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Relations between PTSD and distress dimensions in an Indian child/adolescent sample following the 2008 Mumbai terrorist attacks

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A Dissertation

entitled

Relations between PTSD and Distress Dimensions in an Indian Child/Adolescent Sample

following the 2008 Mumbai Terrorist Attacks

by

Ateka A. Contractor

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Doctor of Philosophy Degree in Clinical Psychology

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August 2015

An Abstract of

Relations between PTSD and Distress Dimensions in an Indian Child/Adolescent Sample
following the 2008 Mumbai Terrorist Attacks

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Ateka A. Contractor

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Posttraumatic stress disorder's (PTSD) four-factor dysphoria model (Simms, 2010) has

substantial empirical support (reviewed in Elhai & Palmieri, 2011; Yufik & Simms,

2010). However, debatable is whether the model's dysphoria factor adequately captures

all of PTSD's general emotional distress (e.g., G. N. Marshall, Schell, & Miles, 2010;

Miller et al., 2010). Thus, the present study assessed the factor-level relationship between

PTSD and general emotional distress to answer two research questions: 1) Relative to

other PTSD factors, does the dysphoria factor better account for variance in external

measures of emotional distress?, and 2) which emotional distress dimension is most

related to PTSD's dysphoria factor (related to PTSD's placement in the quadripartite

model)? The relevance of the current study is further enhanced by virtue of using a young

Eastern cultural sample (i.e., India) with exposure to terrorist attacks. Data analyses was

conducted on an archival dataset collected by Mithibai College at Mumbai, comprising of

children and adolescents attending school during and in the vicinity of the 2008 Mumbai

terrorist attacks. PTSD and emotional distress were measured by the UCLA PTSD

Reaction Index (PTSD-RI; Steinberg, Brymer, Decker, & Pynoos, 2004) and the Brief

Symptom Inventory-18 (BSI-18; Derogatis, 2001) respectively. Primary analyses entailed

confirmatory factor analyses (CFA) to assess the hypothesized PTSD and BSI-18 model

fit, followed by Wald tests of parameter constraints to assess hypothesized relations

between PTSD's and BSI-18's latent factors. Specifically, I assessed if BSI-18's

somatization (Hypothesis 1), anxiety (Hypothesis 2), and depression factors (Hypothesis

3) related more to PTSD's dysphoria than other PTSD factors. Further, I assessed if

PTSD's dysphoria related more to BSI-18's somatization than BSI-18's depression

(Hypothesis 4) and anxiety factors (Hypothesis 6), and more to BSI-18's depression than

to its anxiety factor (Hypothesis 5). Significant results indicated that BSI-18's depression

and somatization factors related more to PTSD's dysphoria factor than PTSD's avoidance

factor. Additionally, PTSD's dysphoria factor related more to BSI-18's depression than

BSI-18's anxiety and somatization factors. Consequent implications are discussed in

detail.

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Most importantly, I would like to thank my parents, brother, husband and close friends for being my strength throughout this process with immense confidence in my ability to accomplish my academic goals. Their optimism and emotional support has been of utmost importance and value and I am unable to envision achieving my goals without them.

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List of Abbreviations

BAI............................Beck Anxiety Inventory
BDI............................Beck Depression Inventory
BIC............................Bayesian Information Criteria
BSI-18………………Brief Symptom Inventory–18

CFA............................Confirmatory Factor Analysis
CFI ....Comparative Fit Index

DF…………………. .Degrees of Freedom
DSM-IV ....Diagnostic and Statistical Manual of Mental Disorders-Fourth
                                   Edition
DSM-5……………... Diagnostic and Statistical Manual of Mental Disorders-Fifth
                                   Edition

EFA............................Exploratory Factor Analysis

GSI ....Global Severity Index

ICD-10 ……………..International Classification of Disease-10

MAR ....Missing At Random
MCAR........................Missing Completely at Random
MI..............................Multiple Imputation
ML.............................Maximum Likelihood
MLM ....Maximum Likelihood with a mean-adjusted chi-square
MMPI-2......................Minnesota Multiphasic Inventory-2
MNAR........................Missing Not At Random

NA..............................Negative Affect

PTSD..........................Posttraumatic stress disorder
PTSD-RI ....The UCLA PTSD Reaction Index

RMSEA......................Root mean square error of approximation

SD…………………..Standard Deviation
S-B ....Satorra-Bentler chi-square statistic
SCL-90-R ....Symptom Checklist-90-Revised
SPSS..........................Statistical Package for the Social Sciences
SRMR ....Standardized Root Mean Square Residual

TLI ....Tucker Lewis Index

List of Symbols

χ^2........................Chi-square value
r..........................Correlation
n.........................Number of participants
N.........................Total sample size
%..............................Percentage
p.........................Probability value

Chapter One

Introduction

Posttraumatic stress disorder's (PTSD) three-factor conceptualization in the

Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition (DSM-IV;

American Psychiatric Association, 2000) has failed to receive empirical support

compared to alternative four-factor models (reviewed in Elhai & Palmieri, 2011;

reviewed in Yufik & Simms, 2010). One such four-factor model of PTSD is the

dysphoria model (Simms, Watson, & Doebbeling, 2002), with substantial empirical

support (reviewed in Elhai & Palmieri, 2011; reviewed in Yufik & Simms, 2010). The

dysphoria model's dysphoria factor, although initially meant to capture PTSD's general

emotional distress, has yielded mixed findings in being differentially related to external

measures of emotional distress compared to other PTSD dimensions (e.g., G. N. Marshall

et al., 2010; Miller et al., 2010). Thus, the present study attempts to explore the

differential relationship of PTSD's dysphoria factor with a refined external measure of

emotional distress. Further, understanding the emotional distress component most related

to PTSD's dysphoria will add to the debate surrounding PTSD's placement in the

quadripartite model (Watson, 2005, 2009). Unique to the PTSD literature, this study used

a non-Western sample with disaster-related traumatic event exposure –

children/adolescents from India exposed to the 2008 Mumbai terrorist attacks.

PTSD in Children and Adolescents

The experience of traumatic events is common in childhood and adolescence

(Fairbank, 2008), with prevalence estimates being as high as 43% (Giaconia et al., 1995)

and 68% (Copeland, Keeler, Angold, & Costello, 2007). Among the typical

psychological sequelae to traumatic events, common is a PTSD diagnosis, one of the *DSM-IV* anxiety disorders (APA, 2000). According to the *DSM-IV*, PTSD requires feelings of fear, helplessness or horror in response to a traumatic event that is directly or indirectly experienced, coupled with symptoms of intrusive re-experiencing (e.g., nightmares, flashbacks), avoidance of trauma-related triggers and emotional numbing (e.g., sense of detachment from others), and hyperarousal (e.g., sleep difficulties, hypervigilance). Further, to qualify for a PTSD diagnosis, PTSD symptoms must persist for more than a month, causing significant functional impairment in daily living and/or distress (APA, 2000). Noteworthy is the significant prevalence of PTSD among children and adolescents (Agustini, Asniar, & Matsuo, 2011; Ayer et al., 2011; Bolton, O'Ryan, Udwin, Boyle, & Yule, 2000), with a nationally representative epidemiological study indicating a six-month prevalence of 6.3% for girls and 3.7% for boys (Kilpatrick et al., 2003). Significant risk for PTSD in this younger sample (reviewed in Davis & Siegel, 2000) may be attributed partly to several physical, psychological (Berndt, 1982; Giedd et al., 1999; Scheeringa, Zeanah, & Cohen, 2011), social (Berndt, 1982; Tanti, Stukas, Halloran, & Foddy, 2011), and developmental changes (reviewed in Davis & Siegel, 2000).

PTSD is comorbid (i.e., co-occurs) with several emotional conditions among children and adolescents, with comorbidity estimates being as high as 75% (Kilpatrick et al., 2003). PTSD is commonly comorbid with mood disorders (Bolton et al., 2000; Carrion, Weems, Ray, & Reiss, 2002; Copeland et al., 2007; Elhai, Ford, Ruggiero, & Frueh, 2009; Giaconia et al., 1995; Kilpatrick et al., 2003; Ruchkin et al., 2005; Smith, Redd, DuHamel, Vickberg, & Ricketts, 1999; Yule, 2001; Zatzick et al., 2008), with

lifetime comorbidity (based on structured diagnostic interviews) for a major depressive episode estimated at 75% (Elhai et al., 2009). Additionally, PTSD is commonly comorbid with other anxiety disorders (Bolton et al., 2000; Carrion et al., 2002; Copeland et al., 2007; Ruchkin et al., 2005; Smith et al., 1999; Yule, 2001), with comorbidity estimates of 43% (Copeland et al., 2007). Among several proposed reasons for the aforementioned comorbidity, one explanation highlights symptom similarity (Garber & Weersing, 2010). To elaborate, PTSD shares several symptoms with depression such as loss of interest, sleep and concentration problems and with anxiety disorders such as hypervigilance, avoidance, conditioned fear responses (Elhai, Grubaugh, Kashdan, & Frueh, 2008; Spitzer, First, & Wakefield, 2007). A second possible explanation references the PTSD dual-representation theory (Brewin, Dalgleish, & Joseph, 1996), which states that a lack of integration of traumatic memories into prior world-views and beliefs leads to repeated emotional processing, and preoccupation with trauma-related memories. Depression follows chronic emotional processing, feelings of powerlessness, or trauma-related loss, while anxiety may manifest as initial reactions to perceived threat, conditional fear reactions, worrying, phobic cue avoidance, somatic or panic symptoms consequent to unsuccessful emotional processing (Brewin et al., 1996). As a third explanation, most empirically tested is the "common latent factor" related explanation (Clark & Watson, 1991; Watson, 2005, 2009) elaborated later in this literature review.

PTSD is additionally comorbid with somatic symptoms in children and adolescents (Agustini et al., 2011; Copeland et al., 2007; Giaconia et al., 1995; Ruchkin et al., 2005; Smith et al., 1999; Zatzick et al., 2008). A meta-analytic review indicated a large effect size regarding PTSD's relation with general physical health problems (meta-

analyzed in Pacella, Hruska, & Delahanty, 2013). Among several reasons for the

aforementioned comorbidity, one explanation suggests that somatic symptoms are part of

the non-specific emotional distress following trauma exposure, given that it is frequently

a part of depressive and anxiety psychopathology (Ursano, Fullerton, & Benedek, 2009).

Second, according to the PTSD dual-representation theory, use of avoidant coping and

inadequate emotional processing related to the traumatic event may contribute to somatic

symptoms (Brewin et al., 1996).

Underlying Dimensions of PTSD

Factor analysis is a data analytic technique that can be used to examine

underlying symptom dimensions of a disorder, such as PTSD. Relatively fewer PTSD

factor analytic studies have been conducted in the adolescent age group compared to pre-

schoolers and adults (Saul, Grant, & Carter, 2008; Scheeringa et al., 2011). Factor

analysis examines a correlation matrix to identify patterns of similarity in responding

(e.g., how a large number of endorsed items may be reduced to a smaller number of

common factors). Factor analysis can be exploratory (EFA) or confirmatory (CFA) in

nature. CFA, which involves testing the statistical fit between an hypothesized population

covariance matrix (pattern of inter-correlations) and the sample's observed covariance

matrix (Kline, 2011), is statistically superior to EFA. To elaborate, CFA's focus on

testing specific hypotheses regarding model fit (Kline, 2011) reduces Type I error and

increases generalizability to other samples, compared to EFA which capitalizes on chance

error to find significant patterns of inter-correlations in the observed data (Fabrigar,

Wegener, MacCallum, & Strahan, 1999; Kline, 2011). Models in factor analysis can be

conceptualized as inter-correlated first-order models, whereby observed items load onto

first-order latent factors. Alternative models may be conceptualized as hierarchical models, whereby observed items load onto first-order latent factors which in turn load onto second-order latent factors (Kline, 2011). For example, a PTSD model may involve the 17 PTSD symptoms loading onto (i.e., subsumed by) four first-order factors of re-experiencing, avoidance, dysphoria and arousal, and these first-order factors would load onto a general, higher-order PTSD factor. I do not further consider hierarchical models of PTSD here, because of statistical limitations and significantly inferior fit found in the PTSD literature (reviewed in Yufik & Simms, 2010).

The model of PTSD conceptualized in the *DSM-IV* is a tripartite model consisting of re-experiencing, effortful avoidance/emotional numbing, and hyperarousal (APA, 2000). This model does not adequately account for the underlying dimensions of PTSD with younger samples (Ayer et al., 2011; Elhai & Palmieri, 2011; Ford, Elhai, Ruggiero, & Frueh, 2009; Nygaard, Jensen, & Dyb, 2012; Saul et al., 2008; Stewart et al., 2004; M. Wang, Elhai, Dai, & Yao, 2012; Yufik & Simms, 2010) as well as adults (reviewed in Elhai & Palmieri, 2011; reviewed in Yufik & Simms, 2010), thus leading to the development of alternative models. The most empirically supported PTSD models include the four-factor models of emotional numbing (King, Leskin, King, & Weathers, 1998), and dysphoria (Simms et al., 2002).

To elaborate, the four-factor emotional numbing model differentiates between effortful avoidance (*DSM-IV* PTSD items C1-C2) and emotional numbing (PTSD items C3-C7) while retaining the remaining *DSM-IV* clusters, consistent with the different mechanisms underlying avoidance and numbing (reviewed in G. J. G. Asmundson, Stapleton, & Taylor, 2004; Foa, Riggs, & Gershuny, 1995; Foa, Zinbarg, & Rothbaum,

1992). This model is empirically supported in samples of children and adolescents (e.g., Armour, Elhai, et al., 2011; Armour, Layne, et al., 2011; Ayer et al., 2011; Nygaard et al., 2012) and adults (reviewed in Elhai & Palmieri, 2011; reviewed in Yufik & Simms, 2010).

Slightly different is the well-supported four-factor dysphoria model, which retains the re-experiencing and avoidance dimensions of the numbing model, however creates different symptom clusters (hyperarousal, and dysphoria) with the remainder of symptoms. The dysphoria model's hyperarousal factor includes only *DSM-IV* PTSD items D4 and D5, with the remaining criterion D symptoms loading on the dysphoria factor which also has *DSM-IV* PTSD symptoms C3-C7 (Simms et al., 2002). PTSD's dysphoria model has received empirical support with children and adolescent samples (e.g., Armour, Elhai, et al., 2011; Armour, Layne, et al., 2011; Ayer et al., 2011; Elhai et al., 2013) and adult samples (reviewed in Elhai & Palmieri, 2011; reviewed in Yufik & Simms, 2010). Table 1 indicates the UCLA PTSD Reaction Index (PTSD-RI) item mappings for the three-factor and four-factor model conceptualizations, coupled with labels and descriptions of the individual *DSM-IV* PTSD items.

