.18	**−.20**	**−.31**	**−.27**	**.29**	**.41**	**.37**
D3/Distorted Cognitions	**.32**	**.41**	**.38**	−.13	**−.24**	−.19	−.17	**−.31**	**−.29**	**.27**	**.37**	**.34**
D4/Neg. Emotional State	**.36**	**.44**	**.41**	−.18	**−.27**	**−.23**	**−.22**	**−.35**	**−.32**	**.33**	**.38**	**.35**
D5/Reduced Interest in Activities	**.34**	**.42**	**.38**	−.15	**−.26**	**−.20**	−.19	**−.33**	**−.29**	**.33**	**.36**	**.33**
D6/Detachment	**.32**	**.47**	**.38**	−.18	**−.26**	**−.20**	**−.21**	**−.34**	**−.29**	**.33**	**.39**	**.33**
D7/Inability to Experience Pos. Emotions	**.34**	**.47**	**.41**	−.13	**−.26**	−.19	**−.20**	**−.33**	**−.30**	**.35**	**.43**	**.38**
E1/Irritability	**.35**	**.48**	**.41**	−.12	**−.25**	−.19	−.18	**−.36**	**−.29**	**.32**	**.42**	**.37**
E2/Recklessness	**.27**	**.41**	**.41**	−.08	−.19	−.16	−.13	**−.21**	**−.21**	**.30**	**.43**	**.42**
E3/Hypervigilance	**.28**	**.35**	**.34**	−.19	**−.31**	**−.27**	**−.20**	**−.32**	**−.28**	**.29**	**.36**	**.32**
E4/Exaggerated Startle	**.33**	**.41**	**.40**	−.16	**−.29**	**−.25**	**−.20**	**−.32**	**−.29**	**.32**	**.39**	**.38**
E5/Concentration Prob.	**.30**	**.41**	**.39**	−.15	**−.27**	**−.24**	**−.21**	**−.36**	**−.33**	**.31**	**.36**	**.33**
E6/Sleep Disturbance	**.30**	**.35**	**.32**	−.16	**−.26**	**−.25**	**−.22**	**−.32**	**−.31**	**.28**	**.30**	**.27**
Total PTSD Symptoms	**.41**	**.51**	**.47**	−.17	**−.33**	**−.27**	**−.24**	**−.41**	**−.35**	**.39**	**.46**	**.43**

Note. Correlations ≥ |.20| are **bolded**; pre- = PTSD symptoms reported for the two-week period prior to the index trauma; 3 m = symptoms reported three months after the index trauma; 12 m = symptoms reported 12 months after the index trauma; *B* = re-experiencing of the traumatic event; *C* = avoidance of threat-related stimuli; *D* = negative alterations in cognitions and mood; *E* = alterations in arousal and reactivity.

which was larger than the Neuroticism-recklessness association at the baseline timepoint (r = 0.19). Agreeableness and Conscientiousness generally exhibited small-to-medium, negative relations with the detachment, inability to experience positive emotions, irritability, recklessness, negative beliefs, negative emotional state, and concentration problems across timepoints. Most of the other FFM-PTSD relations were null-to-small in magnitude.

Impulsivity. Bivariate relations between the UPPS traits and individual PTSD symptoms and total PTSD score at each of the three timepoints (baseline, three-months post-index trauma, one-year post-index trauma) are provided in Table 3. Relations between the UPPS traits and total PTSD score tended to be larger than relations with individual PTSD symptoms, and UPPS-PTSD relations were generally larger at the three-month timepoint than the baseline or one-year timepoint. In general, Negative Urgency bore the largest relations to the PTSD variables and (lack of) Premeditation bore the (relatively) smallest relations, but each of the four UPPS scales bore positive relations to PTSD symptoms that in many cases were large-to-very large in magnitude. The largest relations observed in terms of absolute magnitude were between Negative Urgency and total PTSD at the three-month and one-year timepoints (rs = 0.51 and 0.47, respectively), followed by Negative Urgency's associations with irritability (r = 0.48), inability to experience positive emotions (r = 0.47), and detachment (r = 0.47) at the three-month timepoint.

