EUROPEAN JOURNAL OF
PSYCHO-
TRAUMATOLOGY
THE OFFICIAL JOURNAL OF THE EUROPEAN SOCIETY FOR TRAUMATIC STRESS STUDIES

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BASIC RESEARCH ARTICLE

Revealing what is distinct by recognising what is common: distinguishing between complex PTSD and Borderline Personality Disorder symptoms using bifactor modelling

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ABSTRACT

Background: Despite concerns of conceptual similarity, increasing evidence supports the discriminant validity of Complex Posttraumatic Stress Disorder (CPTSD) and Borderline Personality Disorder (BPD). However, all studies to date have assumed a categorical model of psychopathology. In contrast, dimensional models of psychopathology, such as the Hierarchical Taxonomy of Psychopathology model (i.e. HiTOP model), recognise shared vulnerability across supposedly discrete disorders. Accounting for shared vulnerability between CPTSD and BPD symptoms may help to better reveal what is unique about these constructs.

Objective: To identify the distinct and shared features of CPTSD and BPD via the application of dimensional modelling procedures.

Method: Confirmatory bifactor and confirmatory factor analysis were employed to identify the optimal latent structure of CPTSD and BPD symptoms amongst a convenience sample of Israeli adults ($N = 617$). Additionally, structural equation modelling was used to identify risk factors associated with these constructs.

Results: The latent structure of CPTSD and BPD symptoms was best explained by a bifactor model including one 'general' factor (i.e. vulnerability to all symptoms) and three 'specific' correlated factors (i.e. vulnerability to PTSD, DSO, and BPD symptoms, respectively). CPTSD symptoms were more readily distinguished from the general factor whereas BPD symptoms were not as easily distinguished from the general factor. CPTSD symptoms reflecting a negative self-concept and BPD symptoms reflecting an alternating self-concept were the most distinctive features of CPTSD and BPD relative to the general factor, respectively. Most of the risk factors were associated with the general vulnerability factor, consistent with the predictions of dimensional models of psychopathology regarding shared risk across supposedly distinct psychiatric constructs.

Conclusion: Consistent with a dimensional model of psychopathology, CPTSD and BPD shared a common latent structure but were still distinguishable. CPTSD and BPD symptoms may be most effectively distinguished based on the phenomenology of self-concept symptoms.

HIGHLIGHTS
• CPTSD and BPD symptoms shared a common latent structure consistent with a dimensional model of psychopathology.
• Recognition of this shared latent structure afforded the opportunity to highlight the phenomenological signatures which may distinguish CPTSD and BPD.
• CPTSD was most effectively distinguished by a fixed negative view of the self, whereas BPD was characterised by an alternating sense of self.

Revelar lo que es distinto al reconocer lo que es común: distinguir entre los sintomas del teptc y el trastorno limite de personalidad mediante el modelo bifactorial

Antecedentes: A pesar de las consideraciones sobre la similitud conceptual, cada vez hay más pruebas que respaldan la validez para diferenciar el trastorno de estrés postraumático complejo (TEPT-C) del trastorno límite de personalidad (TLP). Sin embargo, todos los estudios hasta la fecha han asumido un modelo categórico de psicopatología. Por el contrario, los modelos dimensionales de psicopatología, como el modelo de taxonomía jerárquica de psicopatología (el modelo HiTOP), reconocen la vulnerabilidad compartida entre trastornos supuestamente distintos. Tener en cuenta la vulnerabilidad compartida entre los síntomas de TEPT-C y TLP puede ayudar a revelar mejor qué es lo particular de estos constructos.

Objetivo: Identificar las características distintivas y compartidas de TEPT-C y TPL mediante la aplicación de procedimientos de modelado dimensional.Método: Se emplearon análisis de factores confirmatorios y bifactoriales para identificar la estructura latente óptima de los síntomas de TEPT-C y TLP entre una muestra por conveniencia de adultos israelíes ($N = 617$). Además, se utilizó el modelado de ecuaciones estructurales para identificar los factores de riesgo asociados con estos constructos.

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Resultados: La estructura latente de los síntomas de TEPT-C y TLP se explicó mejor mediante un modelo bifactorial que incluye un factor 'general' (es decir, vulnerabilidad a todos los síntomas) y tres factores correlacionados 'específicos' (es decir, vulnerabilidad a los síntomas de TEPT, DSO y TLP respectivamente). Los síntomas de TEPT-C se distinguieron más fácilmente del factor general, mientras que los síntomas de TLP no se distinguieron tan fácilmente del factor general. Los síntomas de TEPT-C que reflejan un autoconcepto negativo y los síntomas de TLP que reflejan un autoconcepto alterno fueron las características más distintivas de TEPT-C y TLP en relación con el factor general, respectivamente. La mayoría de los factores de riesgo se asociaron con el factor de vulnerabilidad general, en consonancia con las predicciones de los modelos dimensionales de psicopatología con respecto al riesgo compartido entre constructos psiquiátricos supuestamente distintos.