Table 1

Three and Four-Factor PTSD Models

PTSD symptoms	DSM-IV	King et al.	Simms et al.
B1. Intrusive recollections (PTSD-R1 #3)	R	R	R
B2. Nightmares (PTSD-RI #5)	R	R	R
B3. Reliving traumas (PTSD-RI #6)	R	R	R
B4. Psychological reactivity to cues (PTSD-RI #2)	R	R	R
B5. Physiological reactivity to cues (PTSD-RI #18)	R	R	R
C1.Avoidance of thoughts, feelings and conversations (PTSD-RI #9)	A/N	A	A
C2. Avoidance of people, places and activities (PTSD-RI #17)	A/N	A	A
C3.Amnesia for traumatic event (PTSD-RI #15)	A/N	N	D
C4.Loss of interest (PTSD-RI #7)	A/N	N	D
C5. Detachment (PTSD-RI #8)	A/N	N	D
C6.Restricted affect (PTSD-RI #10, 11)	A/N	N	D
C7. Foreshortened future (PTSD-RI #19, 21)	A/N	N	D
D1. Sleep difficulties (PTSD-RI #13)	H	H	D
D2. Irritability/anger (PTSD-RI #4, 20)	H	H	D
D3. Concentration difficulties (PTSD-RI #16)	H	H	D
D4. Hypervigilance (PTSD-RI #1)	H	H	H
D5. Exaggerated startle (PTSD-RI #12)	H	H	H

Note. R, re-experiencing; A, avoidance; N, numbing; H, hyperarousal; D, dysphoria; PTSD-RI #, UCLA PTSD Reaction Index item numbers.

Although there is strong empirical support for the emotional numbing and the dysphoria models, there is evidence of a slightly better fit with the latter (meta-analyzed in Yufik & Simms, 2010). Further, the dysphoria model conceptualizes PTSD as having a large emotional distress factor (dysphoria), unlike the emotional numbing model. There is evidence to suggest that the dysphoria factor may represent the shared emotional distress component between mood and anxiety disorders, probably explaining PTSD's comorbidity with those disorders (Forbes et al., 2011; Gootzeit & Markon, 2011; Miller et al., 2010; Simms et al., 2002; Watson, 2005, 2009). Thus, based on slightly better

empirical support and relevance to the current study's research question involving emotional distress, the current study focuses on the dysphoria model.

Underlying Dimensions of Emotional Distress

Emotional distress in the current study refers to general negative affectivity/general emotional distress according to well-known theoretical models (Clark & Watson, 1991; Mineka, Watson, & Clark, 1998; Watson, 2005, 2009), measured by the Brief Symptom Inventory–18 (BSI-18). The BSI-18 is the latest addition to the series of distress measures by Derogatis following the development of the Symptom Checklist-90-Revised (SCL-90-R) and the BSI. Similar in content but briefer compared to the SCL-90-R and BSI, the BSI-18 was developed as a screening measure for distress. The BSI-18 assesses psychological distress with three dimensions: somatization refers to perception of bodily problems causing psychological distress, depression refers to anhedonia, and sad affect, and anxiety refers to nervousness, apprehension, and tension (Derogatis, 2001).

There have been several studies on the BSI-18's factor structure, with most empirical support for the three-factor inter-correlated model of depression (items 2, 5, 8, 11, 14, and 17), anxiety (items 3, 6, 9, 12, 15, and 18) and somatization factors (items 1, 4, 7, 10, 13, and 16) (Derogatis, 2001; Durá et al., 2006; Galdón et al., 2008; Petkus et al., 2010; Recklitis et al., 2006; J. Wang et al., 2010; Wiesner et al., 2010). Some studies have modified the original three-factor model, either correlating residual error variances between item pairs (Durá et al., 2006; Galdón et al., 2008), or using a hierarchical model with the three factors subsumed under a second-order Global Severity Index (GSI) factor

(Petkus et al., 2010; J. Wang et al., 2010). However, I consider the original three-factor model in this paper because it has the most empirical support.

There are some limitations to the existing BSI-18 factor-analytic studies, including use of EFA compared to the statistically superior CFA (Asner-Self, Schreiber, & Marotta, 2006; Derogatis, 2001; Prelow, Weaver, Swenson, & Bowman, 2005), and smaller sample sizes reducing the power to detect significant findings (Asner-Self et al., 2006; Durá et al., 2006; Petkus et al., 2010). Further, some studies did not compare models using appropriate nested and non-nested comparison statistics such as chi-square difference testing or Bayesian Information Criteria (BIC) values (Petkus et al., 2010; Prelow et al., 2005; Recklitis et al., 2006; J. Wang et al., 2010). The current study aims to avoid the aforementioned limitations by using a large sample (Indian), and statistically superior CFA. Further, consistent with recommendations of the BSI-18 of a sixth grade reading level (Pearson Education Inc, 2012); I decided to use the scale for the child/adolescent age group of at least this educational level. It must be noted that one study has used the BSI-18 with a younger population - as young as 16 years old - and the BSI-18 performed well (Andreu et al., 2008). Thus using the BSI-18 with adolescents in this age range is not entirely novel.

PTSD and Emotional Distress

Initial attempts at understanding the relationship between PTSD and emotional distress began with the tripartite model (Clark & Watson, 1991). According to this model, general emotional distress or negative affect (NA) is a non-specific and shared component to anxiety disorders (including PTSD) and depressive disorders, with specific components of anxiety and depressive disorders being physiological arousal (autonomic

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arousal, and nervous tension) and absence of positive affect (apathy, withdrawal, hopelessness, fatigue) respectively (Clark & Watson, 1991). Building on this model, several other models were developed, including the integrative hierarchical model (Mineka et al., 1998), and the quantitative hierarchical model or the quadripartite model (Watson, 2005, 2009). Model modifications were based on the inability of a single specific component (physiological arousal) to account for the diversity of anxiety disorder symptoms (Mineka et al., 1998; Watson, 2005), questions about the applicability of some tripartite constructs including low positive affect which is characteristic of social phobia and other disorders besides depression (Anderson & Hope, 2008), and presence of other common mechanisms of comorbidity excluding NA (Watson, 2005, 2009).

The most recent model, the quantitative hierarchical or the quadripartite model, proposes that a higher-order factor of emotional disorders (internalizing disorders) has the subclasses of 1) bipolar disorders (bipolar disorders, and cyclothymia), 2) distress disorders with a greater experience of general emotional distress (major depressive disorder, PTSD, dysthymia, generalized anxiety disorder), and 3) fear disorders such as panic disorder, agoraphobia, social and specific phobias (Watson, 2005, 2009). With regard to PTSD, its placement in the model has been debated, conceptualized as a distress disorder by some (Cox, Clara, & Enns, 2002; Slade & Watson, 2006; Watson, 2009) and as both a fear and distress disorder by others (Forbes et al., 2011). On one hand, PTSD's general emotional distress component (Smith et al., 1999; Watson, 2009), mainly represented by the dysphoria factor (Forbes et al., 2011), may account for common variance between PTSD and other disorders (e.g., Cox et al., 2002; Slade & Watson, 2006), thus placing PTSD under distress disorders. On the other hand, PTSD symptoms

of fear conditioning such as hyperarousal and re-experiencing indicate conceptual placement within the fear disorders category (Forbes et al., 2011).

Debatable further is whether PTSD's dysphoria factor, as conceptualized by the dysphoria model, is primarily responsible for PTSD's relation with emotional distress and other mood and anxiety disorders within the distress disorders category. While some studies indicate that dysphoria (representing general distress) does not uniquely account for all of PTSD's comorbidity with other mental disorders (Elhai et al., 2008; G. N. Marshall et al., 2010; Williams, Monahan, & McDevitt-Murphy, 2011), other studies present data challenging this viewpoint (Forbes et al., 2011; Gootzeit & Markon, 2011; Miller et al., 2010; Simms et al., 2002; Watson, Gamez, & Simms, 2005). Thus, the aforementioned contradictory results open up avenues to assess structural relationships between PTSD's dysphoria factor and factors of emotional distress in an attempt to resolve these mixed findings by examining the issue in a more refined way.

There are two basic approaches to assess the relation between two psychopathological constructs such as PTSD and emotional distress. First, one could assess their relation using disorder-based analyses such as comparing participants with and without a PTSD diagnosis. Using a disorder-based approach, one acknowledges differences between several disorders under a broad category; an example includes examining differences between PTSD and phobias under anxiety disorders category (Watson, 2009). Further, one considers a symptomatic sample for analyses. Adding to its significance are differences in PTSD's factor structure parameters among people with and without a PTSD diagnosis (Biehn, Elhai, Fine, Seligman, & Richardson, 2012). Thus, future research could aim to understand differences in PTSD's factor structure between

groups with and without a depression diagnosis, and differences in emotional distress

parameters among people with and without a PTSD diagnosis.

The second approach of assessing structural relations using latent factors is

different from a disorder-based approach by virtue of including people ranging from non-

symptomatic to highly symptomatic. The factor-based approach has several advantages.

First, compared to diagnosis-based analyses requiring the presence of a sufficient number

of diagnosable individuals in the sample, factor analysis can analyze low base-rate

disorders by virtue of requiring only the item-level responses rather than a diagnosis.

Second, factor analysis can circumvent problems related to using dichotomous diagnostic

categories. Third, factor analysis also captures more heterogeneity within disorders,

highlighting the PTSD symptom clusters accounting for comorbidity with other disorders

(common variance) and those specific to PTSD (Watson, 2009). Thus, this approach has

utility for diagnostic criteria revisions (Watson, 2009), and establishing construct validity

for PTSD factors (Elhai & Palmieri, 2011). Based on the advantages of using underlying

dimensions and assessing their structural relations, this is the statistical approach of the

current study.

Relation between PTSD's Dysphoria Factor and BSI-18's Emotional Distress

Factors

Focusing on PTSD's dysphoria factor, studies have indicated dysphoria's stronger

correlation with depression (Gootzeit & Markon, 2011; G. N. Marshall et al., 2010;

Naifeh, Richardson, Del Ben, & Elhai, 2010; Simms et al., 2002; Watson, 2009) and

anxiety symptoms (Gootzeit & Markon, 2011; G. N. Marshall et al., 2010; Simms et al.,

2002) compared to other PTSD dysphoria model factors. However, PTSD's dysphoria

factor is more highly correlated with external measures of depression than with anxiety (Watson, 2009). Further probing into dysphoria's relation with depression using underlying dimensions, results indicate dysphoria's stronger relationship with depression's somatic factor than to depression's non-somatic factor (Biehn et al., 2013; Elhai, Contractor, Palmieri, Forbes, & Richardson, 2011), and the somatic factor's stronger relation to PTSD's dysphoria factor compared to other PTSD dysphoria model factors (Elhai, Contractor, et al., 2011). Thus, dysphoria has a stronger relation to anxiety and depression compared to other PTSD dysphoria model factors; however, it relates more to depression than to anxiety, specifically through depression's somatic component.

Apparent are some limitations of the existing literature investigating the relationship between emotional distress and PTSD. First, most studies assessing the differential relations of PTSD's dysphoria model factors with other psychological conditions have used adult samples (e.g., Elhai, Contractor, et al., 2011; Simms et al., 2002). Further, the few studies analyzing PTSD's differential relation with other psychological conditions in younger samples have not used PTSD's dysphoria model (e.g., Elhai et al., 2013; Saul et al., 2008; L. Wang, Li, et al., 2011). Second, given the debatable idea of whether dysphoria is PTSD's non-specific factor explaining comorbidity with distress disorders (e.g., G. N. Marshall et al., 2010; Miller et al., 2010), there is a need to assess PTSD's relation with distress using underlying dimensions to examine this issue in a more refined manner. Although few studies have assessed PTSD's relation with distress using adult (Smith et al., 1999) and younger samples (Nygaard et al., 2012), they have not examined underlying dimensions of emotional distress. Thus, the current study uses a child/adolescent sample to assess the differential relations

between PTSD's dysphoria factor and BSI-18's three distress factors. Moreover, unique to this study is the focus on the impact of terrorism, explained in detail in the next section.

The 2008 Mumbai Terrorist Attacks

Terrorism refers to any intentional, organized violent act aiming to intimidate people for political or religious purposes (Pathak, 2007), and to induce fear and panic (reviewed in Lee, Isaac, & Janca, 2002). By virtue of being unpredictable, terrorist attacks cause disruption in several areas of life, influencing hospital and school services (Galea & Maxwell, 2009). Overall, terrorist acts can affect the psychological wellbeing of the targeted population (R. D. Marshall & Suh, 2003), leading to anger, sadness, fear, disbelief (Pathak, 2007), distorted perception of safety (Greenberg, Rubin, & Wessely, 2009; Pathak, 2007), distress (North & King, 2009; Pathak, 2007), and PTSD symptoms (North & King, 2009; Pathak, 2007; Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). Evidence indicates that about 28% to 35% people exposed to terrorist attacks may develop PTSD (reviewed in Lee et al., 2002).

Focusing on India, man-made traumatic events (Patel, 2000), and terrorist acts such as taking hostages, riots, communal violence, etc., are increasing (Pathak, 2007). Well-known in recent world history are the November 26, 2008 Mumbai terrorist attacks. During this incident, terrorists attacked five primary targets, including the Taj Mahal hotel (symbolic of Mumbai heritage and architecture), the Oberoi-Trident hotel (popular nationally and internationally), Chatrapati Shivaji Railway Terminus (the busiest commuting network), Café Leopold (popular café with foreign tourists), and Nariman House (Jewish community center). The five secondary targets included a hospital, movie

theater, gas station and two taxis in the city (Acharya, Mandal, & Mehta, 2009). The

terrorists fired weapons, threw grenades (Magnier & Sharma, 2008), and held hostages at

the Taj Mahal hotel for about 60 hours. Statistics indicate that about 166 people (citizens

from India, U.K., USA, Israel, etc.) were killed, 304 people were wounded, and property

worth approximately $8,691,667 was destroyed (excluding the Taj Mahal hotel costs)

(Duraphe, 2009). Thus, the 2008 Mumbai terrorist attacks represented the longest running

terrorist attack in the world, having severe consequences for the financial capital of India

(Acharya et al., 2009).