Comparing measures of neuroticism. Results of the analyses examining correlations between four operationalizations of Neuroticism (i.e., TIPI Neuroticism, TIPI Item #1 ["Anxious, Easily Upset"], TIPI Item #2 ["Calm, Emotionally Stable"], BFI Neuroticism) and PTSD symptoms can be found in Supplemental Table 3. Consistent with the findings above, Neuroticism-PTSD relationships were uniformly positive, Neuroticism's relations with total PTSD score tended to be larger with individual PTSD symptoms, and Neuroticism-PTSD relations were generally larger at the three-month timepoint than the baseline or one-year timepoint. BFI Neuroticism generally bore the largest relations to PTSD symptoms and TIPI Item #2 generally bore the smallest relations to PTSD symptoms, but even these smallest relations were small-to-medium in magnitude.

3.2. Multiple regression models

Results of the multiple regression analyses of FFM traits predicting PTSD symptoms at the three-month timepoint are displayed in Table 4. Neuroticism was a statistically significant, positive incremental predictor of every PTSD symptom and total PTSD at the three-month timepoint (β range = 0.16–0.30). Agreeableness was a significant, negative predictor of total PTSD, flashbacks, detachment, inability to experience positive emotions, irritability, recklessness, and negative beliefs (β range = −0.06 to −0.13). Conscientiousness was a significant, negative predictor of all negative alterations in cognitions and mood symptoms except inability to remember, as well as irritability, exaggerated startle, and concentration problems (β range = −0.06 to −0.10). Openness was a significant, positive predictor of irritability (β = 0.06).

Results of the multiple regression analyses of FFM traits predicting PTSD symptoms at the one-year timepoint are in Table 5. As with the three-month timepoint analyses, Neuroticism was a significant, positive incremental predictor of every PTSD symptom and total PTSD at this timepoint (β range = 0.12–0.27). Agreeableness was a significant, negative predictor of nightmares, inability to experience positive emotions, and recklessness (β range = −0.08 to −0.12), and Conscientiousness was a significant, negative predictor of total PTSD, flashbacks, negative beliefs, negative emotional state, detachment, inability to experience positive emotions, recklessness, and concentration problems (β range = −0.07 to −0.10).

Finally, results of the two exploratory regression models where we controlled for baseline PTSD can be found in Supplemental Tables 4 and 5. In the model predicting total PTSD at the three-month timepoint, both baseline PTSD (β = 0.29) and Neuroticism (β = 0.22) were statistically significant predictors. Similarly, both baseline PTSD (β = 0.24) and Neuroticism (β = 0.21) were statistically significant predictors of one-year timepoint.

3.3. Analyses without FIML

Supplemental Tables 6 through 12 present analyses that were not corrected for data missingness, consistent with the pre-registered analytic strategy. In general, results were extremely similar across the two

Table 4
Regression models using FFM traits predicting PTSD symptoms at 3 months post-index trauma (FIML).

