

A confirmatory factor analytic study of the Posttraumatic Growth Inventory among a sample of racially diverse college students

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Abstract

Aims: The primary aim of the study was to confirm the five-factor structure of Tedeschi and Calhoun's (1996) Posttraumatic Growth Inventory (PTGI). A secondary aim of this study was to explore the potential usefulness of the PTGI among populations that experience parentification – a common form of childhood neglect and adversity.

Method: The PTGI was administered to a sample of 143 college students with a history of various levels of parentification.

Results: The resulting data were subjected to confirmatory factor analysis. The goodness-of-fit indices for the five-factor model indicated a moderate fit with the current sample. However, a five-factor, 18-item model produced a more optimal fit than Tedeschi and Calhoun's five-factor, 21-item PTGI.

Conclusions: The study's findings suggest that the PTGI appears to be a useful assessment inventory for mental health practitioners in measuring globally the resources an individual might have following the adversity of parentification.

Keywords: *Mental health, trauma, Posttraumatic Growth Inventory, confirmatory factor analysis, child neglect, parentification*

Introduction

The idea that traumatic experiences can have bimodal consequences – both positive and negative – dates at least as early as the 1960s (Frankl, 1961). Indeed, in existential psychology and in the philosophy that preceded it, growth at the individual level was believed to occur because difficult experiences are reframed as opportunities for profound life changes (Frankl, 1961; Tedeschi, & Calhoun, 1995). However, researchers have only recently attempted to measure this meaning-making and growth, which has been termed “posttraumatic growth” (Tedeschi & Calhoun, 1995).

The purpose of the current study is to confirm the five-factor structure of the Posttraumatic Growth Inventory (PTGI) among a racially diverse sample. Thus, it contributes to the literature in the following ways: First, the study examines posttraumatic

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growth among an understudied population (racially diverse college students); second, and different from previous studies, the current study's index trauma is psychological rather than medical.

Background

Posttraumatic growth

Tedeschi and Calhoun (1995), in their posttraumatic growth framework, postulated that cognitive psychology can account for changes in belief systems that are often reported among people who have experienced growth after trauma, whether the trauma was in childhood or adulthood. Tedeschi and Calhoun suggested that shifts in cognition accounted for the decrease in emotional distress and the increase in "useful activity" among these people (Tedeschi & Calhoun, 1995). The PTGI has now been validated on groups with exposure to various types of adversity and extreme stress. These validation studies have been composed of college students (Calhoun, Cann, Tedeschi, & McMillan, 2000), adolescents (Ickovics et al., 2006; Milam, Ritt-Olson, & Unger, 2004), holocaust child survivors (Lev-Wiesel & Amir, 2003), adults with a history of cardiovascular disease (Sheikh & Marotta, 2005), and adults recovering from a diagnosis of cancer (Ho, Chan, & Ho, 2004). Many of these validation studies have limited the type of adversity to select medical conditions (e.g., heart disease and cancer), but few if any of the study samples are known to be racially diverse. Some studies did not record racial background of their samples (e.g., Tedeschi & Calhoun, 1996), so it is possible that the samples were racially diverse, but we cannot assume it. In an attempt to address these two gaps, the current study is purposefully composed of a racially and ethnically diverse sample of college students and the type of adversity (index trauma) is psychological rather than medical.

Parentification

Parentification is defined in the current study as a role reversal, wherein a child becomes responsible for a parent's and/or other family members' emotional or behavioral needs (Chase, 1999). Parentification is the adversity selected for this study because it is a common phenomenon and because it is known to produce life-altering and enduring adverse mental health consequences (Boszormenyi-Nagy & Spark, 1973; Jones & Wells, 1996; Jurkovic, 1997; Minuchin, Montalvo, Guerney, Rosman, & Schumer, 1967). Among these enduring consequences are potential psychological abandonment of a child by a parent (Minuchin et al., 1967), impaired attachments (Alpert, Brown, & Courtois, 2000; Hooper, Marotta, & Lanthier, 2008), substance abuse (Anderson, 1999), and other psychological disorders (Jones & Wells, 1996; Jurkovic, 1997). Such deficient environments and age-inappropriate roles and responsibilities have been described as potentially traumatic in their consequences. Moreover, the linkages between neglect and psychopathologies such as PTSD and dissociative disorders are well documented (Alpert et al., 2000; Cicchetti, 2004; Kubiak, 2005).

