

# Confirmatory Factor Analysis Post-traumatic Growth Inventory among Domestic Violence Survivor

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**Keywords:** Confirmatory Factor Analysis, Domestic Violence, Post-Traumatic Growth.

**Abstract:** Post-Traumatic Growth Inventory was a measurement tool to reveal the extent of the ability of the victim of traumatic events in feeling the positive influence regarding the event. The samples of this study were victims of domestic violence. One of the measurement tools to identify the impact of traumatic event was Post-Traumatic Growth Inventory (PTGI). Did PTGI have domains or factors that describe growth conditions on the victim of domestic violence? Which domain factor affected PTGI the most? We used CFA with structure equation modeling (SEM) program. With 201 respondents were qualified in the screening process using the domestic violence measurement tool. The respondents' age ranged from 18 to 26 years of age. The process of analysis was conducted using AMOS program. The results showed that the absolute fit measures met the requirement (GFI = .968; NFI = .965 and AGFI = .904), with the value of  $p = .0043$  or  $p < .005$ , indicating that PTGI dimension or indicator was consistent with latent variable and the significance score. This could be inferred that the domain factors of PTGI were able to describe post-traumatic growth on victim of domestic violence. The most influential and contribute indicator was openness to new possibilities.

## 1 INTRODUCTION

Traumatic events (such as chronic disease, traffic accident, losing a loved one, divorce, etc.) could cause negative emotional and psychological condition that would eventually lead to maladaptive behavior and aversive conditions (Taku, Tedeschi, Cann, & Calhoun, 2009). Domestic violence could lead to trauma, since it occurs within the family and the actor being a close relative. However, not all traumatic conditions resulted in maladaptive behavior. Based on a study conducted by Tedeschi (1999), there were individuals who were able to experience positive growth, therefore they became a stronger person after experiencing traumatic events.

According to a theory proposed by Calhoun and Tedeschi (1998), post-traumatic growth (PTG) was a condition where an individual experiences a significant positive change as the result of struggle in harsh life experience. The operational definition of post-traumatic growth was an individual condition measured through Post-Traumatic Growth Inventory (PTGI) scale based on five dimensions, which were Relating to Others, New Possibilities,

Personal Strength, Spiritual Change, and Appreciation of Life, with a total of 21 items.

Post-Traumatic Growth Inventory was used by several researchers with different stressor backgrounds, among individuals that experienced accident or disability (Calhoun, Cann, Tedeschi, & McMillan, 2000; Snape, 1997; Znoj, 1999), individuals that were exposed to war (Powell, Rosner, Butollo, Tedeschi, & Calhoun, 2003), cancer and breast cancer patients (Bellizzi & Blank, 2006; Cordova, Cunningham, Carlson, & Andrykowski, 2001; Tomich & Helgeson, 2004). Domestic violence cases in PTG research were rare cases, therefore this study focused on domestic violence. Researches in PTG mostly discussed generally traumatic cases and was not specific to a particular setting, for example other than domestic violence, the researches were also focused on individual abuse or collective abuse that were simultaneously non-specific on particular settings (Dekel, Mandl, & Solomon, 2011; Hall, Saltzman, Canetti, & Hobfoll, 2015; Kunst, 2010, 2011; Woodward & Joseph, 2003). A specific explanation regarding domestic violence was provided by Kunst

(Kunst, 2010, 2011). Therefore, researchers were interested in discussing PTG which was more focused on cases of domestic violence which was based on data that were increasing. Several studies argued that this tool had a moderately good reliability score. A research conducted on subject experiencing traumatic situation during the last three years found the validity of 0.90, and the retest reliability with a distance of two months was 0.71 (Calhoun et al., 2000). Kunst (2010) found the PTGI reliability value of 0.95 in samples experiencing domestic violence and being left in the shelter. Other studies were conducted on samples experiencing trauma without looking at background of the trauma or stressor. For instance, Duan (in Duan, Guo, & Gan, 2015) adapted PTGI method in Chinese language or culture, and the study found the reliability value of 0.80. PTGI tool measurement was also used and adapted in several countries, such as China (Duan et al., 2015), Taiwan (Su & Chen, 2015), Turkey (Arikan & Karanci, 2012), Israel (Hall et al., 2015) and Indonesia, with the sample background of earthquake survivors in Bantul (Urbayatun & Widhiarso, 2012). Based on those studies, PTGI as a measurement tool could be used to measure PTG attributes with different cultural background after going through the adaptation process. In this study, the PTGI went through a language and cultural adaptation process prior to the confirmatory factor analysis (CFA) process that focused on domestic abuse cases.