Conclusión: De acuerdo con un modelo dimensional de psicopatología, el TEPT-C y el TLP compartían una estructura latente común, pero aún eran distinguibles. Los síntomas de TEPT-C y TLP se pueden distinguir de manera más efectiva según la fenomenología de los síntomas del autoconcepto.

认清相似以揭示差异：使用双因子模型识别复杂PTSD和边缘型人格障碍症状

背景: 尽管存在概念上的相似性, 越来越多的证据支持复杂性创伤后应激障碍 (CPTSD) 和边缘性人格障碍 (BPD) 的区别效度。但是， 至今的所有研究都假定了心理病理学的分类模型。相反, 心理病理学的维度模型, 例如心理病理学的分层分类模型 (即HiTOP模型), 可以识别假定不同的各疾病之间的共享易感性。对CPTSD和BPD症状之间共享易感性的解释可能有助于更好地揭示这些构念的独特性。

目的: 通过应用维度模型处理来识别CPTSD和BPD的独特和共享特征。

方法: 采用验证性双因素和验证性因素分析, 在617名以色列成人方便样本 (N = 617) 中确定CPTSD和BPD症状的最佳潜在结构。另外， 使用结构方程模型来识别与这些构念相关的风险因素。

结果: CPTSD和BPD症状的潜在结构可由双因素模型最佳解释, 该模型包括1个'一般'因素 (即所有症状的易感性) 和3个'特定'相关因素 (即分别对PTSD, DSO和BPD症状的易感性) 。CPTSD症状更容易与一般因素区分开, 而BPD症状不容易与一般因素区分开。相对于一般因素, CPTSD症状反映的负性自我概念和BPD症状反映的交替自我概念分别是CPTSD和BPD的最具区分性特征。大多数风险因素与一般易感性因素有关, 这与心理病理学维度模型对假定不同的精神病学构念共享风险的预测相一致。

结论: 与心理病理学的维度模型一致, CPTSD和BPD具有共同的潜在结构, 但仍可区分。CPTSD和BPD症状也许可以被基于自我概念症状的现象学最有效地区分。

The 11th version of the International Classification of Diseases (ICD-11: World Health Organisation [WHO], 2018) outlines several disorders within the category of 'Disorders Specifically Associated with Stress' including Posttraumatic Stress Disorder (PTSD) and Complex PTSD (CPTSD). Within the ICD-11, PTSD has been refined to six symptoms, which are subsumed under three symptom clusters, these include (i) re-experiencing, (ii) avoidance, and (iii) sense of threat. CPTSD also comprises PTSD symptom clusters plus three additional symptom clusters collectively referred to as 'Disturbances in Self Organisation' (DSO), which encompass (i) affective dysregulation, (ii) negative-self-concept, and (iii) disturbed relationships. CPTSD was considered but was not included in the fourth and fifth editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM: American Psychiatric Association [APA], 1994, 2013), in part, due to concerns of limited distinguishability from Borderline Personality Disorder (BPD; Bryant, 2012; Friedman, Resick, Bryant, & Brewin, 2011; Resick et al., 2012, 2012; Roth, Newman, Pelcovitz, Van Der Kolk, & Mandel, 1997). The recognition of CPTSD within the ICD-11 affords the opportunity to establish the distinguishability of CPTSD and BPD.

Concerns that CPTSD and BPD are potentially indistinguishable are understandable as both disorders encompass difficulties with emotion regulation, self-concept, and interpersonal relationships. However, as noted by Cloitre, Garvert, Weiss, Carlson, and Bryant (2014), the phenomenology of these symptoms may be distinguishable across both disorders. In CPTSD, self-concept symptoms reflect a stable negative evaluation of the self, interpersonal symptoms reflect difficulties establishing connections with others, and emotional regulation symptoms reflect difficulties in finding emotional equilibrium. In BPD, self-concept symptoms reflect unstable and alternating evaluations of the self, interpersonal symptoms reflect volatile patterns of interaction with others, and emotional regulation symptoms encompass self-harming behaviour. Furthermore, fears of rejection or abandonment, feelings of emptiness, impulsivity, and paranoid dissociation have been outlined as symptoms of BPD. Several studies using different statistical methods including latent class analysis (Cloitre et al., 2014; Frost, Hyland, Shevlin, & Murphy, 2018; Jowett, Karatzias, Shevlin, & Albert, 2019), network analysis (Knefel, Tran, & Lueger-Schuster, 2016), and exploratory structural equation modelling (Hyland, Karatzias, Shevlin, & Cloitre, 2019) have provided some initial

evidence that CPTSD and BPD symptoms may be distinguished from one another in ways that characterize distinct symptom profiles. These studies have begun to illuminate the 'phenomenological signatures' differentiating the two disorders. For example, emotional numbing, fear and avoidance of relationships, and negative self-evaluations have been indicative of CPTSD but not BPD, whereas oscillating engagement relationships, alternating self-concepts, and self-harming behaviour have been indicative of BPD but not CPTSD (Cloitre et al., 2014; Hyland, Karatzias, Cloitre, & Shevlin, 2019).