When assessing the impact of terrorist attacks, some caveats relevant to the

current study need to be considered. First, not only are there direct effects, but also

indirect effects such as shared damage, perceived threat (Norris & Wind, 2009), concern

about loved ones being injured/killed, and witnessing death or injury (Greenberg et al.,

2009; Pfefferbaum et al., 2000). The most common type of trauma among children and

adolescents is learning about a traumatic event (21.4%) or witnessing one (23.7%), both

being vicarious experiences (Copeland et al., 2007). Additionally, indirect exposure

affects people beyond the city of the incident (Hoven et al., 2005; R. D. Marshall & Suh,

2003; Ray & Malhi, 2005; Salib, 2003), mainly attributed to extensive media coverage of

the traumatic event (Hoven et al., 2005; reviewed in Lee et al., 2002; R. D. Marshall &

Suh, 2003; Pfefferbaum et al., 2000; Ray & Malhi, 2005; Schuster et al., 2001). Thus,

assessing indirect (in addition to direct) exposure is important when studying the impact

of terrorism (Galea & Maxwell, 2009; Hoven, Duarte, Turner, & Mandell, 2009; Neria,

Galea, & Norris, 2009; Norris & Wind, 2009).

Second, consideration of the impact of terrorism on child/adolescent mental health is important. Noteworthy is the significant exposure to war/terrorism (0.1%) (Copeland et al., 2007), greater risk for PTSD following such incidents (reviewed in Lee et al., 2002), substantial stress following indirect exposure (Dimaggio & Madrid, 2009; Giaconia et al., 1995; Giannopoulou et al., 2006; Schuster et al., 2001), including anxiety, mood disorders (Hoven et al., 2005), shock and anger feelings (Ray & Malhi, 2005) in this age group. Sensitivity to changes in their environments, exposure to several aftermaths of terrorist attacks such as school evacuations and transportation problems (Dimaggio & Madrid, 2009), and influence of parental traumatization including the effects of the terrorist attacks on parents' mental health (Hoven et al., 2005) are contributing factors to the effects of terrorism on child and adolescent mental health.

Third, the methodology of disaster research has important considerations. To elaborate, 80% of disaster studies used 12-18 year old subjects, with schools (61.9%) being the preferred place for recruitment (Hoven et al., 2009). Further, most disaster studies use accessible convenience samples (about 65%), and cross-sectional data (76.3%; Hoven et al., 2009). Use of convenience samples is attributed to the unpredictable nature of disasters which make it difficult to define the population of interest given practical difficulties in locating the targeted sample, and recruiting participants after post-disaster disruption in communication and transportation services (Galea & Maxwell, 2009). Lastly, there is difficulty in obtaining representative samples as well (Hoven et al., 2009).

The current study addresses the aforementioned caveats, specifically focusing on the influence of man-made disasters (e.g., terrorist attacks) on posttraumatic

psychopathology. Specifically, I aim to assess the differential relation between PTSD's

dysphoria factor and the BSI-18's distress factors following direct or indirect exposure to

the 2008 Mumbai terrorist attacks. Further, I use a convenience, cross-sectional sample of

children and adolescents in the vicinity schools of the terrorist attack targets.

Additionally, I consider the already established significant impact of terrorist attacks on

children and adolescents while evaluating the hypotheses. Lastly, I consider the cultural

context of India, given that the 2008 Mumbai terrorist attacks impacted Indian residents

for the most part.

The Indian Cultural Context

Given that most disaster research is conducted in Western countries (Galea &

Maxwell, 2009), research in an Eastern culture (such as India) is valuable to understand

culturally influenced mental health consequences (Patel, 2000). Despite questions on the

applicability of the Western construct of PTSD in Eastern cultures (Marsella, 2010; Patel,

2000; Pole, Gone, & Kulkarni, 2008; Tummala-Narra, 2007), PTSD has construct

validity in the Indian sample (Mehta, Vankar, & Patel, 2005; Rajkumar, Premkumar, &

Tharyan, 2008). To elaborate, the three *DSM-IV* PTSD symptoms clusters were evident

in the narratives of women exposed to communal violence in India (Mehta et al., 2005).

Further, when traumatic event triggers could not be avoided (e.g., exposure to the sea for

fisherman), people experienced intrusion symptoms and fear of reoccurrence (Rajkumar

et al., 2008). Additionally, given that a Western conceptualization of trauma and distress

is usually recommended as a starting point for research in Eastern cultures (Terheggen,

Stroebe, & Kleber, 2001), a Western PTSD conceptualization in an Indian sample is used

for the current study.

Among the limited number of PTSD studies in India, a majority have used adult samples (Chadda, Malhotra, Kaw, Singh, & Sethi, 2007; Chandra, Satyanarayana, & Carey, 2009; Kar, Jagadisha., Sharma, Murali, & Mehrotra, 2004; Kumar et al., 2007; Suar, Das, & Hota, 2010; Suar & Khuntia, 2004; Telles, Singh, & Joshi, 2009), compared to child/adolescent samples (Bhushan & Kumar, 2007; John, Russell, & Russell, 2007; Kar et al., 2007). Although there are epidemiological studies on prevalence of mental health disorders (e.g., 12%) among children and adolescents in the Indian culture (Srinath et al., 2005), there are no known PTSD epidemiological studies. PTSD prevalence rates based on individual studies of younger samples in India range from 30.6% (Kar et al., 2007) to 81.6% (John et al., 2007), with the wide range of prevalence rates possibly attributed to the lack of structured diagnostic interviews, difference in timeline of symptoms assessment, and greater reliance on self-report assessments. Further, prevalence of distressing sub-clinical PTSD symptoms (Chandra et al., 2009; Kar et al., 2007), and persistent emotional distress (fear, withdrawal, etc.) following traumatic event exposure in an Indian sample (Bhushan & Kumar, 2007) makes it even more imperative to study PTSD at a factor-based rather than a diagnostic level.

Exposure to traumatic events in India is associated with PTSD, and comorbid depression (Chadda et al., 2007; Chandra et al., 2009; Kar et al., 2004; Terheggen et al., 2001; Varma, Chandra, Thomas, & Carey, 2007), anxiety (Chadda et al., 2007; Chandra et al., 2009; Kar et al., 2004; Suar & Khuntia, 2004; Terheggen et al., 2001), and somatic symptoms in adults (Chadda et al., 2007; Chandra et al., 2009; Kar et al., 2004; Varma et al., 2007). Similar trends follow with children and adolescent sample studies (Kar et al.,

2007); however, child and adolescent sample studies are relatively fewer compared to adult sample studies, further highlighting the importance of the current study.

The Indian culture has some distinct social characteristics and values that can serve as risk or buffering factors for PTSD. First, there is evidence to suggest better adjustment to traumatic events with social support (meta-analyzed in Brewin, Andrews, & Valentine, 2000). India, mainly a collectivistic society (Hofstede, 2001; Kim, Atkinson, & Umemoto, 2001; Sinha, Vohra, Singhal, Sinha, & Ushashree, 2002; Triandis, 1993), focuses on interdependence with others, and community needs and goals (Markus & Kitayama, 1991). This cultural value of community interdependence, and societal and family bonding can increase resiliency and better coping with traumatic events in the Indian culture (Bhushan & Kumar, 2007; Kayser, Wind, & Shankar, 2008; Tummala-Narra, 2007). In fact belonging to a joint family type (i.e., several generations living together) which is common in India, reduces the emotional impact of the traumatic event among children and adolescents, again reflecting the importance of social support (Bhushan & Kumar, 2007). Second, strengthening religious and spiritual beliefs to cope with traumatic events is valued in the Indian culture (Rajkumar et al., 2008), examples being viewing survival as God's gift, engaging in religious and public rituals to grieve collectively, and belief in reincarnation (Rajkumar et al., 2008). The religious and spiritual beliefs may be associated with better adjustment (Chen & Koenig, 2006).

Referencing Indian cultural risk factors for PTSD after trauma exposure in children and adolescents are loss of family and community support (Bhushan & Kumar, 2007), thus emphasizing the need for family restructuring and strengthening communal support during PTSD intervention (Kayser et al., 2008; Rajkumar et al., 2008). One very

important example is that of the Indian government offering financial incentives to widowers who remarried to aid re-establishment of family structure (Kayser et al., 2008). Further, Indians with greater external locus of control may put in lesser effort to cope with the after-effects of the disaster (Suar et al., 2010). This may lead to more passive coping, possibly contributing to greater PTSD severity. Additionally, India as a developing country may have inadequate warning systems and inadequate preparedness for disasters, exacerbating the traumatic event impact (Suar et al., 2010). Lastly, reluctance in disclosing mental health problems, reluctance in expressing strong and negative emotions (Pole et al., 2008), and stigma/shame attached to help-seeking for mental health concerns in Asian cultures such as India (Varma et al., 2007; Wynaden et al., 2005) could minimize expression of PTSD and comorbid symptoms, even for the current study. Having a family member with a diagnosable mental health condition usually results in their isolation from community and under-utilization of mental health services (Wynaden et al., 2005).

Noteworthy is the distress expression in several non-Western cultures such as India through somatic symptomatology as indicated by empirical evidence and theory (Bhui, Bhugra, & Goldberg, 2002; Marsella, Friedman, Gerrity, & Scurfiled, 1996; Marsella, Friedman, & Spain, 1996; Patel, Pereira, & Mann, 1998; Pole et al., 2008). Evidence indicates that responses to psychosocial stressors or potentially traumatic events such as car accidents are more related to presentation of somatic symptoms (compared to psychological symptoms) to medical professionals. However, there is awareness of psychological explanations (i.e., linked to emotions or mind) for somatic symptoms (Patel et al., 1998). A study on a north Indian Tibetan refugee sample indicated greater

endorsement of the somatic components of anxiety and depression distress scales in response to a traumatic event (Terheggen et al., 2001). Somatic symptoms are associated with internalization of stress consequent to the stigma attached to psychological help-seeking, especially for women (Varma et al., 2007). Hence, the prominence of somatic symptoms in non-Western cultures could be attributed to different cultural meanings and interpretations of somatic symptoms, and encouraging interpersonal responses towards expression of certain somatic symptoms (Kirmayer & Sartorius, 2007). Thus, given that traumatic event exposure in India relates to significant somatic symptoms (e.g., Chadda et al., 2007), which also function to express distress in similar Eastern cultures (e.g., Bhui et al., 2002), one could extrapolate prevalence of more PTSD somatic symptoms (e.g., sleep problems) following traumatic exposure in India. However, this research question has not yet been empirically studied to my knowledge.

Of relevance is that the aforementioned Indian cultural aspects may influence symptom expression (reviewed in Cohen et al., 1998; Frey, 2001; Kirmayer & Sartorius, 2007; Marsella & Christopher, 2004; Marsella, Friedman, Gerrity, et al., 1996; Pole et al., 2008; Wilson, 2007) such as PTSD's underlying dimensions, in turn influencing diagnostic comorbidity (reviewed in Hinton & Lewis-Fernández, 2010) even with emotional distress factors. Although there seems to be similarity in patterns of PTSD's comorbidity in Eastern and Western cultures, certain limitations of prior Eastern culture studies add to the importance of the current study. First, few Eastern culture studies have analyzed psychopathology using latent factors (L. Wang, Di Long, Li, & Armour, 2011; L. Wang, Li, et al., 2011). Thus, one cannot discount the possibility that Indian cultural values (risk or buffering factors of PTSD) may influence the current study's PTSD and

emotional distress latent factors, and thereby their factor-level relations. Second, the few Eastern culture studies assessing PTSD's relation with psychopathology using latent factors were on Chinese adolescent samples, and did not consider somatic symptomatology (L. Wang, Di Long, et al., 2011; L. Wang, Li, et al., 2011), despite their widespread prevalence in Eastern cultures (e.g., Marsella, Friedman, & Spain, 1996; Pole et al., 2008). Thus, in contrast to prior studies is the current study's focus on a different Eastern culture of India using the PTSD dysphoria model, and consideration of somatic distress symptoms.

Current Study

The current study differs from the existing literature in several ways. First, the study adds to the literature on developmental manifestation of PTSD (reviewed in Cohen et al., 1998; Pynoos et al., 2009) by using a child and adolescent sample for factor-analytic research, which is not as widely researched as other age groups (Saul et al., 2008; Scheeringa et al., 2011). Further, there is limited research using younger samples in other cultures (e.g., Elklit & Petersen, 2008; Wickrama & Kaspar, 2007). Second, the current study assesses the relation between PTSD's dysphoria factor and BSI-18's three distress factors using underlying dimensions, which to our knowledge has not been researched. This research question is important given the ongoing question of whether the dysphoria factor is PTSD's only non-specific factor possibly explaining all comorbidity with other distress category disorders (e.g., G. N. Marshall et al., 2010; Miller et al., 2010). Additionally, the current study considers somatic symptoms in addition to anxiety and depression, given that non-Western cultures express distress through somatic symptomatology (e.g., Pole et al., 2008).

Third, the sample is homogeneous in terms of their exposure to terrorist attacks, which has been rarely studied with regards to PTSD's factor structure and relation with latent factors of psychopathology. Fourth, the impact of terrorist attacks in India is not well researched (Kar, 2010), even though these incidents are on the rise (Pathak, 2007). Most Indian PTSD studies have addressed exposure to natural disasters (Chadda et al., 2007; John et al., 2007; Kar et al., 2004; Kar et al., 2007; Kumar et al., 2007; Suar et al., 2010; Telles et al., 2009), or interpersonal violence incidents (Chandra et al., 2009; Varma et al., 2007). Fourth, the current study uses an Indian cultural sample, different from mainstream work in Western cultures (Galea & Maxwell, 2009). Statistics indicate that among disaster studies with sample sizes greater than 100, about 66% were conducted in the U.S. (Hoven et al., 2009). The relevance of the study is further highlighted with statistics showing that Asian Americans (including Indians) are one of the fastest growing ethnic groups in the U.S. (Pole et al., 2008; The Associated Press, 2012), and are underrepresented in the PTSD literature (Pole et al., 2008).

Overall, the current study tests specific hypotheses about the relationship between PTSD's dysphoria factor and the BSI-18's three distress factors. The two research questions and specific hypotheses are:

1. Does PTSD's dysphoria factor better account for general emotional distress compared to other PTSD dysphoria model factors?

   a. It is hypothesized that the BSI-18's somatization factor will be more related to PTSD's dysphoria factor than to other PTSD factors, based on research indicating expression of general emotional distress as somatic symptoms in Eastern cultures such as India (Kar et al., 2007; Marsella,

Friedman, Gerrity, et al., 1996; Marsella, Friedman, & Spain, 1996; Pole et al., 2008).

b. It is hypothesized that the BSI-18's anxiety factor will be more related to PTSD's dysphoria factor than to other PTSD factors based on similar previous research (Gootzeit & Markon, 2011; G. N. Marshall et al., 2010; Simms et al., 2002).

c. It is hypothesized that the BSI-18's depression factor will be more related to PTSD's dysphoria factor than to other PTSD factors based on similar previous studies (Gootzeit & Markon, 2011; Naifeh et al., 2010; Simms et al., 2002; Watson, 2009).