CFA was a tool for researchers to confirm whether the indicator variables (indicator was determined by a strong theory) could be used to confirm a latent variable (Ferdinand, 2014). CFA was analyzed using SEM program, as it could describe the combination between exploratory analysis with multiple regression (Ulman, 2001 as cited in Schreiber, Stage, King, Nora, & Barlow, 2006). The purpose of this study was to find out whether PTGI indicators could confirm PTG variables on the female victims of domestic violence in East Kalimantan, Indonesia, and which indicators had more influence towards the latent variable. Based on the purpose, the authors proposed a hypothesis: PTGI indicators affected how PTG's latent variables were formed.

## 2 METHODS

### 2.1 Participants

Participants in this research were women around 18-25 years old of age (early adult age) in an East Kalimantan university. They had experienced traumatic events of domestic violence. Domestic violence level was screened using the question list in brief autobiography (besides self-identity such as age, race, marital status) filled by participants. The selected participants were those who entered the middle adult criteria because the classic Eriksonian conceptualizations of young adulthood suggested a developmental path that involved exploration and then commitment to a certain identity, including sexual identity in the realm of love and professional identity in the realm of work (Arnett, as cited in Mayselless & Keren, 2014). The traumatic condition caused by domestic violence was believed to affect the decision or readiness in forming relationships and the commitment for marriage. Therefore, a screening process by completing autobiography and meeting the requirements as victims of domestic violence and PTG was conducted to the potential subjects.

### 2.2 Measurement

The Post-Traumatic Growth Inventory (Tedeschi & Calhoun, 1996) was a scale consisting of 21 items with five subscales: Relating to Others (seven items), New Possibilities (five items), Personal Strength (four items), Spiritual Change (two items), and Appreciation of Life (three items). Taku et al. (2008) reported moderately high internal consistency for total PTGI scores and subscales, being: PTGI ( $\alpha$ ) = 0.90, Relating to Others (RTO) = 0.85, New Possibilities (NP) = 0.84, Personal Strength (PS) = 0.72, Spiritual Change (SC) = 0.85, and Appreciation of Life (AOL) = 0.67. Each item was assessed using a 6-point Likert scale, with a value ranging from 0 (I did not experience this change as a result of my crisis) to 5 (I experienced a huge change as a result of my crisis). The total scores obtained ranged from 0 to 105.

### 2.3 Data Analysis

The study used structural equation modeling (SEM) with confirmatory analysis factor (CFA) to find out whether the model was fit or not. The results were processed using AMOS statistic program. CFA allowed the researcher to test the hypothesis of the

relation between observed variables and the underlying latent constructs. The researcher used the knowledge of theory, empirical research, or both, to postulate the relationship pattern a priori, before testing the hypothesis statistically (Suhr, 2006). CFA was performed by first determining the hypothesis to estimate the population covariance matrix compared to the observed covariance matrix. Technically, the researchers wanted to minimize the differences between the estimated and observed matrices (Schreiber et al., 2006). Maximum likelihood was the most popular normal theory estimator (DiStefano, 2002).

### 3 RESULT

#### 3.1 Confirmatory Factor Analysis (CFA)

This study proposed two hypotheses: (1) H0 = there was no influence of PTGI indicators as observer variable toward PTG latent variable; and (2) H1 = there was influence of PTGI indicators as observer variable toward PTG latent variable. In order to test the hypotheses using CFA, Netemeyer, Bearden, and Sharma (2003) used the general CFA model evaluation with the following five criteria: (1) model convergence and acceptable range of parameter estimate; (2) fit indices; (3) significance of parameter estimates and related diagnostics; (4) standardized residual and modification indices; and (5) measurement invariance across multiple samples. The evaluation of CFA was conducted using two of the criteria above, which were criterion (1) and (2). Both criteria were used because they were commonly used and quite appropriate to find out the fit model in CFA analysis (Sharif et al., 2011; Taku, Cann, Calhoun, & Tedeschi, 2008).

##### 3.1.1 Model Convergence and An Acceptable Range of Parameter Estimate

Maximum likelihood estimation (MLE) involved a recurrent/iterative process, in which the observed covariance matrix was compared with the theoretical matrix to reduce the difference (residue). This step aimed to determine whether the CFA converged or not. Although the data in PTGI was ordinal data (0-5), they could be treated as interval data for maximum likelihood in each model. From the data, it was expected that each observed variable would contain factors that measure latent variables and

would not contain other factors (Taku et al., 2008). The value of MLE included standardized parameters. Table 1 provides the estimate values:

Table 1: Standardized Regression Weights: (Group number 1 - Default model).