It is increasingly understood that categorical models of psychopathology, which represent psychological distress in terms of discrete diagnostic categories, fail to provide an accurate representation of the latent structure of psychopathology (for a review see Kotov et al., 2017). Dimensional models of psychological distress have been proposed as an alternative, the most notable of which is the Hierarchical Taxonomy of Psychopathology model (HiTOP; Kotov et al., 2017). According to the HiTOP model, all disorders reflect associated phenomena and the covariation among psychopathology can be explained in terms of broader dimensions of psychopathology (for a review see Kotov et al., 2017). At the lower levels of the HiTOP model disorders are replaced by co-occurring patterns of symptoms which reflect smaller dimensions (termed 'syndromes'), in turn, co-occurring patterns of syndromes reflect broader dimensions of psychopathology (e.g. internalizing, externalizing, thought disorder, and somatoform dimensions; Kotov et al., 2017). Furthermore, it has been proposed that there exists a latent general psychopathology dimension which has been termed 'P' (for a review see Caspi & Moffitt, 2018). This dimension has been proposed to capture what is common across various forms of psychopathology; therefore, 'P' links all disorders (Caspi & Moffitt, 2018). More specifically, it has been proposed that 'P' captures shared vulnerability to developing any or all forms of psychopathology (Caspi & Moffitt, 2018). Acknowledging that there is a shared vulnerability to developing to psychopathology that links CPTSD and BPD symptoms may provide a more accurate conceptualisation of the latent dimensional structure of CPTSD and BPD. Moreover, recognising and controlling for this shared vulnerability when modelling the latent dimensional structure of CPTSD and BPD symptoms may help to elucidate the unique features of CPTSD and BPD, respectively.

The existence of 'P' has been demonstrated using a statistical method called confirmatory bifactor modelling (Caspi et al., 2014; Lahey et al., 2012; Reise, Morizot, & Hays, 2007). In a bifactor model, it is possible to simultaneously model the commonalities across multiple forms of psychopathology (i.e. a 'general' latent dimension accounting for covariation among all observed indicators) and that which is unique to more specific forms of psychopathology (i.e. several 'specific' latent dimensions accounting for covariation among

a subset of observed indicators). This approach may also be employed to model the latent structure of CPTSD and BPD symptoms. Bifactor modelling can be employed to identify (a) if a common vulnerability factor underlies all CPTSD and BPD symptoms (i.e. a general factor of psychopathology akin to 'P'), (b) if specific factors reflecting the CPTSD and BPD are identifiable in the presence of a common vulnerability factor, and (c) when shared vulnerability has been accounted for, if there are symptoms that reflect unique indicators of CPTSD and BPD factors.

Based on the available evidence and existing theory, several hypotheses were formulated. First, consistent with the HiTOP model (Kotov et al., 2017), it was predicted that the latent structure of the CPTSD and BPD symptoms would include three correlated 'specific' factors representing PTSD, DSO, and BPD as well as one orthogonal 'general' factor representing shared vulnerability to all symptoms. Second, based on the findings of Cloitre et al. (2014) and Hyland et al. (2019), it was predicted that (2a) CPTSD symptoms reflecting difficulties with emotion regulation specifically with finding emotion equilibrium, a negative self-image, and avoidance of relationships would load primarily on the DSO factor as compared to the general factor; (2b) BPD symptoms reflecting an alternating self-image, oscillating engagement in relationships, and self-harming behaviour would load primarily on the BPD factor as compared to the general factor. Finally, to assess if the general factor reflected a shared vulnerability to psychopathology akin to 'P', the relationship between known risk variables for general psychopathology and the general factor was investigated. Additionally, the relationship between known risk variables and the specific factors was investigated to identify any risk variables unique to the PTSD, DSO, and BPD specific factors.

1. Method

1.1. Participants

The study data were collected as part of an online survey (conducted from January – February 2017) aimed at producing a convenience sample of the adult Israeli population. Potential participants had to be fluent in Hebrew and ≥18 years. The survey was created and administered online via a Hebrew website (www.imkforms.com). Participants were recruited online, a link to the survey was posted on various social media sites (mainly Facebook) and smartphone applications (i.e. WhatsApp). This link led to the website where participants provided consent and completed several self-report assessments. Ethical approval for data collection was granted by the ethical review board of Ariel University. The sample was mostly female ($n = 481$, 78%), born in Israel ($n = 568$, 91.9%), and had a mean age of

33.41 years (SD = 11.95, range = 18–80 years). Most attended higher education (n = 474, 76.8%) were in full-time or part-time employment (n = 525, 85.1%) and in 'a committed relationship' (n = 452, 73.3%).

1.2. Measures

All measures were administered in the Hebrew language. The English version of each measure was translated into Hebrew using forward and back translation. The translators comprised Faculty members of Ariel University who were native English and native Hebrew speakers.