	Neuroticism			Extraversion			Openness			Agreeableness			Conscientiousness		
Symptom (R^2)	B (SE)	β	*p*	B (SE)	β	*p*	B (SE)	β	*p*	B (SE)	β	*p*	B (SE)	β	*p*
B1 (.06)	**.18 (.02)**	**.24**	**<.001**	.00 (.02)	.00	.888	.03 (.02)	.03	.237	.00 (.02)	.00	.983	−.03 (.02)	−.04	.212
B2 (.07)	**.17 (.02)**	**.23**	**<.001**	.00 (.02)	.00	.974	−.02 (.02)	−.02	.539	−.03 (.02)	−.03	.327	−.03 (.02)	−.04	.210
B3 (.09)	**.17 (.02)**	**.23**	**<.001**	−.01 (.02)	−.01	.770	.01 (.02)	.01	.834	**−.06 (.02)**	**−.06**	**.020**	−.04 (.02)	−.05	.063
B4 (.08)	**.20 (.02)**	**.26**	**<.001**	−.01 (.02)	−.01	.800	.01 (.02)	.02	.644	−.03 (.02)	−.04	.237	.00 (.02)	.00	.933
B5 (.08)	**.19 (.02)**	**.24**	**<.001**	−.02 (.02)	−.02	.507	.00 (.02)	.00	.983	−.04 (.02)	−.05	.127	−.03 (.02)	−.04	.238
C1 (.07)	**.19 (.02)**	**.24**	**<.001**	−.02 (.02)	−.02	.385	.02 (.02)	.03	.427	−.02 (.02)	−.02	.510	−.02 (.02)	−.02	.554
C2 (.06)	**.18 (.02)**	**.25**	**<.001**	−.01 (.02)	−.02	.539	.04 (.02)	.05	.129	−.01 (.02)	−.01	.816	−.02 (.02)	−.02	.465
D1 (.06)	**.15 (.02)**	**.20**	**<.001**	.00 (.02)	.00	.973	−.03 (.02)	−.04	.210	−.03 (.02)	−.03	.330	−.03 (.02)	−.04	.210
D2 (.14)	**.21 (.02)**	**.27**	**<.001**	−.04 (.02)	−.04	.085	.04 (.02)	.05	.123	**−.09 (.02)**	**−.10**	**<.001**	**−.08 (.02)**	**−.10**	**<.001**
D3 (.10)	**.19 (.02)**	**.24**	**<.001**	−.01 (.02)	−.02	.588	.01 (.02)	.01	.869	−.05 (.02)	−.05	.067	**−.06 (.02)**	**−.07**	**.007**
D4 (.12)	**.24 (.02)**	**.30**	**<.001**	−.02 (.02)	−.03	.305	.04 (.02)	.04	.181	−.03 (.02)	−.03	.239	**−.07 (.02)**	**−.08**	**.004**
D5 (.11)	**.22 (.02)**	**.27**	**<.001**	−.02 (.02)	−.03	.351	.02 (.02)	.02	.589	−.05 (.02)	−.05	.112	**−.05 (.02)**	**−.06**	**.037**
D6 (.13)	**.24 (.02)**	**.29**	**<.001**	−.03 (.02)	−.03	.237	.05 (.02)	.06	.059	**−.09 (.02)**	**−.10**	**<.001**	**−.06 (.02)**	**−.07**	**.010**
D7 (.15)	**.24 (.02)**	**.30**	**<.001**	−.03 (.02)	−.03	.210	.03 (.02)	.04	.238	**−.09 (.02)**	**−.10**	**<.001**	**−.06 (.02)**	**−.08**	**.004**
E1 (.13)	**.24 (.02)**	**.30**	**<.001**	.00 (.02)	−.01	.869	**.05 (.02)**	**.06**	**.041**	**−.10 (.02)**	**−.10**	**<.001**	−.03 (.02)	−.04	.181
E2 (.09)	**.12 (.02)**	**.16**	**<.001**	−.01 (.02)	−.01	.802	.00 (.02)	.00	.913	**−.12 (.02)**	**−.13**	**<.001**	**−.06 (.02)**	**−.07**	**.012**
E3 (.06)	**.17 (.02)**	**.19**	**<.001**	−.04 (.02)	−.04	.196	−.02 (.03)	−.02	.636	−.05 (.03)	−.04	.150	−.03 (.02)	−.03	.327
E4 (.10)	**.21 (.02)**	**.25**	**<.001**	−.01 (.02)	−.01	.869	−.02 (.02)	−.02	.588	−.04 (.02)	−.04	.206	**−.06 (.02)**	**−.07**	**.012**
E5 (.12)	**.24 (.02)**	**.29**	**<.001**	.01 (.02)	.01	.688	.00 (.02)	.00	.944	−.05 (.02)	−.05	.098	**−.07 (.02)**	**−.08**	**.004**
E6 (.06)	**.20 (.02)**	**.22**	**<.001**	.02 (.02)	.02	.539	−.02 (.03)	−.03	.539	−.04 (.03)	−.04	.196	−.02 (.02)	−.02	.539
Total (.14)	**3.71 (.31)**	**.30**	**<.001**	−.30 (.30)	−.02	.449	.15 (.38)	.00	.802	**−1.14 (.38)**	**−.08**	**.007**	−.74 (.34)	−.05	.073