2. Which component of general emotional distress has the greatest association with PTSD's dysphoria factor (related to PTSD's placement in the quadripartite model)?

a. It is hypothesized that PTSD's dysphoria factor will be more related to BSI-18's somatization factor than to BSI-18's depression factor. This hypothesis considers evidence of distress expression though somatic symptoms in Eastern cultures such as India (Bhui et al., 2002; Marsella, Friedman, Gerrity, et al., 1996; Marsella, Friedman, & Spain, 1996; Patel et al., 1998; Pole et al., 2008) and presence of somatic symptoms such as headaches (Kar et al., 2007), and pain symptoms (Chadda et al., 2007) following traumatic event exposure in an Indian sample.

b. It is hypothesized that PTSD's dysphoria factor will be more related to BSI-18's depression factor than to BSI-18's anxiety factor. This

hypothesis is supported by research demonstrating dysphoria's closer

relationship with external measures of depression more so than anxiety

(Elhai et al., 2013; L. Wang, Di Long, et al., 2011; L. Wang, Li, et al.,

2011; Watson, 2009).

c. It is hypothesized that PTSD's dysphoria factor will be more related to

BSI-18's somatization factor than to BSI-18's anxiety factor. Although

Western culture research indicates a relation between PTSD's dysphoria

and anxiety symptoms (Gootzeit & Markon, 2011; G. N. Marshall et al.,

2010; Simms et al., 2002), evidence indicates expression of distress

through somatic symptoms in Eastern cultures such as India (Bhui et al.,

2002; Marsella, Friedman, Gerrity, et al., 1996; Marsella, Friedman, &

Spain, 1996; Patel et al., 1998; Pole et al., 2008), thus forming the basis of

the aforementioned hypothesis.

Significance

Assessing structural relations between PTSD's dysphoria and distress latent

factors in a non-Western cultural setting and a different age group with a different

traumatic event exposure than often examined has theoretical, research, and clinical

implications.

Theoretical. The results of the current study will help assess if PTSD's dysphoria

captures all of the distress components, based on our conceptualization of distress as a

heterogeneous construct. This will add to the on-going debate on dysphoria's role in

explaining PTSD's inherent and non-specific distress (e.g., Simms et al., 2002). Further,

understanding if PTSD's dysphoria captures all distress components relative to other

PTSD factors, and assessing the distress factor most related to PTSD's dysphoria can add to the latest common factor model (quantitative hierarchical model) in terms of PTSD's placement under the "distress" disorders category, and comorbidity (common variance) with other distress disorders (Watson, 2005, 2009).

With reference to implications for *DSM-V*, results could inform PTSD's placement with anxiety or mood disorders, subsequently influencing our conceptualization of PTSD as a mood or anxiety disorder, our understanding of its comorbidity with other mood and anxiety disorders, and treatment protocols. Given that the *DSM-V* PTSD criteria has more symptoms representing non-specific dysphoria (Koffel, Polusny, Arbisi, & Erbes, 2012), it would be interesting to extend the current study to the proposed revised criteria as well.

Further, hypotheses about PTSD's dysphoria in relation with distress latent factors are mainly derived from Western-culture based research. Assessing if Western cultural research could inform research findings in an Eastern culture such as India has implications for the cross-cultural validity and generalizability of PTSD's factor structure. Lastly, given that most of the current study's hypotheses are extrapolated from adult sample research, results can inform factor-level relations between PTSD and distress in a younger age group.

Clinical. Results regarding dysphoria's relationship with specific emotional distress factor/s will be of diagnostic and therapeutic value for a clinician (McHugh & Treisman, 2007). To elaborate, the clinician can pay attention to specific emotional distress symptoms comorbid with PTSD's dysphoria in treatment, emphasizing their simultaneous reduction in severity as therapy goals. Further, assessing which specific

emotional distress factor is most related to PTSD's dysphoria may indicate or explain

increased comorbidity with either depressive, anxiety or somatic-symptom based

disorders. Additionally, the current study will highlight distress reactions other than

PTSD symptoms following trauma exposure, which needs to be the focus of treatment for

the child/adolescent age group (Trickey et al., 2012). Lastly, the results may de-

emphasize considering PTSD as simply a diagnosis or a "total score", but rather it would

be helpful to look at its underlying dimensions to capture PTSD's heterogeneity and a

client's standing on these individual dimensions.

Statistical. The current study is the only attempt (to our knowledge) to assess

PTSD's factor structure in the Indian culture, possibly opening up future avenues for

structural modeling research in India.

Chapter Two

Method

Participants/Procedure

The current study used archival data collected by the Department of Psychology, Mithibai College in Mumbai, India. The targeted sample was about 1616 children and adolescents (5th through 10th grades) attending English-medium schools in the vicinity of the 2008 Mumbai terrorist attack targets. Out of the 1616 participants, 48 refused to participate resulting in a response rate of 97.02%. The schools involved in data collection were Campion School (Fort), Holy Name School (Colaba), Villa Theresa School (Peddar road), Army School (Colaba), and St. Joseph High School (Colaba). Data collection occurred between January 1st and 15th, 2009. The aforementioned project was approved by the Department of Psychology (Mithibai college), and the principals of the targeted schools.

Data were collected by 25 undergraduate psychology students of Mithibai College, trained by Ms. Panna Mehta (Professor at the Department of Psychology). Two to three trained undergraduates per session administered questionnaires to classes with an average size of 40 students. Procedurally, they presented the students with a brief introduction to the purpose of the project (to understand problems experienced on exposure to terrorist attacks), emphasizing choice to participate or refuse participation. The collected data were stored securely in the psychology laboratory at the Department of Psychology (Mithibai College), with limited access to authorized personnel.

Data entry into a secure web database was completed by 32 undergraduate psychology students of Mithibai college, almost a year and half after data collection. In

collaboration with my dissertation committee chair and Ms. Panna Mehta, guidelines were developed to promote consistent and accurate data entry. Guidelines included leaving the response blank if subject indicated "don't know or unknown"; using the lowest number if subject indicated a range of answers; using the first answer if subject indicated multiple responses; calculating the year of the traumatic event for the life events questionnaire when subject was unclear (if possible); and indicating any problems with data entry and their solution. I later reviewed the section on "problems and solutions" to determine if the instructions were followed accurately, making appropriate changes to the entered data when needed.

Instrumentation

Among the several instruments administered as part of the original project, only assessments relevant to the current study's research questions are described in detail.

Demographic information. Information regarding one's age, gender, school grade, religion, and family income was obtained.

Experience with the 2008 Mumbai terrorist attacks. Information was obtained regarding one's personal experiences referencing direct exposure (e.g., being physically hurt by the terrorist event), and that of friends/relatives/family members referencing indirect exposure to the 2008 Mumbai terrorist attacks (e.g., family members/friends/relatives being physically hurt/experiencing death, knowing someone personally who was hurt by the events, being close to the place of the attacks, being in personal contact with victims). This information ensured participant's direct or indirect exposure to the incident. Further, the participants were asked if they followed the situation closely via media. Reactions to the 2008 Mumbai attacks were assessed in terms

of feelings of fear, helplessness and/or horror using a five-point Likert scale.

Traumatic events. Information regarding exposure to other traumatic events (unrelated to the terrorist attacks) was also obtained, including death of a close acquaintance, personal danger of injury or death, severe car accident, victim of another terrorist attack, severe disease (oneself or someone close), being a crime victim or witness, sexual assault, crime involvement, or "other" to capture any unlisted traumatic event. Further, information regarding additionally problematic (not necessarily traumatic) events was also obtained, including financial collapse, divorce, drug or alcohol problems, or "other" to capture any unlisted problematic event. For the positively endorsed traumatic or problematic events, the year of occurrence was also asked. Although this questionnaire is unstandardized, several items (e.g., car accident, severe disease, crime victim, sexual assault) are similar to traumatic events queried in well-standardized measures such as the Stressful Life Events Screening Questionnaire (Goodman, Corcoran, Turner, Yuan, & Green, 1998) and the Trauma History Questionnaire (Green, 1996).

Brief Symptom Inventory-18 (BSI-18). The BSI-18 is an 18-item self-report measure of psychological distress referencing the past week, with items rated on a 5-point Likert scale ranging from 0 ("not at all") to 4 ("extremely"). Scores are obtained for the three dimensions of somatization (distress related to bodily problems), depression (anhedonia and sad affect), and anxiety (apprehension and panic-like symptoms), in addition to an overall GSI score (Derogatis, 2001). For the current study, distress was assessed for the past seven days, without reference to any particular traumatic event. Regarding psychometric properties, evidence of good full-scale internal consistency is

reflected in a Cronbach's alpha of 0.89 in the current study and prior studies (Andreu et al., 2008; Derogatis, 2001; Durá et al., 2006; Zabora et al., 2001). Further, there is evidence of adequate internal consistency for the anxiety scale ranging from .71 to .79, depression scale ranging from .84 to .88, and somatization scale ranging from .74 to .80 (Andreu et al., 2008; Derogatis, 2001; Durá et al., 2006). Additionally, the BSI-18 scales have adequate convergent and discriminant validity (Andreu et al., 2008; Derogatis, 2001; Petkus et al., 2010). To elaborate, the BSI-18's depression subscale correlated with other depression measures including the Beck Depression Inventory (BDI) measure (.83), the Minnesota Multiphasic Inventory-2 (MMPI-2) Depression subscale (.78; Andreu et al., 2008), and the SCL-90-R Depression subscale (.93; Derogatis, 2001). The BSI-18's somatization subscale correlated with measures of physical symptoms including the Beck Anxiety Inventory's (BAI) Physical Symptoms (.81) and Subjective Anxiety/Panic (.77) subscales (Andreu et al., 2008), and SCL-90-R's Somatization subscale (.91; Derogatis, 2001). Furthermore, the BSI-18's anxiety subscale correlated with other measures of anxiety including the MMPI-2 Anxiety scale (.66) (Andreu et al., 2008), and SCL-90-R's Anxiety subscale (.96; Derogatis, 2001). Finally, the BSI-18's depression and anxiety subscales effectively discriminate between those with and without a depressive and anxiety disorder respectively (Petkus et al., 2010).

The UCLA PTSD Reaction Index (PTSD-RI). The PTSD-RI (Steinberg et al., 2004) is a 22-item self-report questionnaire, assessing PTSD symptoms in children and adolescents. Referencing the past month, items are rated on a 5-point Likert-type scale ranging from "0" (*none of the time*) to "4" (*most of the time*). Twenty items reflect the 17 *DSM-IV* PTSD symptoms, with a pair of items (two alternative items) assessing each of

the *DSM-IV* PTSD symptoms C6, C7, and D2. For the current study, the two additional items that assess PTSD's associated features (fear of recurrence and trauma-related guilt) were excluded to be consistent with the *DSM-IV* PTSD criteria. Further, the current study's PTSD-RI questions referenced the 2008 Mumbai terrorist attack incident.

Regarding psychometric properties, the PTSD-RI has excellent internal consistency as reflected in a Cronbach's alpha of 0.90 (Steinberg et al., 2013), 0.85 (Ellis, Lhewa, Charney, & Cabral, 2006), .87 (Jensen, Dyb, & Nygaard, 2009), and 0.91 in the current study. Good full-scale internal consistency in other racial groups such as American Indian/Alaskan Native (.88), African American (.89), and Hispanic/ Latino (.90) indicate applicability to other cultural groups (Steinberg et al., 2013). Further, the scale has good convergent and adequate discriminant validity comparing it to the Trauma Symptom Checklist for Children Scale scores (Steinberg et al., 2013), and to the War Trauma Screening Scale and Depression Self-Rating Scale scores (Ellis et al., 2006). Finally, evidence indicates good fit for PTSD's dysphoria model with a sample of adolescents using the PTSD-RI (Armour, Elhai, et al., 2011; Armour, Layne, et al., 2011).

Exclusions and Treatment of Missing Data

The effective sample had some restrictions. First, I included children and adolescents who are 11 years and older, consistent with BSI-18's recommended reading level (Pearson Education Inc, 2012). Second, the sample was limited to those endorsing some personal experience (direct exposure) or experience of family members/relatives/friends (indirect exposure) with the 2008 Mumbai terrorist attacks as assessed by the section on "Experience with the 2008 Mumbai terrorist attacks." Lastly, I

further restricted the sample to participants not missing more than 30% of items on the PTSD-RI (6 or more items) or on the BSI-18 (6 or more items) to ensure sufficient items to inform missing value estimates (Graham, 2009; Schafer & Graham, 2002).

Additionally, I evaluated the pattern of missingness for the remainder of the missing PTSD-RI and BSI-18 data using Little's Missing Completely at Random (MCAR) test with the Statistical Package for the Social Sciences 17 (SPSS) software. Patterns of missingness could be of three types: Missing Completely at Random (MCAR), Missing at Random (MAR), and Missing Not at Random (MNAR; Schafer & Graham, 2002). With MCAR, the missing values are unrelated to observed or unobserved data, whereas for MAR the missing values are related to the observed data (including the participants' own responses on some variables). For MNAR, the missing values depend on the unobserved data, hence called non-ignorable missingness (Schafer & Graham, 2002). Further, compared to MAR and MCAR, MNAR can lead to biased parameter estimates that are not representative of expected population values (Graham, 2009). A significant Little's MCAR value indicates a non-MCAR pattern.

In the current study, it was determined a priori that missing values would be estimated using Maximum Likelihood (ML) estimation for an MCAR pattern, and Multiple Imputation (MI) for a non-MCAR pattern (Graham, 2009; Schafer & Graham, 2002). MI imputes values for missing items based on information from the entire dataset, subsequently averaging parameter estimates across several such imputed datasets to obtain the effective values for final analyses (Graham, 2009; Schafer & Graham, 2002). ML, an iterative process, uses equations to calculate missing value estimates that inform subsequent iterations until there is data convergence with little difference between two

subsequent iterations (Graham, 2009; Schafer & Graham, 2002).

Analysis

Initial analyses using SPSS 17 assessed for the assumptions of univariate normality which is violated with skewness > 2 or kurtosis > 7 for the PTSD-RI and BSI-18 items (Curran, West, & Finch, 1996). Further, descriptive analyses entailed assessing the relation between number of traumatic events experienced and endorsed PTSD severity, and difference in PTSD severity among those with and without direct exposure. Primary analyses with the Mplus 6.12 software (Muthén & Muthén, 1998-2007) entailed two steps.