1.2.1. CPTSD symptoms

The International Trauma Questionnaire (ITQ; Cloitre et al., 2018) was used to assess CPTSD symptoms. The ITQ includes 12 items: 6 PTSD items and 6 DSO items. Participants were asked to select an index trauma and to answer items in relation to this trauma. The PTSD items pertain to the past month, whereas the DSO items are answered in relation to how one typically responds (see Table 1). The internal reliability estimates for the total scale score (α = .86), the PTSD subscale scores (α = .84) and the DSO subscale scores (α = .81) were satisfactory. All ITQ items were answered based on a 5-point Likert-type scale ranging from 0 ('not at all') to 4 ('extremely'). Responses of ≥2 ('moderately') indicated symptom endorsement, all items were dichotomised in this manner and treated as binary

variables. The ITQ has demonstrated good psychometric properties in other Israeli samples; PTSD (α = .75 – .89), DSO (α = .91 – .94; Ben-Ezra et al., 2018; Gilbar, Hyland, Cloitre, & Dekel, 2018).

1.2.2. BPD symptoms

BPD symptoms were measured using a self-report scale that includes 14 items, based on the BPD module of the Structured Clinical Interview for DSM-5 Axis II disorders (SCID-II; First, Williams, Benjamin, & Spitzer, 2016; see Table 1). As such, it is also consistent with DSM-5 BPD criteria (APA, 2013). Participants were asked to indicate if each statement was true of them, all items had a binary response format (0 = 'no', 1 = 'yes'). This measure has been designed as a self-report measure of BPD and has been used in another study (Hyland et al., 2019). The internal reliability of the scale was satisfactory (α = .81).

1.2.3. Trauma exposure

The Life-Events Checklist for DSM-5 (LEC-5; Weathers et al., 2013) was used to assess for trauma history. The LEC-5 includes 16 items that assess for various traumatic experiences (e.g. transportation accident, physical assault, sexual assault) and a 17th item to identify 'any other very stressful event/experience'. Each item is scored based on the following categories; (1) Happened to me, (2) Witnessed it happening to somebody else, (3) Learned about it happening to someone close to me, (4) Part my job and (5) Not sure it applies.

Table 1. Frequency of endorsement of each CPTSD and BPD item (N = 618).

Item		Total (%)
Posttraumatic stress disorder		
Re1	Having upsetting dreams that replay part of the experience or are clearly related to the experience?	11.0
Re2	Having powerful images or memories that sometimes come into your mind in which you feel the experience is happening again in the here and now?	19.9
Av1	Avoiding internal reminders of the experience (for example, thoughts, feelings, or physical sensations)?	26.3
Av2	Avoiding external reminders of the experience (for example, people, places, conversations, objects, activities, or situations)?	25.1
Th1	Being 'super-alert', watchful, or on guard?	37.3
Th1	Feeling jumpy or easily startled?	26.3
Disturbance in self-organisation		
Ad1	When I am upset, it takes me a long time to calm down.	47.3
Ad2	I feel numb or emotionally shut down.	15.7
Nsc1	I feel like a failure.	13.0
Nsc2	I feel worthless.	12.3
Dr1	I feel distant or cut off from people.	16.0
Dr2	I find it hard to stay emotionally close to people.	18.5
Borderline personality disorder		
BPD1	Have you often become frantic when you thought that someone you really cared about was going to leave you?	73.7
BPD2	Do your relationships with people you really care about have lots of extreme ups and downs?	21.4
BPD3	Have you suddenly changed your sense of who you are and where you are headed?	28.8
BPD4	Does your sense of who you are often change dramatically?	10.7
BPD5	Are you different with different people or in different situations so that sometimes you don't know who you really are?	23.0
BPD6	Have there been lots of sudden changes in your goals, career plans, religious beliefs, and so on?	24.0
BPD7	Have you often done things impulsively? (for example, spending money, sex, substance abuse, reckless driving, binge eating)	19.0
BPD8	Have you tried to hurt or kill yourself or threatened to do so?	9.2
BPD9	Have you ever cut, burned, or scratched yourself on purpose?	6.8
BPD10	Do you have a lot of sudden mood changes?	25.0
BPD11	Do you often feel empty inside?	26.6
BPD12	Do you often have temper outbursts or get so angry that you lose control?	14.6
BPD13	Do you hit people or throw things when you get angry?	6.3
BPD14	When you are under a lot of stress, do you get suspicious of other people or feel especially spaced out?	28.7

Only the two first categories 'Happened to me' or 'Witnessed it happening to somebody else' were used in the present study. Depending on the population under investigation, responses '(2)', '(3)' and '(4)' collect additional information about the nature of trauma exposure, but response '(1)' is the most commonly endorsed response and captures trauma exposure at a general level. LEC item responses scored as '(1)' were coded as '1' and all other responses were coded as '0' to gauge the cumulative level of trauma exposure in the sample. Based on the number of traumas someone had been considered to have been exposed to, a total score was calculated to represent a cumulative trauma score.

1.2.4. Psychological wellbeing

The World Health Organisation-Five Well-Being Index (WHO-5; WHO, 1998) was used to assess psychological wellbeing. This scale contains five items, each scored on a 6-point Likert scale from 0 ('all the time') to 5 ('at no time'). Participants were asked to indicate how they felt in relation to each statement over the past 2 weeks. The reliability of this scale was excellent (α = .90). The WHO-5 yields high validity and reliability (Topp, Østergaard, Søndergaard, & Bech, 2015). A summed score was created, higher scores reflected higher levels of psychological wellbeing.