The study of parentification is an important one. As Van der Kolk contended, "childhood trauma, including abuse and neglect, is probably the single most important public health challenge in the United States" (Van der Kolk, 2005, p. 401). Indeed, there are more cases of neglect than there are of abuse (60% of the abuse cases are identified as neglect, according to the U.S. Department of Health & Human Services in 2002). Neglect is defined as refusing to provide affection, emotional support, or attention, and it is associated with adverse psychological outcomes (Widom, 1999). Parentification is one

form of this type of neglect and is a role reversal so that emotional warmth, consistency, and proximity are provided by the child to the parent rather than the parent to the child. Waddell, MacMillan, and Pietrantonio (2004) contended that childhood adversity exists on a continuum and that the more sustained and continuous the exposure, the more likely there will be harm. Parentification is a chronic condition and, as such, meets the definition of sustained adversity at the severe end of the continuum. Thus, despite the trauma of parentification, as with other traumas, the possibility exists for children and the adults they become to experience posttraumatic growth (Cicchetti, 2004; Hooper, 2007; Tompkins, 2007).

Method

Participants

Participants were 143 college students who reported a history of moderate rates of childhood parentification ($M = 26.90$; $SD = 7.81$) compared with other nonclinical samples (Jurkovic & Thirkield, 1998). They were recruited from a community college on the East Coast of the United States. Participants were primarily never-married young adult students, of whom 69.2% were female ($n = 99$) and 30.8% were male ($n = 44$). Participants ranged in age from 18 to 49 years, and the mean age was 22.45 ($SD = 6.04$). The self-reported race and ethnicity were diverse: 36% ($n = 52$) were non-Hispanic white; 22% ($n = 32$) were non-Hispanic black; 19% ($n = 27$) were Hispanic/Latino; 13% ($n = 18$) were Asian; 8% ($n = 12$) were other; and 1% ($n = 2$) failed to report their racial background.

Procedure

The sampling procedure required that the participants who reported a history of parentification (as measured by the Parentification Questionnaire; Jurkovic & Thirkield, 1998) must (a) be at least 18 years of age, (b) be enrolled as students at a designated college, and (c) read and speak English at an eighth-grade level or above. Study recruitment took place during regularly scheduled undergraduate psychology classes. At that time, informed consent was obtained, and the instrument was administered to each group of volunteer participants.

Instrumentation

Demographic survey. The demographic survey created for the study asked for information regarding year in school, program in which the student was enrolled, race and ethnicity, current age, marital status, and country of origin.

Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996). Participants completed the PTGI. This scale was designed to assess positive outcomes reported by people who have experienced a traumatic event, extreme stress, or adverse environment. The PTGI consists of 21 self-report items, which the respondent is asked to evaluate on a scale of 0 to 5 (with 0 meaning "I did not experience this change as a result of my adverse environment" and 5 meaning "I experienced this change to a very great degree as a result of my adverse environment").

The PTGI provides an overall score and five subscale scores. The six-point Likert scale yields a total score in a range of 0 to 105, with higher scores reflecting greater growth. The

first subscale, *relating to others*, includes statements like “I have a greater sense of closeness with others.” The second subscale, *new possibilities*, includes statements like “I am able to do better things with my life.” The third subscale, *personal strength*, includes statements like “I discovered that I am stronger than I thought I was.” The fourth subscale, *spiritual change*, includes statements like “I have a better understanding of spiritual matters.” Finally, the fifth subscale, *appreciation of life*, includes statements like “I have a greater appreciation of the value of my own life.”

The mean PTGI score for this sample was 67.03 (SD = 19), which was lower than that reported in the original validation sample (see Tedeschi & Calhoun, 1996) but in the moderately high range of posttraumatic growth as compared with other nonclinical samples. See Table I for subscale and full-scale scores. Internal consistency and test-retest reliability of the PTGI full-scale score has been reported as .90 (Tedeschi & Calhoun, 1996). Reliability scores in the current study, as measured by Cronbach’s alpha (see Table I), are consistent with or higher than scores obtained in Tedeschi and Calhoun’s original (1996) validation sample.