			Estimate
RTO	<---	PTG	.5874
NP	<---	PTG	.8557
PS	<---	PTG	.8452
SC	<---	PTG	.6077
AOL	<---	PTG	.8370

#### 3.1.2 Fit Indices

Fit indices in this study classified CFA's goodness of fit data into absolute fit indices, comparative or incremental, and parsimony based fit indices. The value of absolute fit measured degree of freedom (df) = 5, the estimated value of chi square ( $\chi^2$ ) = 17.1084 with  $p=0.0043 \leq 0.05$  could be considered as significant (Ho, 2006). The value of goodness of fit index (GFI) = 0.9678 and goodness of fit index (AGFI) = 0.9037. The value of GFI and AGFI in this study ranged between 0 and 1, with a value of  $\geq 0.90$ . This indicated that the model was fit to the data (good fit) (Sharif et al., 2011). Root mean square residual (RMR) = 0.4208, root mean square error of approximation (RMSEA) = 0.110. The value of RMR and RMSEA should be  $\leq 0.05$ . However, in this research, the value was greater than 0.05. Thus, the value of RMR and RMSEA could not match/fit the data (poor fit) (Netemeyer, 2003). Expected cross validation index (ECVI) = 0.1855. The value was considered sufficient as it was close to 1, so this value showed poor fit model. Incremental fit measured the value that included Normed Fit Index (NFI) = 0.9654, Relative Fit Index (RFI) = 0.9309, Incremental Fit Index (IFI) = 0.9501 and Comparative Fit Index (CFI) = 0.9750. The values in this research had the same value of  $\geq 0.90$ . Thus, it showed that they were good models in matching the data (good fit) (Netemeyer et al., 2003).

The value of Parsimony Fit Measures, which consisted of Akaike Information Criterion (AIC) and Consistent Akaike Information Criterion (CAIC), were used to compare multiple models. The smaller value indicated better capability in terms of matching data than other models. In the evaluation of this research, the values were: AIC model (37.10)  $\leq$  Saturated AIC (30) and Independence AIC (505.012); CAIC model (80.141)  $\leq$  Saturated CAIC (94.549) and Independence CAIC (526.529). Both values of AIC and CAIC were smaller than other

values, indicating that they fit to CFA PTGI model. If PGFI had a greater value than other models with values ranging between 0 and 1, it indicated that it had better ability to match data than other models. However, the value of PGFI = 0.3226, which was smaller than RMR = 0.3226, so the model results were not fit (Santoso, 2015). Table 2 provides the results of the models.

Table 2: Akaike Information Criterion.

Model	AIC	CAIC
Default model	37.1084	80.1414
Saturated model	30.0000	94.5496
Independence model	505.0120	526.5286

### 3.2 Convergent Validity and Construct Reliability

Convergent validity could be seen from MLE value or loading factor that presented in Table 1 or path analysis in Figure 1. Loading factor in this study had a value above 0.500, indicating that PTGI indicators had good convergent validity (Netemeyer et al., 2003). Construct reliability value aimed to measure an item's internal consistency of the measuring instrument. Hair (as cited in Netemeyer et al., 2003) agreed that the recommended reliability threshold was 0.70, while Bagozzi and Ying (as cited in Netemeyer et al., 2003) set 0.60. This construct reliability size, according to Hair (as cited in Netemeyer et al., 2003), could be obtained by Formula 1:

$$CR = \frac{(\sum_{i=1}^n SLF_i)^2}{(\sum_{i=1}^n SLF_i)^2 + (\sum_{i=1}^n e_i)} \tag{1}$$

Internal consistency could also be measured with Average Variance Extracted (AVE) estimates. This method was used to assess the number of variants processed by a series of items on a scale towards measurement error. The AVE size was formulated by Formula 2 (Hair, as cited in Netemeyer et al., 2003):

$$AVE = \frac{\sum_{i=1}^n SLF_i^2}{n} \tag{2}$$

SLFi represented SLF value of i<sup>th</sup>, and n<sup>th</sup> showed the number of latent or construct variable used to measure its latent variable. Hair (as cited in Gio, 2017) asserted that AVE value ≥ 0.5 indicates adequate convergence. According to the aforementioned Formula 1 and 2, it was obtained: CR value = 0.829 and AVE = 0.572. This indicated that reliability of PTGI measurement instrument in this research was 0.829 ≥ 0.70, which

implied sufficient reliability. Moreover, the internal consistency of 0.572 ≥ 0.50 also showed sufficient value.

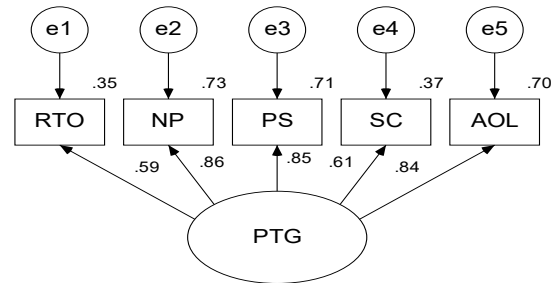


Figure 1: Path CFA PTGI.