1.3. Analysis

Confirmatory factor analysis (CFA) and confirmatory bifactor modelling (CBM) were employed to compare three alternative models of the latent structure of the CPTSD and BPD symptoms (see Figure 1).

Model 1 was tested using CFA, this model reflected a three-factor model which included three latent variables representing PTSD, DSO, and BPD. Model 1 reflects the categorical model of psychopathology, in which CPTSD and BPD have been proposed to represent discrete diagnostic entities. This model was consistent with the classification of CPTSD and BPD within the ICD-11/DSM-5 (APA, 2013; WHO, 2018). The PTSD and DSO factors were free to correlate because CPTSD is explicitly defined as the co-occurrence of PTSD and DSO symptoms, and the correlations between the BPD factor and the PTSD and DSO factors were fixed to zero. Model 2 was tested using CFA, this model reflected three-correlated factors reflecting PTSD, DSO, and BPD. This model represents CPTSD and BPD as associated constructs. Lastly, Model 3 was tested using CBM. It is possible to specify both a general factor and specific factors with CBM. In Model 3, a general factor was added to the model, this general factor was orthogonal to the three specific factors (which are free to correlate with each other). The inclusion of a general factor reflects the HiTOP description that a general psychopathology factor and specific

dimensions of psychopathology explain vulnerability to all forms of psychopathology (Kotov et al., 2017). Model 3 tests the hypothesis that CPTSD and BPD symptoms reflect associated phenomena that share a common latent structure in the form of a general vulnerability to psychopathology (i.e. 'P').

These models were specified and tested using Mplus version 7.0 (Muthén & Muthén, 2012) and estimated using the WLSMV estimator. Goodness of fit was assessed using the following measures; chi-square (χ^2) statistic, Tucker–Lewis Index (TLI; Tucker & Lewis, 1973), Comparative Fit Index (CFI; Bentler, 1990), and the root-mean-square error of approximation (RMSEA; Steiger, 1990). A non-significant χ^2 result, CFI and TLI values above .90 (Barrett, 2007), and RMSEA values less than .08 (Hu & Bentler, 1999) indicate an acceptable fit. To compare the fit of the alternative models, we used the MLR estimator to calculate a Bayesian Information Criterion (BIC; Schwarz, 1978) value for each model. The model with the lowest BIC value is considered the best fit and a difference of 10 points provides evidence in favour of the model with the lower value (Raftery, 1995). Estimation of the BIC was valuable as it contains penalties for increasingly complex models, which is the case with bifactor models.

Following the selection of the best fitting model, the latent factors from the model were entered into a structural equation model as criterion variables and regressed on to eight risk factor variables: sex (male = 0, female = 1), age, urbanicity (rural = 0, urban = 1), relationship status (in a relationship = 0, single = 1), employment status (not employed = 0, in full-time or part-time employment = 1), education status (no university or college education = 0, university or college education = 1), cumulative trauma (summed LEC scores), and psychological wellbeing (summed WHO-5 scores). Psychological wellbeing was added to the SEM model as a latent variable and all others as directly observed variables.

2. Results

2.1. Descriptive statistics

Table 1 includes the endorsement rates for the CPTSD and BPD items. Among the CPTSD items, endorsement rates ranged from 11.0% (Re2) to 47.3% (AD1). Among the BPD items, endorsements ranged from 6.3% (BPD 13) to 73.7% (BPD 1).
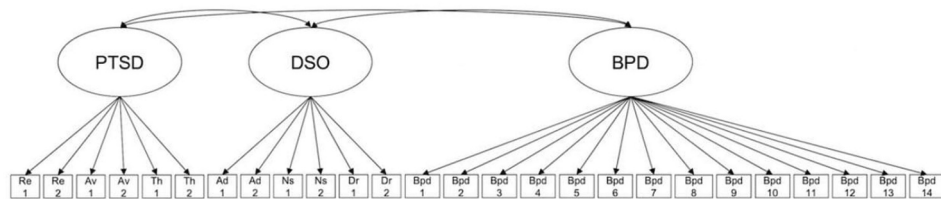
2.2. Model comparisons