Data analysis

Assessment scales can be validated through either a confirmatory factor analysis or an exploratory factor analysis (Kahn, 2006). We chose to use a confirmatory factor analysis because this type of analysis was used to verify the structure of Tedeschi and Calhoun’s (1996) original five-factor model using SAS PROC CALIS, version 9.1.3. For our analyses, the amount of each factor loading onto the targeted factor was allowed to vary, while loadings onto nontargeted factors were set to zero. The adequacy of this model was assessed using several goodness-of-fit measures (Browne & Cudeck, 1993; Hu & Bentler, 1999), as shown in Table II.

We examined missing data, confirmatory factor analysis, and reliability as measured by Cronbach’s alpha. All analysis models included subjects with non-missing values for the appropriate scales. Only observed values were used; no imputation was performed.

Correlations

Table III presents the intercorrelations among the five subscales and full-scale correlations. These correlation scores are consistent with Tedeschi and Calhoun’s 1996 study, which described correlations among the five subscales ranging from .27 to .52 and correlations between the five subscales and full scale ranging from .62 to .83.

Table I. Mean, Standard Deviation, Potential Range, and Cronbach’s Alpha of the PTGI Full-Scale and Subscale Scores.

Scale	N	M	SD	Potential Range	Cronbach’s Alpha
1. Relating to others	142	20.92	7.52	0–35	.85
2. New possibilities	141	17.09	5.20	0–25	.81
3. Personal strength	142	14.01	4.16	0–20	.72
4. Spiritual change	142	5.13	3.07	0–10	.76
5. Appreciation of life	143	10.34	3.37	0–15	.73
6. PTGI Full Scale	134	67.03	18.74	0–105	.92

Table II. Goodness-of-Fit indices for the five- and four-factor models of the PTGI.

MODEL	GFI	X ²	df	X ² /df	RMSEA (90% CI)	AIC	NNFI
Model 1 (five-factor, 21-item)	0.8076	333.56	179	1.86	0.0806 (.0671-.0939)	-24.43	0.8646
Model 2 (five-factor, 18-item)	0.8458	216.35	125	1.73	0.0733 (.0566-.0895)	-33.65	0.8998
Model 3 (four-factor, 19-item)	0.8250	272.90	146	1.81	0.0808 (.0659-.0956)	-19.10	0.8697

Note: GFI, Goodness-of-fit index; RMSEA, Root mean square error of approximation; AIC, Aikake information criterion; NNFI, Nonnormed fit index.

Table III. Intercorrelations of Subscale Scores and Full-Scale Score of the PTGI and Emotional and Instrumental Parentification Scores.

Variables	1	2	3	4	5	6
1. Relating to others	-					
2. New possibilities	.620**	-				
3. Personal strength	.570**	.751**	-			
4. Spiritual change	.275**	.362**	.313**	-		
5. Appreciation of life	.534**	.679**	.653**	.301**	-	
PTGI Full Scale	.845**	.880**	.832**	.503**	.798**	-

Note: **Correlations are significant at the 0.01 level (2-tailed).

Confirmatory factor analyses

The goodness-of-fit index and nonnormed fit index were used to evaluate the fit of these models. Stevens (2002) suggested that models with these indices above .90 were considered a good fit, with values closer to 1 indicating a better fit. In addition, the root mean square error of approximation (RMSEA) and its 90% confidence interval were used to evaluate the model fit. Values below .08 are considered to indicate moderately good model fit, while values above .10 indicate poor fit (Browne & Cudeck, 1993). Finally, the X^2/df ratio was examined, which does not have an absolute standard for cut-off values to indicate a good fit. Although lower values of this index are associated with a better fit, some researchers interpret ratios as high as 5 as a "good" fit (Hu & Bentler, 1999). The Aikake Information Criterion (AIC) is also presented to provide an additional comparison between models, although there is no recommended range for this index. Its strength is in its potential for variable selection and in that it is not dependent on which models are compared first. Calculated as $X^2 - 2df$, lower values of the AIC also indicate an improved fit.