Note. Reported *p*-values are adjusted using Benjamini-Hochberg Procedure (105 tests, α = .05); *B*=re-experiencing of the traumatic event; *C*=avoidance of threat-related stimuli; *D*=negative alterations in cognitions and mood; *E*=alterations in arousal and reactivity.

approaches. As in the FIML analyses, Neuroticism and Negative Urgency were the strongest, positive predictors of total PTSD and individual PTSD symptoms across time points, with Agreeableness and Conscientiousness showing smaller, negative relations to specific symptoms such as irritability, recklessness, and inability to experience positive emotions.

4. Discussion

In this study, we examined longitudinal links between PTSD symptoms and FFM and UPPS personality traits in a sample of $N = 2943$ participants recruited from emergency departments within 72 h of a Criterion A trauma exposure. Several key patterns are worth noting. First, across personality models, PTSD-personality relations were significantly larger at the three-month post-trauma time point than the baseline and one-year post-trauma time points. Studies have shown approximately 95 % of individuals experience some PTSD symptomology in immediate wake of a traumatic event, and differentiation between PTSD and natural recovery is thought to occur around the three-month post-trauma time point (Rothbaum et al., 1992). The current results suggest that personality factors are important predictors of which individuals develop PTSD symptoms and which individuals experience natural recovery, and this distinction is apparent at the three-month time point and persists to the one-year time point. Second, in terms of FFM traits, we observed a clear pattern showing that Neuroticism is a key correlate and predictor of individual PTSD symptoms and total PTSD. This was true across all time points examined, and this remained true in our exploratory analyses, such that Neuroticism predicted incremental variance in total PTSD symptoms above and beyond baseline total PTSD symptoms. This finding is consistent with previous literature that shows associations between negative affect-based personality traits and PTSD (e.g., DiGangi et al., 2013; Maples-Keller et al., 2021; Waszczuk et al., 2018, 2022), as well as conceptual (e.g., Miller, 2003) and empirical (e.g., Kotov et al., 2017) models that identify negative affect as the core individual difference feature associated with PTSD.

Third, in line with prior work, we observed some evidence for the role of Conscientiousness in PTSD symptom maintenance. PTSD-Conscientiousness bivariate relations were negative, as expected, and were small-to-medium in magnitude, and in several cases, Conscientiousness was an incremental predictor of longitudinal PTSD symptoms in the multiple regression analyses. In contrast to prior work, we did not observe evidence for a substantial role of Extraversion in PTSD symptom development. The PTSD-Extraversion bivariate relations were negative and were uniformly null-to-small in magnitude. In addition, Extraversion did not incrementally predict any PTSD symptoms. Interestingly, the current results suggest a role of Agreeableness in the maintenance of PTSD symptoms over time, especially symptoms related to social relationships with others, irritability, lack of positive emotions, and

Table 5
Regression models using FFM traits predicting PTSD symptoms at one-year post-index trauma (FIML).