The chi-square statistic was statistically significant, but this should not lead to model rejection as the power of the chi-square test has been positively related to sample size (Tanaka, 1987). The model fit
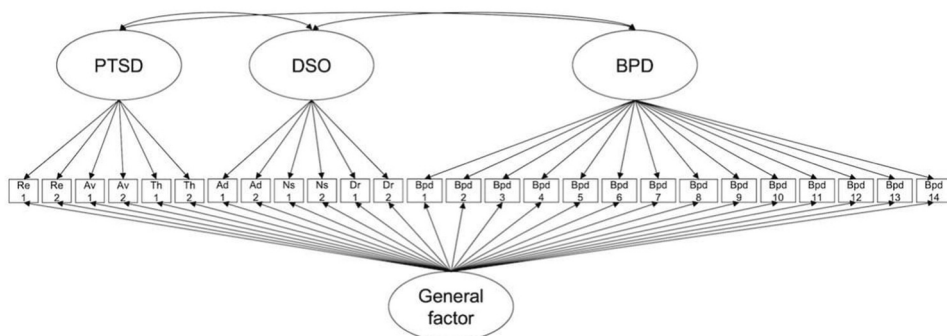
Model 1.
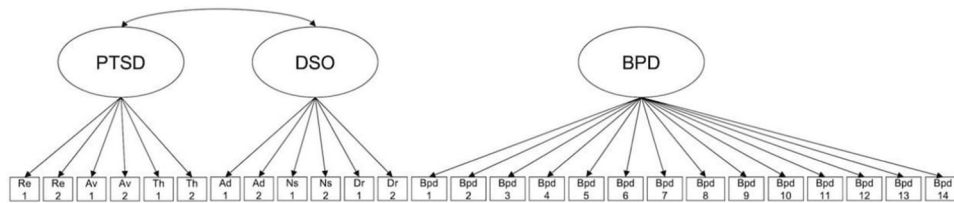
Model 2.

Model 3.

Figure 1. Alternative models of the latent structure of CPTSD and BPD symptoms

indices are presented in Table 2. Model 1 was rejected as a poor fit of the data. The inclusion of correlations between BPD and PTSD and BPD and DSO in Model 2 substantially improved model fit, this was a good representation of the sample data. Model 3, which included a bifactor representing vulnerability to all symptoms, was also a good fit of the data and the CFI, TLI, and RMSEA values were marginally better compared to Model 2. The BIC was therefore used to select the best model, Model 3 had a BIC value 237 points lower than Model 2. Consequently, Model 3 was deemed to be the best representation of the data.

Of the specific factors in Model 3, DSO was significantly ($ps < .001$) associated with PTSD ($r = .30$) and BPD ($r = .58$), but the PTSD and BPD ($r = .23$, $p = .09$) factors were not significantly associated. The standardised factor

Table 2. Model fit information.

Model	χ^2	df	BIC	RMSEA (90% CI)	CFI	TLI
1	2862.523*	298	11,921	.118 (0.114–0.122)	.637	.644
2	578.587*	296	11,679	.039 (0.035–0.044)	.964	.960
3	488.066*	270	11,442	.036 (0.031–0.041)	.972	.967

* $p < .05$; χ^2 = chi-square test of model fit; df = degrees of freedom; BIC = Bayesian information criteria; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis Index.

loadings for Model 3 are presented in Table 3. All but one item loaded significantly on the general factor.

The six PTSD items loaded significantly on the PTSD factor. Two items, 'Avoiding external reminders of the experience' and 'Being super-alert watchful or on guard' had a substantially higher loading on the PTSD factor compared to the general factor. The other four PTSD items loaded onto the PTSD factor

Table 3. Standardised factor loadings from Model 3.

	General	PTSD	DSO	BPD
Re 1	.62*	.49*		
Re 2	.57*	.52*		
Av 1	.51*	.66*		
Av 2	.49*	.74*		
Th 1	.40*	.73*		
Th 2	.48*	.63*		
AD 1	.44*		.23*	
AD 2	.49*		.60*	
NSC 1	.40*		.88*	
NSC 2	.39*		.89*	
DR 1	.53*		.69*	
DR 2	.53*		.61*	
BPD 1	.37*			.17
BPD 2	.49*			.54*
BPD 3	.25*			.62*
BPD 4	.44*			.78*
BPD 5	.45*			.56*
BPD 6	.19			.66*
BPD 7	.36*			.46*
BPD 8	.87*			.14
BPD 9	.80*			.07
BPD 10	.66*			.45*
BPD 11	.58*			.61*
BPD 12	.46*			.51*
BPD 13	.44*			.31*
BPD 14	.59*			.34*

* $p < .05$; for a description of items please see Table 1; PTSD = posttraumatic stress disorder; DSO = disturbances in self-organisation; BPD = borderline personality disorder.

at a similar or relatively higher magnitude compared to the general factor.

The six DSO items loaded significantly on the DSO factor. Notably, the two negative self-concept items and one disturbed relationship item ('I feel distant or cut off from people') had substantially higher factor loadings on the DSO factor than the general factor. In contrast, one of the affective dysregulation items ('When I am upset, it takes me a long time to calm down') had a substantially higher factor loading on the general factor than the DSO factor.

Eleven of the BPD items loaded significantly on the BPD factor. Two BPD items reflecting self-harming behaviours ('Have you tried to hurt or kill yourself or threatened to do so?' and 'Have you ever cut, burned, or scratched yourself on purpose?') had very high factor loadings on the general factor, but very low and non-significant factor loadings on the BPD factor. Additionally, two items reflecting emotional regulation difficulties ('Have you often become frantic when you thought that someone you really cared about was going to leave you?' and 'Do you have a lot of sudden mood changes?') loaded substantially more strongly on the general factor than on the BPD factor. Only three BPD items had substantially higher loadings on the BPD factor compared to the general factor: 'Have you suddenly changed your sense of who you are and where you are headed?', 'Does your sense of who you are often change dramatically?', and 'Have there been lots of sudden changes in your goals, career plans, religious beliefs, and so on?'.