The results of the confirmatory factor analysis of the 21-item, five-factor model shows mixed evidence of an adequate fit, as reflected in the fit statistics shown in Table II. The goodness-of-fit index was .81, which is below the recommended .90; the RMSEA value of .081 was very close to the upper limit of moderate model fit for this index; and the resultant X^2/df ratio of 1.86 indicates a good fit. Only the X^2/df ratio of 1.86 indicates a good fit of the data to the posited model, although Kahn (2006) suggests that "using chi-square as a measure of model fit is contraindicated" (p. 707). The goodness-of-fit index and nonnormed fit index results of .81 and .86, respectively, were below the recommend cut-off of .90 for these indices. The AIC of -24.44 is provided for the purpose of comparisons with our attempts to iteratively improve model fit.

Items with large residuals, low communality, and low factor loadings were then removed iteratively to improve the model fit, resulting in an 18-item, five-factor model (see Table II). By iteratively removing items with the poorest fit (Questions 1, 10, and 16), as recommended by Hagger and Orbell (2005), we achieved a slightly better fit, using only 18 of the 21 items (see Table IV for factor loadings). The goodness-of-fit index (.85), RMSEA (.07), and nonnormed fit index (.90) reflect this improvement, as shown in Table II. The decreased value of the X^2/df ratio (1.73) and increased size of the AIC (-33.65) also indicate that this model has an improved fit.

Additionally, we explored an improved model fit by using a four-factor model. This model was derived through exploratory factor analysis on the 19 items that had salient factor loadings greater than .50 on one and only one factor. The confirmatory factor analysis of this model, as suggested by Van Prooijen and Van Der Kloot (2001), showed a slightly poorer fit than the 18-item, five-factor model (goodness-of-fit index = .83, RMSEA = .08, nonnormed fit index = .87). The X^2/df ratio (1.81) and AIC (-19.10) also indicated that the four-factor model provides a worse fit than the reduced five-factor model. Therefore, we concluded that the five-factor, 18-item model produced the optimal fit in this study (see Table II for the final model).

Discussion

The PTGI is a well-known instrument in the mental health clinical and research literature, as well as the trauma literature, for measuring growth after adversity. The PTGI appears to be a useful instrument for measuring growth where the adversity of parentification has been experienced by a racially and ethnically diverse group of college students. The five-factor

Table IV. Mean, Standard Deviation, Confirmatory Rotated Factor Loading, and Communalities for the five-factor PTGI (18 items).

Item	<i>M</i>	<i>SD</i>	Factor Loadings					<i>h</i> ²
			1	2	3	4	5	
21	2.72	1.44	0.77	0	0	0	0	0.59
20	2.67	1.44	0.75	0	0	0	0	0.56
15	3.34	1.50	0.68	0	0	0	0	0.46
8	2.90	1.48	0.72	0	0	0	0	0.53
6	2.93	1.48	0.72	0	0	0	0	0.52
9	2.69	1.52	0.58	0	0	0	0	0.34
11	3.62	1.23	0	0.86	0	0	0	0.74
7	3.34	1.57	0	0.75	0	0	0	0.56
17	3.51	1.26	0	0.64	0	0	0	0.41
14	3.16	1.49	0	0.64	0	0	0	0.41
3	3.37	1.36	0	0.59	0	0	0	0.35
12	3.51	1.16	0	0	0.74	0	0	0.55
19	3.57	1.42	0	0	0.71	0	0	0.50
4	3.40	1.34	0	0	0.65	0	0	0.43
5	2.75	1.66	0	0	0	1.00	0	1.00
18	2.34	1.73	0	0	0	0.64	0	0.44
2	3.46	1.51	0	0	0	0	0.76	0.58
13	3.43	1.32	0	0	0	0	0.77	0.59

Note: Factor 1 = Personal strength; Factor 2 = Relating to others; Factor 3 = New possibilities; Factor 4 = Spiritual change; Factor 5 = Appreciation of life.

solution originally derived by Tedeschi and Calhoun (1996) does not vary in this sample, though the model fits better with only 18 of the original 21 items in the PTGI. Additionally, the PTGI only moderately fits the data, but does support the multidimensionality of the construct of posttraumatic growth. This finding is especially useful given that the literature on positive outcomes from parentification is still in its infancy (Hooper, 2007; Tompkins, 2007).