## 4 DISCUSSION

This study aimed to examine the observer variable ability in predicting PTG latent variable. The PTGI observer variable encompassed Relating to Others (seven items), New Possibilities (five items), Personal Strength (four items), Spiritual Change (two items), and Appreciation of Life (three items) (Tedeschi & Calhoun, 1996). According to the findings of the five indicators analysis, those items could predict the PTG latent variable of domestic violence victim sample in East Kalimantan. This indicated that CFA PTGI was a multidimensional measurement, regarding to its factor structure and determined estimate values.

The goodness fit in this study was based on a research conducted by Netemeyer et al. (2003), in which fit model evaluation could be seen from the number of ways. Likewise, this study employed common ways to evaluate goodness fit, namely estimate and fit indices. Overall, the findings showed that CFA PTGI test on domestic violence sample was significant and met the fit criteria. When referring to fit indices values, such as GFI, AGFI, which had a value of nearly 1, then the goodness fit was fulfilled. Likewise, NFI, RFI, IFI and CFI values were higher than 0.90. Probability value of Chi square was also significant (<0.05). These findings were consistent with a study conducted by Taku et al. (2008) which evaluated five PTG indicators in American population which had various traumatic causes. Taku et al.'s (2008) study obtained a significant and fit model.

The results of this study also showed that construct validity on each indicator was quite sufficient, although the Relating to Other (RTO)

value of 0.5874 was considered to have a small contribution. RTO was a condition in which individuals were able to establish good relationships with people. In the case of domestic violence, the condition of being in contact with another person required more effort because the victims experience anxiety and lose confidence in communicating with others (Evans, Davies, & DiLillo, 2008). New Possibility (NP) had the greatest contribution as individuals had confidence in the new possibilities in life. Individuals with high NP values generally became more optimistic, extraverted and open to new experiences. A study conducted by Tedeschi and Calhoun (1996) found that women tended to have a higher NP value than men.

In addition to PTGI's indicator contribution, this study also found reliability and good internal consistency. This value could be seen from CR and AVE values. The indicator values, CR and AVE, were closely related to the sampling process (Ferdinand, 2014). In this study, the sampling process was conducted by screening in order to get a qualified research sample with quite extreme domestic violence. The process was consistent with a study conducted by Tedeschi and Calhoun (1996), in which they stated that individuals who had experienced more extreme traumatic conditions actually had higher PTGI value. Research by Kleimand Ehlers (2009) suggested a curvilinear relationship between PTG and PTSD, as well as PTG and depression in survivors of interpersonal violence. This curvilinear relationship indicated that the intermediate level of traumatic disturbance was optimal for the occurrence of PTG (Calhoun & Tedeschi, 1998, 2004).

However, there were several studies that reported no significant relationship between PTG and critical condition (Borja, Callahan, & Long, 2006; Cobb, Tedeschi, Calhoun, & Cann, 2006; Grubaugh & Resick, 2007; Kunst, 2010, 2011).

Calhoun and Tedeschi (2004) argued that different findings of PTG aspects were possible, as this was very sensitive and related to cognitive processes. It might also be influenced differently by other variables. Calhoun and Tedeschi (as cited in Taku et al., 2008) pointed out that when individuals experience traumatic conditions and they constantly contemplate (i.e. seeking or forming a new world that is assumed to highlight positive aspects of the experience), their thoughts about ways to understand trauma would be more likely to reach PTG. Overall, this study revealed that PTGI indicators were able to predict PTGI latent variable. The sampling process was crucial for CFA statistical analysis

measurement as well as for the sample itself. It was expected that this study could illustrate that PTGI could be used in sample with traumatic condition due to domestic violence. Further study needs to measure traumatic level more specifically in order to obtain a more profound analysis in terms of traumatic level differences towards contribution of PTGI indicators.

## 5 CONCLUSION

This study found that PTGI indicators of domestic violence victims contribute to PTG latent variable. This indicated that PTGI could be adapted and implemented on respondents with different cultures/cultural backgrounds. The results also showed that PTGI could be used on specific cases such as domestic violence. Other specific cases that could cause traumatic conditions, such as disability causing accidents, were potential research targets. The authors hoped that the results were able to provide other researchers with a clear portrayal that the measurement domains in the development of PTGI could contribute in diagnosing the potential of growth in subjects with traumatic experiences. The growth being: being able to be more open with others, being appreciative of life, having inner-strength, having an increase in spirituality, and having a more positive viewpoint regarding the future. The domains could be used as the benchmark for individuals' post-traumatic growth.

## ACKNOWLEDGEMENTS

The writers would like to thank to the Ministry of Research, Technology, and Higher Education for funding in this study and to the Psychology Department of Faculty of Social and Political Science of Universitas Mulawarman Samarinda.

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