2.3. Structural equation modelling

The results of the SEM analysis are presented in Table 4 (see Table 4 for model fit). Higher scores on the general factor were significantly associated with lower levels of psychological wellbeing ($\beta = -.45$, $p < .001$), not being in a relationship ($\beta = .13$, $p = .006$), lower educational attainment ($\beta = -.12$, $p = .009$) and cumulative trauma ($\beta = .10$, $p = .020$).

Two variables were significantly associated with higher PTSD scores: cumulative trauma ($\beta = .32$, $p < .001$) and being female ($\beta = .20$, $p < ,001$). Three variables were significantly associated with higher BPD scores: lower levels of psychological wellbeing ($\beta = -.35$, $p < .001$), cumulative trauma ($\beta = .19$, $p = .001$), and younger age ($\beta = -.17$, $p = .001$). None of the risk factors were significantly associated with DSO scores.

3. Discussion

Consistent with the first hypothesis, a bifactor model comprised of three specific correlated factors (i.e. PTSD, DSO, and BPD) and one general factor provided the optimal representation of the latent structure of CPTSD and BPD symptoms. This finding was consistent with research concerning the latent structure of general psychopathology (i.e. Caspi & Moffitt, 2018). Given that all but one item loaded significantly on the general factor (i.e. which is assumed to reflect 'P'), the findings indicate that CPTSD and BPD symptoms have much in common. Even after adjusting for a shared vulnerability across all symptoms, CPTSD and BPD emerged as distinct but correlated factors, consistent with recent research supporting a distinction between CPTSD and BPD symptoms (Cloitre et al., 2014; Frost et al., 2018; Hyland et al., 2019; Jowett et al., 2019; Knefel et al., 2016). The findings also highlighted that while CPTSD and BPD symptoms share a common latent structure that CPTSD and BPD may differ concerning the phenomenological presentation of symptoms. Overall, these findings provide evi-

Table 4. Standardised regression coefficients from the SEM analysis ($N = 617$).

	P		PTSD		DSO		BPD	
	β	SE	β	SE	β	SE	β	SE
Sex (female)	−.07	.04	**.20***	.05	−.03	.05	.08	.05
Age	−.01	.05	−.04	.05	−.07	.05	**−.17***	.05
Higher education	**−.12***	.05	−.10	.05	.09	.06	−.09	.05
Employment status	.02	.04	−.02	.05	−.06	.05	.02	.05
Relationship (single)	**.13***	.05	.00	.05	.03	.06	.05	.05
Urbanicity	.07	.04	.01	.05	.00	.05	−.00	.05
Cumulative trauma	**.10***	.04	**.32***	.04	.02	.05	**.19***	.05
Psychological wellbeing	**−.45***	.04	−.01	.06	−.14	.09	**−.35***	.06
R-squared	**.26***	.04	**.14***	.03	.03	.03	**.22***	.04

Model fit: $\chi^2 = 1471$, df = 590, $p < .001$; CFI = .88; TLI = .86; RMSEA = .049; 90% CI = .046 −.052

* $p < .05$; P = general factor; PTSD = posttraumatic stress disorder; DSO = disturbances in self-organisation; BPD = borderline personality disorder; β = standardised regression co-efficient; SE = standard error.

dence that CPTSD and BPD may be empirically distinguishable and that a dimensional representation of psychopathology may be necessary to understand how these constructs are associated.

By recognising the common latent structure of CPTSD and BPD symptoms, the current analytical approach illuminated the symptoms that are characteristic of CPTSD and BPD. Consistent with hypothesis 2a, variability in symptoms reflecting emotional numbing, negative self-concept, and avoidance of relationships were shown to be primarily due to the influence of the DSO factor and less so due to the general factor. This finding may indicate that these symptoms are distinctive of CPTSD. Notably, symptoms considered to be core features of PTSD (i.e. flashbacks and nightmares) had a higher loading on the general factor relative to the specific PTSD factor. This finding may have been impacted by the trauma-exposed nature of the sample under investigation. It may be possible that re-experiencing symptoms would have a higher loading on the PTSD factor among a sample that was not stratified by trauma exposure. This finding may also indicate that re-experiencing symptoms have a specific association with the general factor, perhaps such as acting as a gateway into other forms of psychopathology.

Moreover, partially consistent with hypothesis 2b, variability in the symptoms of an alternating self-image were primarily due to the BPD factor. However, virtually none of the variability among two self-harming behaviour items was accounted for by the BPD factor but instead was attributable to the general factor. In contrast, previous research has suggested that these symptoms are reflective of BPD (Cloitre et al., 2014; Hyland et al., 2019). This result could suggest that self-harming behaviour emerges due to a general vulnerability to psychopathology. As such, these symptoms may not help to distinguish BPD from CPTSD. While many individuals with BPD may be at risk of self-harm and suicidal behaviour, these symptoms may represent transdiagnostic phenomena rather than unique features of BPD. This is consistent with research demonstrating that suicidality may not be due to any specific disorder but rather to a broad psychopathology liability (Hoertel et al., 2015). Additionally, three other symptoms were strongly determined by the general factor as opposed to their specific factors, these included two BPD items reflecting real or imagined abandonment and sudden changes in mood; and one DSO item reflecting difficulty calming down when upset. These symptoms may similarly represent transdiagnostic phenomena and as such may not readily distinguish CPTSD or BPD.