CFA. The first CFA estimated fit of the PTSD dysphoria model using the PTSD-RI items, with the proposed item mappings shown in Figure 1. Noteworthy is that for the PTSD-RI's alternative versions of the *DSM-IV* PTSD symptoms C6, C7 and D2, error variances (variance in the observed variable not accounted for by the latent variable) were allowed to correlate for each pair based on wording similarity and the pair contributing to the same *DSM-IV* PTSD symptom. Correlating theoretically justified error variances aids appropriate interpretation of the proposed latent factors, obtaining appropriate factor loadings for the items, and appropriate model fit estimation (Cole, Ciesla, & Steiger, 2007). An additional CFA assessed fit of the inter-correlated three-factor model using the BSI-18 items, with the proposed item mappings shown in Figure 2. The third CFA assessed the fit of the model combining PTSD's dysphoria model and BSI-18's three-factor inter-correlated model.

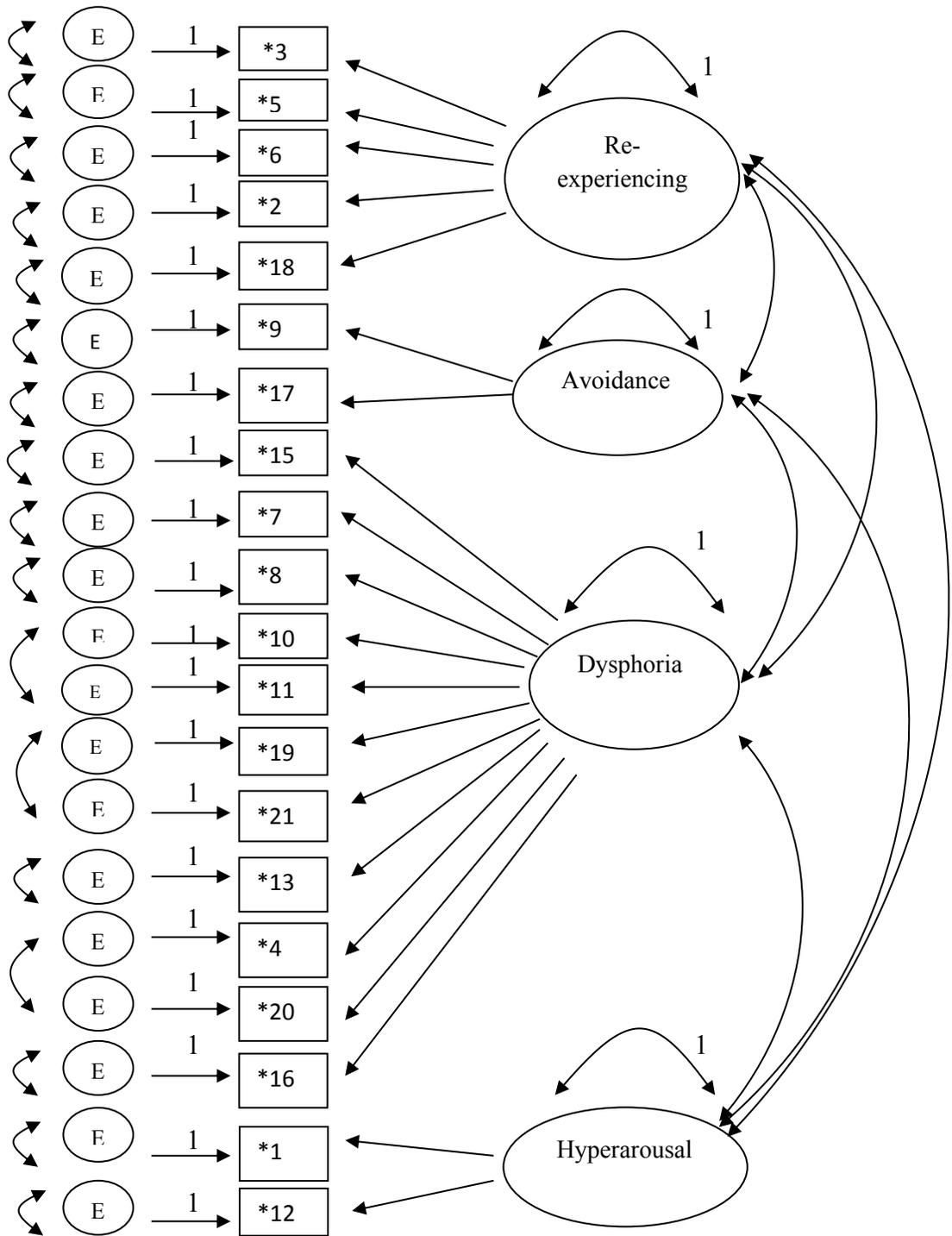*Figure 1.* Item mappings of the PTSD dysphoria model using the PTSD-RI items

Note. Numbers with * refer to the corresponding PTSD-RI items; E refers to error terms; items 10 and 11, 19 and 21, and 4 and 20 have correlated error variances.
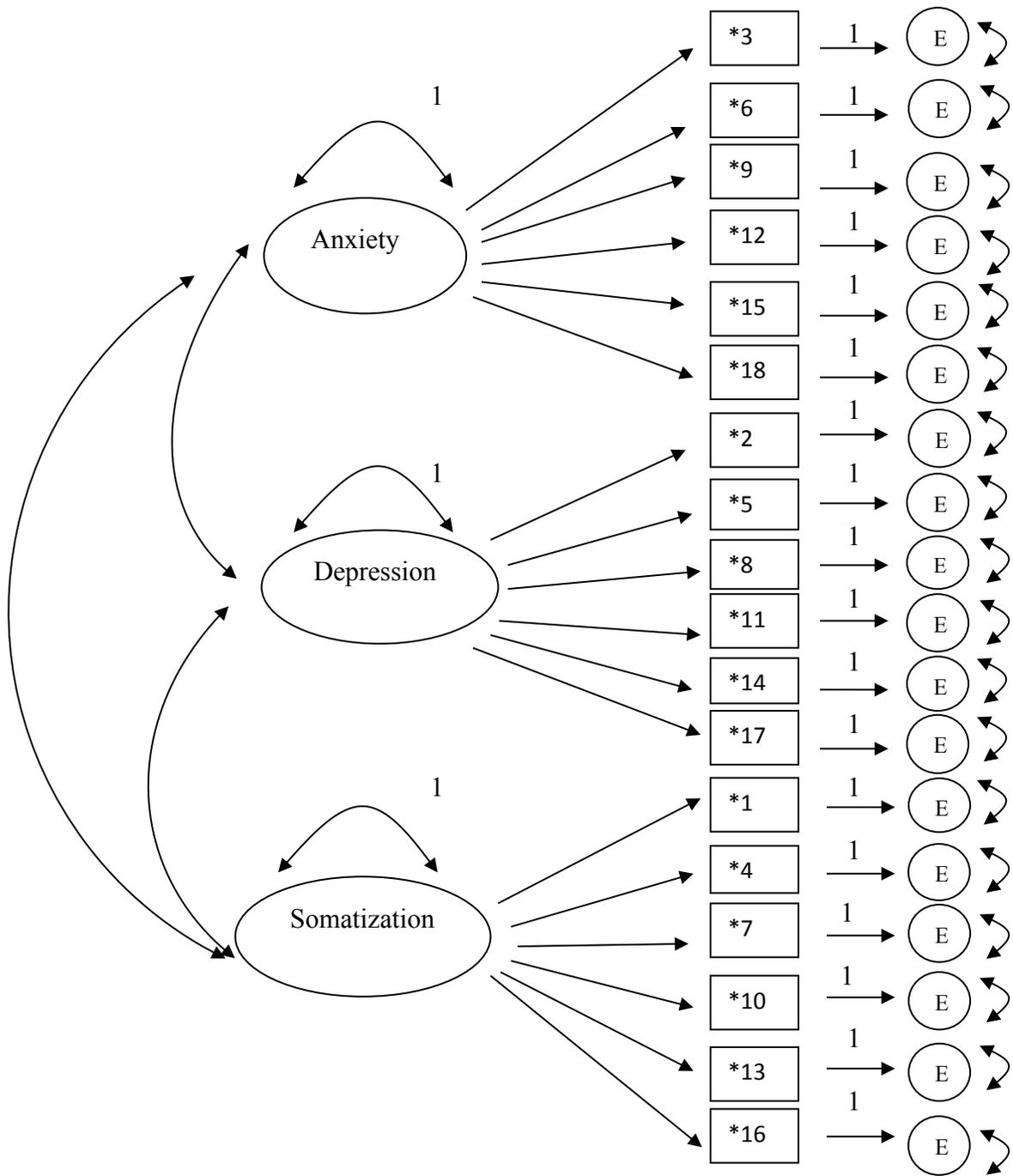
Figure 2. Item mappings of the BSI-18 three-factor inter-correlated model.

Note. Numbers with * refer to the corresponding BSI-18 items; E refers to error terms.

For all CFAs, I ensured model identification (ability to derive a unique set of parameter estimates) by scaling latent factors (providing a metric for the factors) and obtaining model degrees of freedom greater than or equal to zero (Kline, 2011). Scaling involves assigning a constant such as "1", providing a way to "fix" the parameter as a reference point for other estimations, and for standardization purposes. Factor variances were scaled to "1" (Unit Variance Identification), with all factor loadings being freely estimated. Further, error terms were scaled to "1" (Unit Loading Identification) wherein I only estimated the error term's variance (Kline, 2011). Further, referencing the model degrees of freedom for the PTSD-RI items, the difference between the number of observations (230) and free parameters (69) was greater than 0 (overidentified model; df = 161), satisfying the model identification requirement. For the BSI-18 items, the difference between the number of observations (171) and free parameters (39) was greater than 0 (overidentified model; df = 132), also satisfying the model identification requirement. Additionally, alpha levels of .05 and two-tailed tests were used.

Model estimation in CFA is contingent on meeting assumptions of normality for continuously scaled study items (Kline, 2011). The PTSD-RI and the BSI-18 items were treated as continuous (five response options for each item), with the use of Pearson covariance matrices and linear regression paths to estimate factor loadings. Further, Maximum Likelihood (ML) or Maximum Likelihood with a mean-adjusted chi-square (MLM) estimation was used for normal or non-normal data respectively. The ML method (normal theory method necessitating data normality) is a statistical iterative process that improves the originally derived estimates representing fit between the sample and population data through subsequent calculations (Kline, 2011). However, when the

assumption of normality is violated, the ML based model fit indices are inflated (Curran et al., 1996; Kline, 2011), and standard errors are lower leading to greater Type I error possibility (Kline, 2011). Thus, a corrected normal theory method (corrects for non-normality) such as the MLM (Kline, 2011) was used in conditions of non-normal data.

Finally, assessment of model fit used several recommended fit indices. To begin with, a chi-square goodness of fit index assesses the magnitude of discrepancy between the sample and hypothesized covariance matrix, thus a significant value usually means lack of acceptable model fit (Hu & Bentler, 1999). The tendency of the chi-square goodness of fit index to be significant with a larger sample size (Hu & Bentler, 1999) necessitated using additional absolute and incremental fit indices with their recommended cut-off points to reduce Type II error and to ensure acceptable Type I error rates (Hu & Bentler, 1999). Absolute fit indices indicate what proportion of the sample covariance is explained by the model, without using any other reference model, while incremental fit indices indicate improvement in fit using the hypothesized model compared to a baseline restricted model (Hu & Bentler, 1999; Kline, 2011). The former includes root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR) while the latter includes comparative fit index (CFI) and Tucker Lewis Index (TLI). A well-fitting (adequate) model had CFI and TLI values ≥ 0.95 (0.90-0.94), RMSEA value ≤ 0.06 (0.07-0.08), and SRMR value ≤ 0.08 (0.09-0.10) (Hu & Bentler, 1999). Additionally, in the event of non-normal data, an MLM derived Satorra-Bentler (S-B) chi-square statistic, which corrected for non-normality was used in place of the chi-square goodness of fit index (Curran et al., 1996; Satorra & Bentler, 2001). The S-B

statistic, a corrected model test statistic adjusts the ML obtained chi-square value per degree of kurtosis (Kline, 2011).

Wald chi-square tests of parameter constraints. The second step of the primary analyses consisted of computing Wald chi-square tests of parameter constraints to test hypothesized relations between the PTSD's and BSI-18's latent factors. The Wald chi-square test assessed the null hypothesis that the difference between two correlations is zero. I used an alpha level of .01 to control for Type I error across analyses. For the first research question on whether PTSD's dysphoria factor accounts for all general emotional distress compared to other PTSD factors, I assessed if the BSI-18's somatization (Hypothesis 1), anxiety (Hypothesis 2) and depression factors (Hypothesis 3) were more related to PTSD's dysphoria factor compared to other PTSD factors. For the second research question of which components of general emotional distress have the greatest association with PTSD's dysphoria factor, I assessed if PTSD's dysphoria factor was more related to the BSI-18's somatization factor than to the BSI-18's depression factor (Hypothesis 4) and anxiety factor (Hypothesis 6). Finally, I assessed if PTSD's dysphoria factor was more related to the BSI-18's depression factor than to the BSI-18's anxiety factor (Hypothesis 5).

Results

Exclusions and Treatment of Missing Data

The total sample of 1568 participants was first restricted to those older or equal to

11 years of age, resulting in a truncated sample of 1103 participants. Further, the

subsample of 1103 participants was restricted to those endorsing direct or indirect

exposure to the Mumbai 2008 terrorist attacks, resulting in a further reduced sample of

868 participants. Lastly, this subsample was further restricted to those not missing more

than 30% of items on the PTSD-RI (6 items or greater), or on the BSI-18 (6 items or

greater), resulting in an effective sample of 818 participants.

Among the 818 participants, 87 participants missed 1 item (10.6%), 17

participants missed 2 items (2.1%), 11 participants missed 3 items (1.3%), 6 participants

missed 4 items (.7%), and 2 participants missed 5 items (.2%) on the BSI-18. Further, in

this subsample, 127 participants missed 1 item (15.5%), 42 participants missed 2 items

(5.1%), 12 participants missed 3 items (1.5%), 4 participants missed 4 items (.5%), and 7

participants missed 5 items (.9%) on the PTSD-RI.

Missing value analyses using the SPSS -17 program resulted in a significant

Little's MCAR test value, Little's MCAR test χ^2 (5187) = 6917.3, $p < .001$, indicating a

non-MCAR pattern of missing data. Hence, missing data were imputed using MI with the

Mplus program (Graham, 2009).