	Neuroticism			Extraversion			Openness			Agreeableness			Conscientiousness		
Symptom (R^2)	B (SE)	β	*p*	B (SE)	β	*p*	B (SE)	β	*p*	B (SE)	β	*p*	B (SE)	β	*p*
B1 (.04)	**.15 (.02)**	**.20**	**<.001**	.01 (.02)	.01	.797	.00 (.03)	.00	.951	.03 (.03)	.03	.538	−.02 (.03)	−.02	.677
B2 (.06)	**.13 (.02)**	**.19**	**<.001**	.01 (.02)	.01	.849	.01 (.03)	.01	.805	**−.07 (.03)**	**−.08**	**.039**	−.03 (.02)	−.04	.322
B3 (.06)	**.13 (.02)**	**.18**	**<.001**	.00 (.02)	.00	.942	.00 (.03)	.00	.968	−.04 (.03)	−.05	.255	**−.06 (.02)**	**−.07**	**.049**
B4 (.08)	**.20 (.02)**	**.26**	**<.001**	.00 (.02)	.00	.951	.01 (.03)	.01	.860	.01 (.03)	.01	.906	−.04 (.02)	−.04	.322
B5 (.06)	**.17 (.02)**	**.23**	**<.001**	.02 (.02)	.02	.690	.02 (.03)	.02	.755	−.03 (.03)	−.03	.449	−.03 (.02)	−.04	.394
C1 (.06)	**.16 (.02)**	**.21**	**<.001**	.00 (.02)	.00	.942	−.01 (.03)	−.01	.877	−.01 (.03)	−.01	.849	−.04 (.02)	−.05	.278
C2 (.06)	**.16 (.02)**	**.22**	**<.001**	.00 (.02)	.00	.979	.00 (.03)	.00	.959	−.01 (.03)	−.01	.942	−.04 (.02)	−.05	.269
D1 (.06)	**.13 (.02)**	**.18**	**<.001**	.03 (.02)	.04	.322	−.05 (.03)	−.05	.223	−.02 (.03)	−.03	.618	−.05 (.02)	−.06	.130
D2 (.10)	**.19 (.02)**	**.24**	**<.001**	−.01 (.02)	−.01	.850	.03 (.03)	.03	.504	−.05 (.03)	−.06	.130	**−.09 (.02)**	**−.10**	**<.001**
D3 (.06)	**.16 (.02)**	**.21**	**<.001**	.02 (.02)	.02	.617	−.02 (.03)	−.02	.708	−.02 (.03)	−.02	.708	−.04 (.02)	−.05	.278
D4 (.09)	**.19 (.02)**	**.24**	**<.001**	−.02 (.02)	−.03	.498	.03 (.03)	.03	.528	−.03 (.03)	−.04	.441	**−.06 (.02)**	**−.07**	**.039**
D5 (.07)	**.19 (.02)**	**.23**	**<.001**	.00 (.02)	.00	.951	.03 (.03)	.03	.511	−.01 (.03)	−.01	.860	−.06 (.03)	−.07	.051
D6 (.09)	**.20 (.02)**	**.25**	**<.001**	−.01 (.02)	−.01	.760	.06 (.03)	.06	.130	−.03 (.03)	−.03	.591	**−.09 (.03)**	**−.10**	**.004**
D7 (.10)	**.17 (.02)**	**.22**	**<.001**	−.02 (.02)	−.02	.617	.01 (.03)	.01	.906	**−.08 (.03)**	**−.08**	**.016**	**−.06 (.02)**	**−.07**	**.047**
E1 (.10)	**.20 (.02)**	**.27**	**<.001**	−.03 (.02)	−.03	.424	.03 (.03)	.03	.504	−.06 (.03)	−.07	.065	−.04 (.02)	−.04	.322
E2 (.07)	**.08 (.02)**	**.12**	**<.001**	.02 (.02)	.03	.418	.01 (.02)	.01	.906	**−.09 (.02)**	**−.12**	**<. 001**	**−.07 (.02)**	**−.10**	**.004**
E3 (.05)	**.17 (.03)**	**.20**	**<.001**	−.05 (.03)	−.05	.130	.01 (.03)	.01	.935	−.02 (.03)	−.02	.707	−.02 (.03)	−.02	.765
E4 (.08)	**.20 (.02)**	**.25**	**<.001**	.00 (.02)	.00	.968	−.04 (.03)	−.04	.438	.00 (.03)	.00	.951	−.04 (.03)	−.04	.405
E5 (.10)	**.22 (.02)**	**.27**	**<.001**	.03 (.02)	.03	.441	−.03 (.03)	−.03	.566	.02 (.03)	.02	.797	**−.07 (.03)**	**−.08**	**.027**
E6 (.04)	**.19 (.03)**	**.21**	**<.001**	−.01 (.03)	−.01	.860	−.02 (.03)	−.02	.708	.04 (.03)	.04	.438	−.02 (.03)	−.02	.760
Total (.11)	**3.37 (.36)**	**.27**	**<.001**	.12 (.34)	.01	.860	.04 (.44)	.00	.959	−.53 (.43)	−.04	.438	**−1.02 (.40)**	**−.08**	**.039**