The finding that self-harming behaviour was due to a latent vulnerability to psychopathology and that most of the BPD items had a higher loading on the general factor as compared to the specific BPD factor may somewhat undermine the validity of BPD. Indeed, it has been argued whether BPD reflects a distinct diagnostic entity

(Tyrer et al., 2019). Alternatively, it may be the case that less severe forms of psychopathology look more distinct relative to the general factor (i.e. PTSD, depression, panic disorder) whereas more severe presentations of psychopathology may look less distinct and share a greater number or type of problems that emerge with increasing illness severity (i.e. self-harming behaviour). For example, symptoms of psychosis have been less easily distinguished from 'P' (Caspi et al., 2014).

Controlling for the effect of all other variables within the SEM model, four risk factors (lower education, not being in a committed relationship, cumulative trauma exposure, and lower psychological wellbeing) were significantly associated with the general factor. This finding may be explained by a diathesis-stress interpretation of psychopathology (e.g. Monroe & Simons, 1991), vulnerability to developing psychopathology (i.e. location on the general factor) may dominate interactions with stressors to influence differential development of PTSD, DSO, or BPD symptoms. These findings are consistent with dimensional psychopathology assumptions regarding shared risk across supposedly distinct psychiatric constructs (Caspi & Moffitt, 2018; Kotov et al., 2017). Conversely, two risk factors were associated with specific dimensions independently of the general factor (i.e. sex with the PTSD factor and age with the BPD factor). There was limited scope in the current study to explore how risk factors might uniquely influence the specific expression of psychopathology. There were no significant associations evident for DSO, perhaps greater specificity in the trauma indicator (e.g. interpersonal versus situational/early development versus adulthood trauma exposure) may have meaningfully revealed how DSO operates independently of the general psychopathology dimension.

The present study highlighted how the HiTOP model may offer greater insight into the latent structure of trauma-related psychopathology (Caspi & Moffitt, 2018; Kotov et al., 2017). Researchers have begun to discuss the potential clinical implications of recognising 'P'. It has been hypothesised that 'P' may reflect a biological vulnerability or processes inherent to many forms of psychopathology, such as neuroticism or negative emotionality, deficits with emotion regulation, and/or disordered thought processes (Caspi & Moffitt, 2018). One of the most radical implications of 'P' is that clinicians may potentially provide the same treatment to all clients regardless of presenting problems, this may explain why transdiagnostic therapies which were initially developed for one disorder have been successful in treating a range of disorders (Hopwood et al., 2019; Ruggero et al., 2019). However, if there are features unique to a specific syndrome or broader dimensions of psychopathology then more specific treatment considerations may be required (Hopwood et al., 2019; Ruggero et al., 2019). Overall, the HiTOP model and recognition of 'P' may offer greater insight into the nature of psychopathology and may

afford the opportunity in the future to reform our existing classification systems (Caspi & Moffitt, 2018; Kotov et al., 2017).

The present study had several limitations. The study objectives were investigated among a convenience Israeli sample, which limits the generalizability of these findings to other populations. PTSD items were scored in relation to a variety of index trauma and participants were from Israel. Individuals residing in the Middle East may be exposed to ongoing armed conflict and/or terror attacks and this may impact symptom expression thus the findings may not be representative of other cultural contexts. This study also evaluated the unique and shared indicators of CPTSD and BPD within a dimensional framework of psychopathology, the HiTOP model also states that other psychopathologies co-occur with these symptoms, but other psychopathologies were not considered in the present study. Further, given the cross-sectional nature of the data, it is not possible to infer causality for any of the risk factors within the SEM model. BPD symptoms were assessed via self-report which may be less reliable compared to assessment via clinical interview. Further replication with interview-based data is necessary and the results should be interpreted with caution. Lastly, concerns that CPTSD was indistinguishable from BPD centred around the conceptualisation for DSM-IV/DSM-5 BPD (APA, 1994, 2013), how these findings will translate to ICD-11 conceptualisation of personality disorder is not known and warrants further investigation (WHO, 2018).

In conclusion, CPTSD and BPD symptoms shared a common latent structure but were still distinguishable. CPTSD and BPD symptoms may be most effectively distinguished from a shared vulnerability to psychopathology by the way in which self-concept symptoms manifest. A fixed negative view of the self was the most distinctive feature of CPTSD whereas an alternating sense of self was the most distinctive feature of BPD. Additionally, emotional numbing and avoidance of relationships distinguished CPTSD. These distinctions may help to guide differential diagnosis in clinical settings, especially in cases where service-users present with a history of trauma exposure.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

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