Effective Sample Characteristics

The effective sample of 818 participants had a mean age of 12.85 years ($SD =$

1.33), with the majority of participants being male ($n = 435$, 53.8%). Most participants

were enrolled in the 6th ($n = 224$, 28.1%) and 7th ($n = 260$, 32.7%) grades (called classes in India). Further, a majority reported their religion to be Hinduism ($n = 513$, 65.9%), followed by 129 participants indicating Islam (16.6%). Additionally, 316 participants reported their family income to be average ($n = 316$, 47.7%), and 184 reported theirs as higher than average ($n = 184$, 27.8%) compared to the average Indian family. Lastly, fewer respondents endorsed direct exposure to the terrorist attacks ($n = 229$, 28.3%). Referencing the indirect exposure categories, a majority reported being close to the place of the terrorist attacks ($n = 541$, 66.6%), and knowing someone hurt by the terrorist attacks ($n = 407$, 50.2%). Further, 787 participants gave a rating of 2 or greater (either "felt it a little" or more) on items assessing for fear, helplessness or horror in relation to the terrorist attacks (96.2%). Detailed information about demographics and direct/indirect exposure categories is presented in Tables 2 and 3 respectively.

Table 2

Demographic Information of 818 Participants

Variable	Categories	Frequency (n)	Percentage
Gender	Boy	435	53.8
	Girl	373	46.2
Class	4	2	.3
	5	52	6.5
	6	224	28.1
	7	260	32.7
	8	82	10.3
	9	176	22.1
Religion	Hindu	513	65.9
	Muslim	129	16.6
	Christian	60	7.7
	Jain	24	3.1
	Other	52	6.7
Own family income compared to average Indian family	Much higher than average	71	10.7
	Higher than average	184	27.8
	Average	316	47.7
	Lower than average	59	8.9
	Much lower than average	33	5.0

Table 3

Information on Direct and Indirect Exposure, and Reactions to the Terrorist Attack Event

		Frequency (*n*)	Percentage
Direct exposure	Physically hurt by the terrorist attacks	229	28.3
Indirect exposure	Family member/relatives was hurt	138	16.9
	Death of a person (family/relatives).	81	10.0
	A friend was hurt	201	24.6
	Death of a friend	86	10.6
	Knowing anyone personally that was hurt by the terrorist attacks	407	50.2
	Being close to the place where attacks took place	541	66.6
	In personal contact with victims of the disaster	184	23.4
Reaction of fear	Did not feel this at all	62	7.7
	Felt a little	135	16.8
	Felt it somewhat	94	11.7
	Felt it much	179	22.3
	Felt it very much	332	41.4
Reaction of helplessness	Did not feel this at all	133	16.7
	Felt a little	210	26.3
	Felt it somewhat	129	16.2
	Felt it much	175	21.9
	Felt it very much	151	18.9
Reaction of horror	Did not feel this at all	69	8.7
	Felt a little	130	16.5
	Felt it somewhat	105	13.3
	Felt it much	176	22.3
	Felt it very much	309	39.2
Reaction of fear, helplessness or horror	≥ 2 on either reaction of fear, helplessness or horror	787	96.2

Further, referencing other potentially traumatic or problematic events, the most

commonly endorsed was death of a close acquaintance (*n* = 319, 39.5%), and severe

disease on a close person ($n = 282$, 34.9%). Additionally, the mean number of traumatic events endorsed was 1.98 ($SD = 1.76$). Most participants endorsed one ($n = 209$, 25.6%), two ($n = 151$, 18.5%), or three ($n = 125$, 15.3%) traumatic events. Further, there was a significant correlation between number of traumatic events endorsed in the past (excluding the 2008 terrorist attack event) and PTSD severity ($r = .282$, $p < .001$). Lastly, there was a significant difference in PTSD severity between participants with ($M = 21.41$, $SD = 16.70$) and without direct exposure to the terrorist attacks ($M = 18.62$, $SD = 15.56$), t (393.12) $= 2.18$, $p = .03$. Detailed information on traumatic and problematic events endorsement is presented in Table 4.

Table 4

Exposure to Other Potentially Traumatic and Problematic Events

	Frequency (*n*)	Percentage
Death of a close acquaintance (not related to terrorist attacks)	319	39.5
Personal danger of injury or death	165	20.5
Severe car accident	114	14.2
Victim of another terrorist attack	105	13.2
Severe disease (personally)	193	23.9
Severe disease of a close person	282	34.9
Victim or witness of a serious crime	96	12.0
Experiencing an event of financial collapse	116	14.5
Divorce	40	5.0
Sexual assault	41	5.2
Involvement in a crime	29	3.6
Drugs/alcohol abuse problems	52	6.5
Other	69	9.1

Total PTSD-RI scores for the 20 items included in this study averaged 19.50 (*SD* = 15.97). Further using the PTSD *DSM-IV* diagnostic algorithm of at least one re-experiencing symptom, three avoidance/numbing symptoms and two hyperarousal symptoms endorsed as "3" or higher as "much of the time" or "most of the time" (Steinberg et al., 2004), 12.7% (*n* = 104) of these trauma-exposed participants had a probable PTSD diagnosis. Using the recommended cut-off score of 38 or higher (Steinberg et al., 2004) which was prorated as 35 or higher in this study accounting for 20 rather than 22 items, 19% of the trauma-exposed sample probably had a PTSD diagnosis (*n* = 134).

Total BSI-18 scores averaged 12.08 (*SD* = 11.21). Further, the mean and standard deviations of the BSI-18 total score for age groups of less than 13 (*M* = 11.69, *SD* =

11.32) and 13 and older ($M = 12.65$, $SD = 11.02$) were close. Additionally, the reliability coefficients in terms of Cronbach's alpha for the age groups of less than 13 (.892) and 13 and older (.894) were also similar.

Additionally, regarding the idea that distress is expressed more predominantly via somatic symptoms in Eastern cultures, notable are two points. Descriptive analyses of the BSI-18 item frequencies indicated that items referencing anhedonia, being scared, and being fearful were most endorsed (greater than 50% participants rated ≥ 1), whereas several somatic items such as faintness, chest pain and numbness were least endorsed (greater than 70% participants rated them as 0). Even for the PTSD-RI item frequencies, items referencing more of the re-experiencing symptoms such as intrusive thoughts and physiological reactivity to cues were most endorsed (greater than 40% rated ≥ 1), rather than more of the somatic items.

Primary analyses

CFA. Referencing the assumption of normality, some BSI-18 items had skewness > 2 (6 items), and kurtosis > 7 (2 items), and none of the PTSD-RI items had skewness > 2, and kurtosis > 7. Thus, the assumption of normality is violated for the BSI-18 items, prompting one to use MLM as the estimator for the Mplus analyses. CFA indicated a well-fitting four-factor PTSD dysphoria model according to majority of the fit indices, S-B χ^2 ($df = 161$, $N = 818$) = 362.639, $p < .001$, CFI = .95, TLI = .94, RMSEA = .04, SRMR = .04. Factor loadings for the PTSD-RI items per the PTSD's dysphoria model mapping are indicated in Table 5.

Table 5

Standardized Factor Loadings of the PTSD-RI Items per the Dysphoria Model

PTSD–RI items	Dyphoria model mapping
	Re-experiencing
B1. Intrusive recollections (PTSD-R1 #3)	.65
B2. Nightmares (PTSD-RI #5)	.67
B3. Reliving traumas (PTSD-RI #6)	.62
B4. Psychological reactivity to cues (PTSD-RI #2)	.59
B5. Physiological reactivity to cues (PTSD-RI #18)	.66
	Avoidance
C1.Avoidance of thoughts, feelings and conversations (PTSD-RI #9)	.63
C2. Avoidance of people, places and activities (PTSD-RI #17)	.68
	Dysphoria
C3.Amnesia for traumatic event (PTSD-RI #15)	.64
C4.Loss of interest (PTSD-RI #7)	.54
C5. Detachment (PTSD-RI #8)	.66
C6.Restricted affect (PTSD-RI #10, 11)	.56, .63
C7. Foreshortened future (PTSD-RI #19, 21)	.57, .62
D1. Sleep difficulties (PTSD-RI #13)	.60
D2. Irritability/anger (PTSD-RI #4, 20)	.57, .56
D3. Concentration difficulties (PTSD-RI #16)	.64
	Hyperarousal
D4. Hypervigilance (PTSD-RI #1)	.50
D5. Exaggerated startle (PTSD-RI #12)	.54

Note. For all factor loadings, $p < .001$.

Further, CFA indicated an adequately-fitting BSI-18 three-factor intercorrelated model according to majority of the fit indices, S-B χ^2 ($df = 132$, $N = 818$) = 292.962, $p <$ .001, CFI = .93, TLI = .92, RMSEA = .04, SRMR = .04. Table 6 shows the factor loadings of the BSI-18 items per BSI-18's three factor inter-correlated model.

Table 6

Standardized Factor Loadings of the BSI-18 Items per BSI-18's Three Factor Inter-

correlated Model

BSI-18 items	BSI-18 three factor model mapping
	Anxiety
BSI-18 item 3	.56
BSI-18 item 6	.55
BSI-18 item 9	.67
BSI-18 item 12	.62
BSI-18 item 15	.55
BSI-18 item 18	.68
	Depression
BSI-18 item 2	.45
BSI-18 item 5	.47
BSI-18 item 8	.54
BSI-18 item 11	.52
BSI-18 item 14	.64
BSI-18 item 17	.66
	Somatization
BSI-18 item 1	.48
BSI-18 item 4	.48
BSI-18 item 7	.63
BSI-18 item 10	.61
BSI-18 item 13	.64
BSI-18 item 16	.66

Note. For all factor loadings, $p < .001$.

Lastly, a combined CFA of PTSD's dysphoria model and BSI-18's three-factor intercorrelated model fit the data adequately, S-B $\chi^2(df = 641, N = 818) = 1291.967, p < .001$, CFI = .91, TLI = .90, RMSEA = .04, SRMR = .04.

Wald chi-square tests of parameter constraints. The first research question addressed if PTSD's dysphoria factor better accounts for general emotional distress compared to other PTSD dysphoria model factors. The first three hypotheses analyzed the first research question. The first hypothesis stating that BSI-18's somatization factor

will be more related to PTSD's dysphoria factor than to other PTSD factors was partly

supported. Based on Wald test results, BSI-18's somatization factor was not significantly

more related to PTSD's dysphoria factor ($r = .639$, $p < .001$) than to PTSD's re-

experiencing factor ($r = .576$, $p < .001$), Wald $\chi^2(1, N = 818) = 3.75$, $p = .053$; however, a

p value of .053 with a slightly larger sample could have been statistically significant.

Further, BSI-18's somatization factor was significantly more related to PTSD's dysphoria

factor ($r = .639$, $p < .001$) than to PTSD's avoidance factor ($r = .532$, $p < .001$), Wald

$\chi^2(1, N = 818) = 7.025$, $p = .008$. Additionally, BSI-18's somatization factor was not

significantly more related to PTSD's dysphoria factor ($r = .639$, $p < .001$) than to PTSD's

arousal factor ($r = .621$, $p < .001$), Wald $\chi^2(1, N = 818) = .077$, $p = .781$.

The second hypothesis stated that the BSI-18's anxiety factor will be more related

to PTSD's dysphoria factor than to other PTSD factors; this hypothesis was not

supported. Based on the Wald test results, the BSI-18's anxiety factor was not

significantly more related to PTSD's dysphoria factor ($r = .656$, $p < .001$) than to PTSD's

re-experiencing factor ($r = .701$, $p < .001$), Wald $\chi^2(1, N = 818) = 2.293$, $p = .13$; to

PTSD's avoidance factor ($r = .667$, $p < .001$), Wald $\chi^2(1, N = 818) = .08$, $p = .778$; and to

PTSD's arousal factor ($r = .735$, $p < .001$), Wald $\chi^2(1, N = 818) = 1.73$, $p = .189$.

The third hypothesis, which states that the BSI-18's depression factor will be

more related to PTSD's dysphoria factor than to other PTSD factors was partly

supported. Based on Wald test results, the BSI-18's depression factor was more

significantly related to PTSD's dysphoria factor ($r = .78$, $p < .001$) than to PTSD's

avoidance factor ($r = .655$, $p < .001$), Wald $\chi^2(1, N = 818) = 10.556$, $p = .001$. However,

the BSI-18's depression factor was not significantly more related to PTSD's dysphoria

factor ($r = .78$, $p < .001$) than to PTSD's re-experiencing factor ($r = .705$, $p < .001$), Wald $\chi^2(1, N = 818) = 6.023$, $p = .014$; although a p value of .014 could possibly reach significance with a slightly larger sample. Additionally, the BSI-18's depression factor was not significantly more related to PTSD's dysphoria factor ($r = .78$, $p < .001$) than to PTSD's arousal factor ($r = .667$, $p < .001$), Wald $\chi^2(1, N = 818) = 3.313$, $p = .069$.

The second research question addressed which component of general emotional distress has the greatest association with PTSD's dysphoria factor. The next three hypotheses are relevant to the second research question. The fourth hypothesis stating that PTSD's dysphoria factor will be more related to the BSI-18's somatization factor than to the BSI-18's depression factor was not supported. In fact, PTSD's dysphoria factor was significantly more related to the BSI-18's depression factor ($r = .78$, $p < .001$) than to the BSI-18's somatization factor ($r = .639$, $p < .001$), Wald $\chi^2(1, N = 818) = 16.391$, $p < .001$. The fifth hypothesis stated that PTSD's dysphoria factor will be more related to the BSI-18's depression factor ($r = .78$, $p < .001$) than to the BSI-18's anxiety factor ($r = .656$, $p < .001$); this hypothesis was supported, Wald $\chi^2(1, N = 818) = 19.505$, $p < .001$. Lastly, the sixth hypothesis, stated that PTSD's dysphoria factor will be more related to the BSI-18's somatization factor ($r = .639$, $p < .001$) than to the BSI-18's anxiety factor ($r = .656$, $p < .001$); this hypothesis was not supported, Wald $\chi^2(1, N = 818) = .324$, $p = .57$. Table 7 presents the results of the Wald tests and Table 8 displays the correlations between the PTSD and distress factors.