Note. Reported *p*-values are adjusted using Benjamini-Hochberg Procedure (105 tests, α = .05); *B* = re-experiencing of the traumatic event; *C* = avoidance of threat-related stimuli; *D* = negative alterations in cognitions and mood; *E* = alterations in arousal and reactivity.

reckless behavior. These findings are consistent with findings from work on the broader nomological network of Agreeableness (e.g., Lynam & Miller, 2019; Vize et al., 2022), namely that this trait is associated with antisocial behavior, lower positive emotionality, and a tendency to treat others more coldly and to perceive others as treating oneself more coldly. Moreover, given that Agreeableness (Hyatt et al., 2019; Vize et al., 2019) and PTSD (Birkley and Schumm, 2016; Orth and Wieland, 2006) are both strong risk factors for aggression and interpersonal hostility, we believe that understanding the role of Agreeableness in the expression of PTSD symptomology is an important area for future research. We also note that the support for the role of the Neuroticism, Conscientiousness, and Agreeableness as relevant predictors of PTSD symptoms is consistent with theoretical accounts of these traits as representative of the *meta*-trait Stability. These traits shared the common feature of being related to an individuals' ability to "maintain stability and avoid disruption in emotional, social, and motivational domains" (DeYoung, 2006, p. 1138), and their links to emotional and social functioning after experiencing a significant psychological disruption in the form of a Criterion A trauma are sensible.

Fourth, all UPPS scales showed uniformly positive relations to PTSD symptoms that ranged in magnitude from small to very large, consistent with previous work (Contractor et al., 2016, 2018). In the current study, Negative Urgency showed the largest statistically significant association with PTSD symptoms among the UPPS traits. In fact, the bivariate relation between Negative Urgency and total PTSD symptoms at the three-month time point was greater than $r = 0.50$, suggesting that individual differences in Negative Urgency accounted for more than 25 % of the observed variance in PTSD symptoms! In several ways, this relation is sensible. Negative Urgency was originally derived from the impulsiveness facet of FFM Neuroticism (Whiteside & Lynam, 2001), and so this finding is consistent with the current findings on the centrality of Neuroticism as a predictor of PTSD symptoms. Moreover, the conceptual definition of Negative Urgency is the tendency to behave impulsively when experiencing acute negative emotions, which has clear conceptual overlap with many PTSD symptoms related to experience of negative emotions (e.g., negative emotionality, irritability) and resultant behavioral tendencies (e.g., avoidance, recklessness). Thus, like the FFM, we believe the UPPS represents a useful framework to understand and track the individual differences that predict PTSD symptomology.

Fifth, supplemental analyses of the relations between PTSD symptoms and eight-item, two-item, and single-item Neuroticism measures consistently showed medium to very large, positive links between PTSD symptom severity and Neuroticism. This suggests that even extraordinarily brief measures of Neuroticism predict a substantial amount of variance in PTSD symptoms at least a year post-index-trauma, and thus could function quite well as screening measures for PTSD severity. To date, there are no behavioral or physiological measures that function this well in this capacity; indeed, algorithms developed to predict PTSD symptomology have found that self-reported items function well (Jones et al., 2022) and items indexing stress reactions outperform physiological variables in capturing variance in subsequent PTSD symptoms (Schultebraucks et al., 2020). As such, we believe that the consistency and magnitude of the PTSD-Neuroticism relations underscore the

promise of using personality measures as screening tools for the longitudinal prediction of PTSD. In addition to high predictive value, there are substantial methodological benefits to consider as well: personality traits can be assessed extremely quickly, for no or very little financial cost, and without requiring a specialist (or specialized equipment) to administer or interpret, which may be optimal for intensive applied settings (e.g., emergency departments, combat).