In order to obtain the best model fit, three items were removed: Item 1, "My priorities about what is important"; Item 10, "Knowing I can handle difficulties"; and Item 16, "Putting effort into my relationships." One potential explanation for these items being less relevant in this sample than in the original validation sample might be that the college context for this diverse group of students might have affected their response to such individualistic values as setting priorities and assuming that all problems can be solved by individual effort. This explanation is tentative in that the highest mean score on the subscales appeared to be on the personal strength subscale (14 out of a possible 15), which suggests that there is some individualism being espoused by participants. Alternatively, it may be that the adversity of parentification has a more pervasive effect that would be resistant to present-day efforts reflected in the items. A corollary to this explanation might be that there is a time competence component, with the orientation of these items being in the present, where perhaps the ethnic value orientations of the sample might be more past focused (Siegel, Aneshensel, Taub, Cantwell, & Driscoll, 1998). A replication of these findings with a similar sample would be required to determine whether the PTGI needs to be modified for diverse population groups with a single adversity measured.

A careful review of the 18 items that loaded on the five factors reveal that these items were identical to the items that loaded on the five factors in the Tedeschi and Calhoun (1996) study. We attribute this similarity of results to the similarity of the samples: both samples were college students. This finding would explain the very different factor structure obtained by Sheikh and Marotta (2005), where the study sample was considerably older than the Tedeschi and Calhoun sample and the present sample. Clearly, we recommend additional testing of the theoretical model and confirmation of the factor structure in different aged samples to account for possible developmental differences in posttraumatic growth.

One final result warrants mentioning in terms of future research directions: the incidental subscale differences between women and men on the *relating to others* subscale. Our sample size and the main purpose of the study made it impossible to parse this difference out further; however, it might be useful to consider competing models for women and men, as others have noted that there are gender differences in coping (Hendy & Nagle, 2002), which at least theoretically could affect growth outcomes as well.

From a clinical perspective, these findings are relevant. The PTGI full-scale total might be useful for mental health practitioners in measuring globally the resources an individual might have following the adversity of parentification. Psychological interventions might then be designed to address any skill deficits, as measured by lower scores on subscales of the PTGI. In the current study, participants rated their *personal strength*, *appreciation of life*, *new possibilities*, *relating to others*, and *spiritual change* as areas of growth. Given the propensity of clinicians to assess for and treat the negative effects of trauma, use of this instrument could help clinicians avoid missing out on opportunities to build growth into their treatment plans. In other words, clinicians could foster a therapeutic environment where clients are "changed for the better by their struggles with crisis" (Calhoun & Tedeschi, 1999, p. 54). Additionally, including the PTGI in the mental health provider's repertoire of assessments can help both the provider and patient consider a balanced, inclusive framework (i.e., both positive and negative) to possible outcomes related to the adversity associated with parentification.

This study has a number of limitations. First, the data in the present study were all derived from a single-source information design. It is assumed that the participants accurately reported their childhood experiences; however, we cannot be sure that underreporting, minimizing, or denying childhood adversity experienced in the family of origin existed. Thus, self-report is a limitation of the current study. Second, although findings of Vrana and Lauterbach (1994) suggested that prevalence rates of trauma among college students are comparable to those of the general population, our sample composed of college students limits the generalizability of our findings. Finally, the results of our confirmatory factor analysis could be influenced by our sample size of only 143 participants. When the sample size is small, the obtained factor structure may not be stable (Reise, Waller, & Comrey, 2000).

In conclusion, this small study considered the possible positive effects of parentification. It appears that, among the current sample, the PTGI is a reliable instrument to measure growth after childhood adversity. The PTGI psychometric properties, in general, showed results comparable to Tedeschi and Calhoun's (1996) similar, but potentially less racially/ethnically diverse, validation study. In Tedeschi and Calhoun's validation study, they stated that a core aim of the development of the PTGI was to establish a measure that would capture positive outcomes (i.e., benefits) for people who experience disparate types of adversity and trauma. Thus, our findings on parentification, in conjunction with other studies (see Ickovics et al., 2006; Lev-Wiesel & Amir, 2003; Sheikh & Marotta, 2005), further validate the PTGI for use among those who have been exposed to a range of traumatic and adverse events.

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