Table 7

Results of the Wald Tests of Parameter Constraints

Path	*r* (*p* value)	Path	*r* (*p* value)	Wald test (*p* value)
Somat with Dysph	.639 (*p* < .001)	Somat with Reexp	.576 (*p* < .001)	3.75 (*p* = .053)
Somat with Dysph	.639 (*p* < .001)	Somat with Avoid	.532 (*p* < .001)	7.025 (*p* = .008)
Somat with Dysph	.639 (*p* < .001)	Somat with Arousal	.621 (*p* < .001)	.077 (*p* = .781)
Anx with Dysph	.656 (*p* < .001)	Anx with Reexp	.701 (*p* < .001)	2.293 (*p* = .13)
Anx with Dysph	.656 (*p* < .001)	Anx with Avoid	.667 (*p* < .001)	.08 (*p* = .778)
Anx with Dysph	.656 (p < .001)	Anx with Arousal	.735 (*p* < .001)	1.73 (*p* = .189)
Dep with Dysph	.78 (*p* < .001)	Dep with Reexp	.705 (*p* < .001)	6.023 (*p* = .014)
Dep with Dysph	.78 (*p* < .001)	Dep with Avoid	.655 (*p* < .001)	10.556 (*p* = .001)
Dep with Dysph	.78 (*p* < .001)	Dep with Arousal	.667 (*p* < .001)	3.313 (*p* = .069)
Dysph with Somat	.639 (*p* < .001)	Dysph with Dep	.780 (*p* < .001)	16.391 (*p* = .0001)
Dysph with Dep	.78 (*p* < .001)	Dysph with Anx	.656 (*p* < .001)	19.505 (*p* < .001)
Dysph with Somat	.639 (*p* < .001)	Dysph with Anx	.656 (*p* < .001)	.324 (*p* = .57)

Note. Somat is BSI-18's somatization factor; Anx is BSI-18's anxiety factor; Dep is BSI-18's depression factor; Reexp is PTSD-RI's re-experiencing factor; Avoid is PTSD-RI's avoidance factor; Dysph is PTSD-RI's dysphoria factor.

Table 8

Patterns of Correlations between PTSD and Distress Factors

	1	2	3	4	5	6	7
1. Re-experiencing	-						
2. Avoidance	.96	-					
3. Dysphoria	.876	.891	-				
4. Hyperarousal	1.029	.881	.901	-			
5. Somatization	.576	.532	.639	.621	-		
6. Anxiety	.701	.667	.656	.735	.887	-	
7. Depression	.705	.655	.78	.667	.888	.947	-

Note. For all results $p < .01$.

Chapter Four

Discussion

The current study attempted to analyze relations between factors of PTSD's dysphoria model and the BSI-18's three-factor model in a sample of 818 Indian children and adolescents with direct or indirect exposure to the 2008 Mumbai terrorist attacks. The current study appears to be the first attempt to assess if PTSD's dysphoria represents its inherent non-specific distress, using latent-level factor analyses and an Eastern cultural younger sample (e.g., India). Statistical analyses including CFA and Wald tests of parameter constraints indicated partial support for the proposed hypotheses, with important clinical and theoretical implications.

To begin with, notable is a well-fitting PTSD dysphoria model and an adequately fitting BSI-18 three factor model in the current study's Eastern cultural sample, validating the pursuit of subsequent statistical analyses with these measures. These findings are notable because this is the first study known to test PTSD or BSI models in an Indian sample. Interestingly, the current study's PTSD prevalence rate, ranging from 12% to 19% (using a diagnostic criteria algorithm or PTSD-RI cut-off score recommendation), is lower than that found in prior studies using younger Indian samples which has ranged from 30% - 80% (e.g., John et al., 2007; Kar et al., 2007). However, there are differences in types of traumatic events assessed across compared studies, with prior studies assessing exposure to natural disasters including Tsunamis (John et al., 2007) and cyclones (Kar et al., 2007). Further, PTSD measures other than the PTSD-RI were used in prior studies, for example the Child Behavior Checklist Posttraumatic Disorder Scale-Tamil Revised (John et al., 2007). Additionally, the measures used in

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prior studies were not in English as used in the current study, specifically in the local languages of Oriya (Kar et al., 2007) and Tamil (John et al., 2007). Lastly, one of the studies used the International Classification of Disease-10 (ICD-10) criteria (Kar et al., 2007), again different from the current study's *DSM-IV* PTSD criteria. The aforementioned differences could account for differences in PTSD prevalence rates across studies. Notable is that the significant association between number of traumatic events experienced (lifetime) and PTSD severity found in the current study is consistent with prior research (e.g., Boscarino & Adams, 2009).

Does Dysphoria Account for PTSD's General Emotional Distress?

The first three hypotheses addressed if the BSI-18's somatization, anxiety and depression factors relate more to PTSD's dysphoria factor than to other dysphoria model factors. Some studies indicate that dysphoria does not represent PTSD's inherent non-specific distress (Elhai et al., 2008; G. N. Marshall et al., 2010; Williams et al., 2011), contradictory to other studies (Forbes et al., 2011; Gootzeit & Markon, 2011; Miller et al., 2010; Simms et al., 2002; Watson et al., 2005). The current study results did not strongly support either viewpoint over the other, instead indicating that PTSD's dysphoria factor captured somatic and depressive distress only when compared to PTSD's avoidance factor. Further, PTSD's dysphoria factor did not account for anxious distress when compared to other PTSD factors.

Somatization. The first hypothesis, stating that the BSI-18's somatization factor relates more to PTSD's dysphoria than to other PTSD dysphoria model factors had partial support. Distress expression in Eastern cultures *predominantly* via somatic symptoms (e.g., Bhui et al., 2002; Patel et al., 1998; Pole et al., 2008; Terheggen et al., 2001) could

account for the somatic distress captured more by PTSD's dysphoria when compared to PTSD's avoidance. In other words, the Indian culture may express some trauma exposure-related distress partly in somatic ways, possibly captured by PTSD's dysphoria factor compared to PTSD's avoidance factor. Further, PTSD's avoidance does not actually represent somatic symptoms but rather possibly leads to more PTSD distress (reviewed in Brewin & Holmes, 2003; Foa & Kozak, 1986) including PTSD's dysphoria symptoms and BSI-I8's somatization symptoms.

When compared to other PTSD factors such as re-experiencing and hyperarousal, PTSD's dysphoria did not relate more to somatic distress. Possible explanations for such findings include (1) conceptual dissimilarity between PTSD's dysphoria factor and BSI-18's somatization factor; and (2) the concept of "somatic distress" in the Indian culture may be inadequately represented by BSI-18's somatization factor. First, the BSI-18's somatization factor reflecting physiological arousal symptoms such as chest pains, trouble breathing, etc. (Derogatis, 2001) is conceptually dissimilar to PTSD's dysphoria factor. In fact, PTSD's hyperarousal factor reflecting symptoms of hypervigilance and startle responses, or re-experiencing factor addressing physical reactivity to trauma triggers (American Psychiatric Association, 2000) may represent more of the BSI-18's somatization symptoms. Research indicates that PTSD's re-experiencing symptoms have a significant relation with headaches and pain interference complaints (G. J. Asmundson, Wright, & Stein, 2004). In fact, pain-related symptoms increase the severity of PTSD's hyperarousal symptoms (G. J. Asmundson et al., 2004). Alternatively, it is possible that compared to other PTSD factors, dysphoria is more related to somatic distress, but that the present study's instrumentation did not tap into the type of culturally influenced

"somatic distress" in question. The "somatic distress" in question could be better captured by more emic instruments compared to etic ones (Patel et al., 1998).

Anxiety. The second hypothesis, stating that the BSI-18's anxiety factor relates more to PTSD's dysphoria factor than to other PTSD dysphoria model factors, was not supported. Given PTSD's classification as an anxiety disorder (American Psychiatric Association, 2000), and conceptualization as involving conditioned fear responses to generalized external and internal cues (thoughts, and images) associated with the original traumatic event (Kirmayer, 1996), all PTSD factors may account for anxious distress equally (G. N. Marshall et al., 2010). Referencing PTSD theories, PTSD's avoidance of conditioned stimuli associated with the traumatic event may reduce fear temporarily, however it increases PTSD symptom severity (including dysphoria) and anxiety in the long-run (reviewed in Brewin & Holmes, 2003; Foa & Kozak, 1986). Exposure to any traumatic cue can lead to activation of the fear network, and simultaneous symptoms of hypervigilance, intrusion, and avoidance (reviewed in Brewin & Holmes, 2003; Foa, Steketee, & Rothbaum, 1989). Thus, PTSD's theories indicate that all PTSD symptoms and anxiety feelings may occur simultaneously; this probably adds to the equivalent variance in anxious distress accounted for by PTSD's dysphoria when compared to other dysphoria model factors.

The current study results referencing anxious distress contrast with prior studies indicating a greater relation between PTSD's dysphoria factor and anxiety symptoms compared to other PTSD dysphoria model factors (e.g., Gootzeit & Markon, 2011; Simms et al., 2002). However, the most substantial difference between the present and prior studies is that prior studies used anxiety as an overall construct rather than

conceptualizing anxiety as a latent factor of distress. Thus, the present study's finer measurement of anxiety may be an advantage in clarifying the nature of previous results. Further, prior studies used adult samples from Western cultures in contrast to a younger Indian sample in the current study. Thus, differences in samples and conceptualization of anxiety could serve as explanations of discrepant findings across compared studies.

Depression. The third hypothesis, stating that the BSI-18's depression factor relates more to PTSD's dysphoria factor than to other PTSD dysphoria model factors, was partly supported. Specifically, the BSI-18's depression factor was more significantly related to PTSD's dysphoria factor compared to only PTSD's avoidance factor (but not PTSD's re-experiencing and hyperarousal factors).

A significantly greater relation between depressive distress and PTSD's dysphoria compared to the avoidance factor is consistent with prior studies comparing PTSD factors with depression as an overall construct (e.g., Gootzeit & Markon, 2011; Naifeh et al., 2010; Simms et al., 2002; Watson, 2009). However, the present study's finding that in contrast to PTSD's re-experiencing and hyperarousal factors, PTSD's dysphoria factor was not more related to depressive distress consistent with the findings of Marshall et al. (2010) differs from results of the aforementioned studies. Again prior studies have used depression as an overall construct rather than as a latent dimension of distress; and have used Western adult samples, possibly explaining the differences in findings. Notable is that all PTSD factors correlated significantly with depressive distress, although PTSD's dysphoria correlated with depression more than just PTSD's avoidance correlated with depression. These findings add to results showing simultaneous reduction in PTSD and depression symptoms in treatment (Liverant, Suvak, Pineles, & Resick, 2012).

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Overall, the current study results suggest that dysphoria may not be PTSD's only non-specific factor (Elhai et al., 2008; G. N. Marshall et al., 2010; Williams et al., 2011). Thus, PTSD's hyperarousal and re-experiencing factors may also account for some of PTSD's distress as elaborated in detail in the section on "Implications" below.

Which Component of Emotional Distress has the Greatest Association with PTSD's Dysphoria?

The last three hypotheses addressed which distress component has the greatest association with PTSD's dysphoria (related to PTSD's placement in the quadripartite model). Results indicated that PTSD's dysphoria factor relates more to depressive distress than to somatic distress (contrary to the fourth hypothesis) and anxious distress (consistent with the fifth hypothesis). Lastly, the sixth hypothesis, stating that PTSD's dysphoria relates more to somatic distress than anxious distress, was not supported.

Results indicating dysphoria's greater relation with depressive distress compared to anxious distress is supported by studies using depression and anxiety as single-score observed variables rather than as latent dimensions (e.g., Elhai et al., 2013; L. Wang, Di Long, et al., 2011; L. Wang, Li, et al., 2011; Watson, 2009). Support for the aforementioned result is provided by studies using PTSD's five-factor model, which retains three symptom clusters of the emotional numbing model (arousal, avoidance, and numbing), but distinguishes between dysphoric arousal (D1-D3) and anxious arousal (D4-D5) of the hyperarousal symptom cluster (Elhai, Biehn, et al., 2011). PTSD's dysphoria factor includes components of the numbing factor and dysphoric arousal factor according to this five-factor model, both of which strongly relate to depression (Elhai et al., 2013; L. Wang, Di Long, et al., 2011; L. Wang, Li, et al., 2011). Additionally, there is

conceptual similarity between PTSD's dysphoria factor and BSI-18's depression factor, mainly that both represent general distress. To elaborate, PTSD's dysphoria dimension has a large general distress component (Simms et al., 2002; Watson, 2009) and depression symptoms in the BSI-18's depression factor (anhedonia, sadness, worthlessness) reflect general distress rather than specificity to depressive disorders (Watson, 2009). Thus, PTSD possibly does belong *partly* to the "distress disorders" category, explaining the greater shared variance with mood disorders than anxiety disorders (Watson, 2009; Watson et al., 2005).

Hypotheses regarding dysphoria's greater relation with somatic distress were mainly based on evidence indicating distress expression via somatic symptoms in Eastern cultures (e.g., Bhui et al., 2002; Patel et al., 1998; Pole et al., 2008; Terheggen et al., 2001). Concerning dysphoria's greater relation with depressive distress compared to somatic distress, and non-significant difference in dysphoria's relation to somatic and anxious distress, notable are two possible explanations. First, Mumbai as a large urban city is not representative of only an Eastern culture, given factors such as modernization (Kapoor, Hughes, Baldwin, & J., 2003), better opportunities, higher income, and greater exposure to a Western lifestyle (Sinha et al., 2002). Thus, one may see elements of individualism and collectivism in the Mumbai culture (e.g., Kapoor et al., 2003; Sinha, Sinha, Verma, & Sinha, 2001; Sinha et al., 2002), which may influence expression of distress via somatic symptomatology in the current study. Alternatively, distress via somatic symptomatology may not be specific to Eastern cultures, and somatic symptoms may not account for general distress entirely; rather distress may be better explained by cultural idioms of distress or cultural syndromes (Kirmayer, 2001). Supporting this idea

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are descriptive analyses of the BSI-18 and PTSD-RI item frequencies indicating lesser endorsement of somatic distress and PTSD somatic symptoms compared to anxious distress symptoms and re-experiencing symptoms. Both these explanations may support the current study results contradictory to the proposed hypotheses.

Implications

Although most proposed hypotheses were not supported, the current study has several theoretical, clinical and statistical implications.

Theoretical. First, results of the current study do not support the assertion that PTSD's dysphoria factor accounts for all the variance in distress components more than that accounted for by other PTSD dysphoria model factors, based on our conceptualization of distress as a heterogeneous construct. Rather, PTSD's dysphoria accounts for depressive and somatic distress when compared to only PTSD's avoidance factor. Thus, the question of whether PTSD's dysphoria is PTSD's non-specific factor may be contingent on how we conceptualize latent factors of distress and psychopathology, and the specific PTSD factor as comparative reference (Contractor et al., 2014). This may explain some contradictory findings in the literature (e.g., G. N. Marshall et al., 2010; Miller et al., 2010). Possible is that PTSD's dysphoria may in fact reflect a lack of normal psychological functioning rather than all of general distress (G. N. Marshall et al., 2010), thus not supporting its proposed removal from PTSD's diagnostic criteria (Spitzer et al., 2007). Consistent is the possibility that all PTSD factors may relate to different aspects of general distress, for different reasons indicating causal or correlational pathways (G. N. Marshall et al., 2010).