4.1. Limitation and future directions

There are several limitations of this study. First, the "baseline" PTSD measures were administered at presentation to the emergency department immediately following the traumatic event. As such, the proximal experience of trauma may have impacted these responses. We strongly encourage study designs that allow for pre-trauma assessment of personality. Second, the personality measures were administered two weeks following the Criterion A trauma. Although personality measures are designed to capture characterological dispositions that are highly consistent across time, it is possible that participant responses to this measure were meaningfully influenced by their recent trauma exposure. While acute impacts of trauma are less documented in literature, a longitudinal study showed the stressful event of widowhood was associated with an increase in emotional stability three years following widowhood. In this study, men showed decreased openness in the first year after losing a spouse compared to controls who did not experience widowhood throughout the study (Asselmann & Specht, 2020). This concern of malleability in personality characteristics acutely following trauma may be especially true for Neuroticism, given the increased experience of negative emotions is a commonly observed response to trauma (Rothbaum et al., 1992). To address each of these concerns, we encourage longitudinal panel data that permits assessment of pre-trauma personality and psychopathology data (see DiGangi et al., 2013). We also strongly suggest that future researchers be mindful about the assessments used to measure Neuroticism and experiences of emotional distress, as these are conceptually interrelated constructs and care must be taken to ensure that the constructs are appropriately captured (e.g., being instructional prompts that are specific about the time scale of interest).

Third, this study utilized short form measures of the FFM and UPPS. Under ideal conditions, these personality traits would be assessed with more robust, longer measures that more comprehensively assess these constructs, which may yield meaningfully different correlations than those observed herein. Importantly, though, several lines of evidence support the validity of the TIPI in the current sample, including the very large correlation between BFI-Neuroticism (a more robust measure) and TIPI-Neuroticism ($r = 0.76$) that is consistent with those found in previous work (Sleep et al., 2021), as well as the very high degree of similarity observed between the BFI-Neuroticism and TIPI-Neuroticism and relations to the PTSD symptoms. Specifically, we computed correlations between the various Neuroticism measures in terms of their relations with PTSD symptoms (i.e., correlated the columns of BFI-Neuroticism's and TIPI-Neuroticism's relations to PTSD symptoms at the same timepoints in Supplemental Table 3), the values ranged from $r = 0.90$ to 0.95, indicating that despite the differences in measure length, these measures have very similar nomological networks, supporting the construct validity of the TIPI. Moreover, although internal consistency of the TIPI was relatively low, these values are consistent with those reported in systematic review of the TIPI's psychometric properties (Thørrisen & Sadeghi, 2023).

Importantly, another considerable benefit of using more robust, longer personality measures in future work is that it would permit effective implementation of latent variable statistical approaches (e.g., latent growth modeling). This approach was not taken with the current data due to measurement brevity, but future, longitudinal work with more robust personality measures would allow modeling of the links between personality and PTSD symptoms over time to be estimated more parsimoniously. Another key benefit of this approach would be better adjustment for measurement error, which can downwardly or upwardly bias effects when multiple covariates have measurement errors.

Fourth, skip logic was used for baseline administration of PCL-5 due to time constraints. As such, baseline PCL scores are influenced by being from participants more likely to screen positive for PTSD symptoms, which impacted the range of these scores and limits effect size interpretability (e.g., Goodwin & Leech, 2006). All other PCL administrations were standard, and thus the follow-up PCL data most germane to the present investigation as not influenced by this alteration. Finally, the use of these specific short form measures of personality precludes the examination of the role of personality facets in the prediction of PTSD and makes generalizability to results from other measures of personality (e.g., Personality Inventory for *DSM*-5; Krueger et al., 2012) more tentative.

In addition to further research that addresses these limitations, we also encourage future work examining interventions focused on personality measures as predictors of PTSD symptom severity. This approach could be particularly be interesting as research burgeons on interventions like the Unified Protocol that specifically target personality traits like Neuroticism, or explicitly target the mechanisms through which this trait operates (e.g., discouraging behavioral avoidance; Sauer-Zavala et al., 2021). Finally, although the results are unambiguous that negative affect-based personality traits like Neuroticism and Negative Urgency are associated with most PTSD symptoms, we believe that this investigation highlights that multiple personality traits, including Agreeableness and Conscientiousness, deserve further consideration in etiological models of PTSD. Future intervention efforts may consider supplementing existing gold standard interventions (e.g., exposure-based protocols; Rauch et al., 2012) with brief interventions that more focally target these domains of psychological functioning.

CRediT authorship contribution statement

Courtland S. Hyatt: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Conceptualization. **Preethi J. Reddi:** Writing – review & editing, Writing – original draft, Resources, Methodology, Formal analysis, Data curation. **Brinkley M. Sharpe:** Visualization, Validation, Methodology, Formal analysis. **Vasiliki Michopoulos:** Writing – review & editing, Supervision, Resources, Project administration, Funding acquisition, Data curation. **Sanne J.H. van Rooij:** Writing – review & editing, Supervision, Resources, Funding acquisition, Data curation. **Stacey L. House:** Writing – review & editing, Resources, Project administration, Funding acquisition, Data curation. **Francesca L. Beaudoin:** Writing – review & editing, Funding acquisition. **Xinming An:** Writing – review & editing, Funding acquisition. **Jennifer S. Stevens:** Writing – review & editing, Funding acquisition. **Donglin Zeng:** Writing – review & editing, Funding acquisition. **Thomas C. Neylan:** Writing – review & editing, Funding acquisition. **Gari D. Clifford:** Writing – review & editing, Funding acquisition. **Sarah D. Linnstaedt:** Writing – review & editing, Funding acquisition. **Laura T. Germine:** Writing – review & editing, Funding acquisition. **Kenneth A. Bollen:** Writing – review & editing. **Scott L. Rauch:** Writing – review & editing. **John P. Haran:** Writing – review & editing. **Christopher Lewandowski:** Writing – review & editing. **Paul I. Musey:** Writing – review & editing. **Phyllis L. Hendry:** Writing – review & editing. **Sophia Sheikh:** Writing – review & editing. **Christopher W. Jones:** Writing – review & editing. **Brittany E. Punches:** Writing – review & editing. **Michael C. Kurz:** Writing – review & editing. **Robert A. Swor:** Writing – review & editing. **Lauren A. Hudak:** Writing – review & editing. **Jose L. Pascual:** Writing – review & editing. **Mark J. Seamon:** Writing – review & editing. **Erica Harris:** Writing – review & editing. **Claire Pearson:** Writing – review & editing. **David A. Peak:** Writing – review & editing. **Roland C. Merchant:**

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Declaration of competing interest

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Dr. Ressler has performed scientific consultation for Bioxcel, Bionomics, Acer, Takeda, and Jazz Pharma; serves on Scientific Advisory Boards for Sage and the Brain Research Foundation, and he has received sponsored research support from Takeda, Brainsway and Alto Neuroscience. Dr. Koenen's research has been supported by the Robert Wood Johnson Foundation, the Kaiser Family Foundation, the Harvard Center on the Developing Child, Stanley Center for Psychiatric Research at the Broad Institute of MIT and Harvard, the National Institutes of Health, One Mind, the Anonymous Foundation, and Cohen Veterans Bioscience. She has been a paid consultant for Baker Hostetler, Discovery Vitality, and the Department of Justice. She has been a paid external reviewer for the Chan Zuckerberg Foundation, the University of Cape Town, and Capita Ireland. She has had paid speaking engagements in the last three years with the American Psychological Association, European Central Bank. 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Data availability

Data is available through NIMH data archive.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jrp.2024.104524.

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