Second, it may be preferable to conceptualize specific and non-specific factors of PTSD as dimensional rather than categorical variables (Gootzeit & Markon, 2011; Watson, 2009). To elaborate, Watson (2009) conceptualized symptoms as having two quantitative properties: level of specificity and amount of general distress variance. Differential relations of PTSD factors with other psychopathology constructs such as depression and anxiety indicate level of specificity. Being more related to anxiety compared to depression, or more related to PTSD compared to other anxiety disorders indicates higher PTSD specificity. The amount of general distress variance is assessed by examining the inter-correlations between PTSD factors and distress disorders or factors. A greater relation of a distress disorder or factor with a certain PTSD factor such as dysphoria compared to other PTSD factors indicates greater distress variance for dysphoria. Thus, dysphoria could be conceptualized as a high distress symptom dimension (greater correlations with some distress factors compared to PTSD's avoidance factor) with lower PTSD specificity (greater correlation with depressive distress than anxious distress).

Surprisingly, PTSD's hyperarousal equally represented anxiety, somatic and depressive distress when compared to PTSD's dysphoria. Hyperarousal has an established significant relation with anxiety (Anthony, Lonigan, & Hecht, 1999; Gootzeit & Markon, 2011; Simms et al., 2002), and depression as overall constructs (Gootzeit & Markon, 2011; Simms et al., 2002), and incremental positive predictive power for anxiety symptoms after accounting for variance by PTSD's dysphoria (Gootzeit & Markon, 2011). Although no known studies have analyzed the relation between hyperarousal and the latent factor of somatic symptoms, there is a significant relation between hyperarousal

and somatic depression (Biehn et al., 2013), and physical symptoms (G. J. Asmundson et al., 2004; Pérez, Abrams, López-Martínez, & Asmundson, 2012). Thus, hyperarousal could be a high distress symptom (comparable relation with distress factors as PTSD's dysphoria). Further, given that PTSD's hyperarousal is the best predictor of severity for other PTSD factors over time (G. N. Marshall, Schell, Glynn, & Shetty, 2006; Schell, Marshall, & Jaycox, 2004), it could have more PTSD specificity. Further research is needed to substantiate this possible conclusion.

Additionally, PTSD's re-experiencing factor accounted equally for somatic, depressive, and anxiety distress compared to PTSD's dysphoria factor. Intrusive symptoms with a significant relation with trauma exposure are conceptualized as one of the PTSD specific symptom clusters (Gootzeit & Markon, 2011; Simms et al., 2002). Although PTSD theories differ in terms of their perceived role of intrusions within PTSD symptomatology; they emphasize intrusions to be central in PTSD. PTSD theories conceptualize intrusions as stemming from a need to reconcile the new trauma-related information into prior beliefs (Stress Response theory); as being subsequent to avoidance efforts (Conditioning theory) or activation of the fear network (Information Processing theories), and as being activated involuntarily to situational reminders (reviewed in Brewin & Holmes, 2003). Thus, re-experiencing could be a factor with greater PTSD specificity and a higher distress variance component; although more research needs to directly address this research question.

Results of the current study clearly demonstrate that PTSD's avoidance factor does not account for greater distress component variance than PTSD's dysphoria (for the most part), consistent with prior research (Gootzeit & Markon, 2011). Given that PTSD

theories emphasize the role of avoidance in the maintenance of PTSD symptoms (reviewed in Brewin & Holmes, 2003), it is speculated to have greater PTSD specificity. Thus, avoidance could be conceptualized as a PTSD factor with greater PTSD specificity and lower distress variance component. Further research is needed to substantiate this hypothesis. Overall, assessing the two quantitative properties of PTSD factors on a continuum can aid differential diagnoses and accurate assessments (Watson, 2009).

Third, given that dysphoria accounts for more depressive distress than anxious distress, it lends support to PTSD's comorbidity with other mood disorders (distress disorders category of the quadripartite model). However, PTSD's dysphoria accounts for more depressive distress only when compared to PTSD's avoidance factor, and does not account for more anxious distress when compared to other PTSD factors. It is possible that PTSD may not *solely* belong to the distress disorders category of the quadripartite model. In other words, there may be no perfect fit for PTSD as a distress disorder (e.g., Forbes et al., 2011), given that PTSD's dysphoria only accounts for some distress components when compared to other PTSD dysphoria model factors. Thus, there is no conclusive support to the controversy regarding PTSD's placement for *DSM-5* under anxiety or mood disorders.

Fourth, the results have several cultural implications. Although PTSD's dysphoria model has an excellent fit in Western cultures where it was originally established (reviewed in Elhai & Palmieri, 2011; Yufik & Simms, 2010), it has been rarely tested in Eastern cultures (e.g., L. Wang, Di Long, et al., 2011; L. Wang, Li, et al., 2011). With no known study analyzing the fit of this model in India, the current study's results of a well-fitting PTSD dysphoria model speaks to its possible cross-cultural applicability in this

Eastern culture. Additionally, given limited studies on the use of the BSI-I8 on different

cultural groups, with most studies using a Spanish sample (Andreu et al., 2008; Durá et

al., 2006; Galdón et al., 2008), the current study's results also add to its three-factor

model applicability in the Indian culture.

Further, my hypotheses based on the theoretical common latent factor model

(Watson, 2005, 2009) mainly validated with Western culture adult samples were partially

supported. Alternate explanations and implications exist for the aforementioned findings.

First, the results could reflect possible inapplicability of the models guiding our

hypotheses to an Eastern cultural sample (e.g., India) using younger samples,

necessitating a possible culturally influenced modification. Notable is that the current

study results (the emotional distress component most related to PTSD's dysphoria) are

consistent with Western research without consideration of including an Indian sample.

Thus, several Indian cultural factors are worth investigating in future research with

reference to the current study's research questions. Second, the concept of "distress"

itself may be inadequately captured by the BSI-18's factors in this cultural setting. In

addition to somatic symptoms, cultural idioms of distress or cultural syndromes may

reflect psychological distress in Eastern cultures (Kirmayer, 2001); the cultural idioms of

distress and cultural syndromes were not assessed in the current study. Hence, the BSI-

18's symptoms probably may not represent all of the general distress expression in

Eastern cultures; thus influencing the concept of "distress" hypothesized to be captured

by PTSD's dysphoria factor.

Lastly, results of the current study, mainly that PTSD's dysphoria does not

account for all distress components compared to some PTSD factors, and that PTSD's

dysphoria relates more to depressive distress compared to anxious and somatic distress are novel to the existing literature for a younger sample. This is notable given that few studies have analyzed latent-level relations in a younger sample (Anderson & Hope, 2008). Factors such as reluctance to disclose traumatic experiences attributed to shame or guilt feelings, concern about self-image, exaggeration of symptoms if perceived as socially acceptable in their in-group, lack of trust in adults assessing symptoms (perceived as authority), and perception of the traumatic events as personal failures could lead to symptom minimization or exaggeration (Habib & Labruna, 2011). Further, several PTSD risk factors in younger samples not analyzed in this study could have influenced PTSD's latent dimensions' comorbidity with distress dimensions. Examples include a greater impact of mass trauma exposure (affecting a community such a terrorist attack) versus individual trauma (affecting one person) for a younger sample; greater traumatic event impact for younger females compared to younger males; and significant interaction effects (e.g., greater risk for older female children/adolescents exposed to an intentional traumatic event). Additionally, comorbid mental health problems such as depression increase the risk for PTSD, particularly for intentional trauma including terrorist attacks (meta-analyzed in Trickey et al., 2012). The aforementioned provide avenues for future research.

  Clinical. Given the current study's results of dysphoria's significantly greater relation with depressive distress compared to somatic and anxious distress, it would be helpful for a clinician to assess for depression symptoms comorbid with PTSD. Further, the clinician can pay attention to depressive distress reactions following group trauma exposure in a younger sample.

Additionally, a clinician working with a client from an Eastern culture such as India, may understand PTSD as represented by four latent dimensions, and focus more on comorbid depressive distress following trauma exposure rather than assume distress expression via somatic symptomatology necessarily. There are several factors specific to the Indian culture that may have influenced the current study's findings, and are notable for future research. Risk and buffering factors relevant to mental health symptoms in Eastern cultures (including India) are social support; collectivistic values (e.g., Bhushan & Kumar, 2007; Kayser et al., 2008; Tummala-Narra, 2007); social cohesiveness (R. D. Marshall & Suh, 2003); stigma towards help-seeking (Varma et al., 2007; Wynaden et al., 2005); reluctance to disclose distressing emotions (Pole et al., 2008); importance of religious and spiritual values (Rajkumar et al., 2008); an external locus of control (Suar et al., 2010); different coping styles including Ayurvedic treatments, and yoga (Marsella, 2010); and inadequate disaster preparation (Suar et al., 2010). Additionally, evidence indicates a differing pattern of PTSD symptoms using invariance testing across cultures (Hoyt & Yeater, 2010; G. N. Marshall, Schell, & Miles, 2009), and differing saliency of PTSD and other comorbid symptoms (reviewed in Hinton & Lewis-Fernández, 2010) across cultures. Lack of similar research in the Indian culture is a barrier to speculating any such specific hypotheses and if that influenced comorbid distress symptoms in the current study.

Statistical. The current study is the only attempt (to my knowledge) to assess PTSD's factor structure in the Indian culture, possibly opening up future avenues for structural modeling research in India. Given its good fit and significant factor loadings for all its indicators, future research would benefit from using such statistically superior

modeling techniques. Additionally, future research could compare the pattern and magnitude of factor loadings cross-culturally, and possibly replicate the study using *DSM-5* PTSD criteria, and influence of culturally relevant variables (e.g., social support, collectivistic values, religious coping) in path analyses models.

Limitations and Future Research

Despite significant contributions, this study is not without limitations. First, although the schools used for data collection in the current study had English as a medium of instruction, future research would benefit by using a back-translated measure (Brislin, 1970) to assess if the Western defined PTSD symptoms have cultural equivalence in the Indian language. Overall, cross-cultural research has shown that use of an instrument in another culture has linguistic and translation issues; the meaning of constructs may differ culturally (Beins, 2011; Brislin, 1970). Further, some prior Indian studies have used back-translated measures with Indian languages (e.g., John et al., 2007; Suar et al., 2010; Suar & Khuntia, 2004). Second, research in India has shown the influence of moderating variables such as gender and age, with greater PTSD severity among younger and middle adolescents (e.g., John et al., 2007) and females (e.g., John et al., 2007; Suar et al., 2010). Further, past research has indicated an influence of level of trauma exposure on PTSD severity (e.g., Hoven et al., 2005). Thus, future research could benefit by using gender, age, and levels of trauma exposure as moderating variables to assess the current study's research question.

Third, the timeline for the PTSD-RI measure assessing PTSD symptoms (the past month) is different from the BSI-18 timeline assessing distress symptoms (past week). Further, the PTSD-RI measure referenced the terrorist attack event unlike the BSI-18

measure. Thus, participants may reference different time points and different traumatic events when reporting symptoms for the participants, creating a confound in the data. Future research would benefit by using a consistent timeline and a consistent index trauma across measures in the study. Additionally, the BSI-18 is recommended for the age group of 18 and over for the most part, and hence there are relatively fewer studies indicating its ability to capture distress adequately in a younger sample such as the one used in the current study. Fourth, given the influence of response styles and social desirability on self-report measures (Furnham, 1986), and use of a younger sample in the current study, it would have been preferable to use multi-method assessments including obtaining information from teachers and parents (reviewed in Lori Davis & Siegel, 2000); this being an avenue for future research.

Fifth, the BSI-18 has been conceptualized to include a fourth factor (panic) which comprises of some anxiety factor symptoms represented by items 9, 12, and 18 (Derogatis, 2001). Several studies have found adequate fit for the four-factor model, but have selected other models based on parsimony, interpretative value, and past empirical support (Petkus et al., 2010; Recklitis et al., 2006; J. Wang et al., 2010; Wiesner et al., 2010). Future research could separate out the specific panic symptoms from general anxiety and reassess the current study's research questions. Sixth, it would be helpful to assess the relation between PTSD factors and trauma exposure, adding to the assessment of which PTSD factor has greater specificity to PTSD. Seventh, the results are specific to a younger adolescent sample (more young adolescents rather than older adolescents) in an Indian culture, which limits the generalizability of results. Eight, the current study results indicate the possibility that distress expression in India may not be completely via

somatic symptoms; this was the basis of several current study hypotheses and is a good avenue for future research. Ninth, although the PTSD-RI referenced the traumatic event of terrorist attack exposure, it is difficult to ascertain that the participants' responses were solely referencing the index trauma rather than prior traumatic events (reviewed in Elhai & Palmieri, 2011). Lastly, given the current study results, it would be helpful to explore a similar research question using the *DSM-5* PTSD criteria.

Conclusion

The current study aimed to assess if PTSD's dysphoria factor better accounted for distress factors compared to other PTSD dysphoria model factors, and the distress component most related to PTSD's dysphoria (related to PTSD's placement in the quadripartite model) using a sample of 818 Indian children and adolescents with direct or indirect exposure to the 2008 Mumbai terrorist attacks. Notable is that PTSD's dysphoria factor related more to depressive and somatic distress only when compared to PTSD's avoidance factor, and did not relate more to anxious distress compared to any other PTSD factor. This indicates the importance of assessing emotional distress as a heterogeneous construct possibly explaining the contradictory findings in the literature. The results also emphasize looking at PTSD specificity and distress variance for PTSD factors on a continuum, rather than assuming dysphoria factor's complete accountability for PTSD's inherent distress. Further, dysphoria's significantly greater relation to depressive distress compared to anxious and somatic distress may explain increased comorbidity with other depressive disorders and partial placement under the distress disorders category (have more mood disorders) per the common latent factor models. Lastly, the results being

specific to a younger Indian sample necessitate looking at Indian cultural factors and

developmental factors influencing the current study's findings.[1]

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[1] The study has been published: Contractor, A. A., Mehta, P., Tiamiyu, M. F., Hovey, J. D., Geers, A. L., Charak, R., et al. (2014). Relations between PTSD and distress dimensions in an Indian child/adolescent sample following the 2008 Mumbai terrorist attacks. *Journal of Abnormal Child Psychology, 42*, 925-935. doi: 10.1007/s10802-013-9846-5

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