Newfound compassion after prostate cancer: A psychometric evaluation of additional items in the Posttraumatic Growth Inventory

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Abstract

Purpose: The most widely used measure of posttraumatic growth (PTG) is the Posttraumatic Growth Inventory (PTGI). Qualitative research indicates the importance of increased compassion as a result of struggling with challenges presented by cancer and treatments. However, current PTG measures may not adequately assess compassion. **Methods:** A cross-sectional survey of 514 prostate cancer survivors assessed the PTGI and Dispositional Positive Emotional Scale (DPES). Five additional PTG items were derived from previous qualitative research to assess increased compassion. **Results:** After removing eight items with complex loadings, a Principal Components Analysis with oblimin rotation revealed a six-component structure. A clear delineation was seen between components relating to *compassion*, *new possibilities*, *relating to others*, *personal strength*, *appreciation of life*, and *spiritual change*. Compassion accounted for 48.9% of variance in data, with the overall model accounting for 79.9% of variance. Strong factorability was demonstrated through Kaiser–Meyer–Olkin (0.92) and Bartlett's test of sphericity (approximate $\chi^2 = 5791.85$, *df* 153, $p < 0.001$). The six-component structure was validated with a confirmatory factor analysis. Strong internal consistency was evidenced through Cronbach's Alpha coefficients ranging from .74 to .90 for subscales, and item-to-total correlations and inter-item correlations exceeded accepted thresholds of .50 and .30, respectively. Convergent validity was acceptable between the PTGI compassion subscale and DPES ($r = .50$). **Conclusions:** Compassion is a highly salient PTG domain after prostate cancer. Further studies can explore this construct with more heterogeneous samples of cancer types and gender.

Keywords: Posttraumatic Growth Inventory, posttraumatic growth, prostate cancer, compassion, psychometric

Overall, cancer incidence in Australia continues to rise; however, mortality associated with this disease is decreasing [1] as advances are made in early detection, screening, and treatments. Thus, as more people are living with this disease, research that adequately addresses psychosocial adjustment is essential to investigate effective means of supporting people affected by cancer. The cancer survivor's journey that begins from the moment symptoms are detected can initiate unknown life schemas comprising of interactions with the healthcare system, treatment regimes, and physical and psychological stressors. These new experiences may be marked with fear, uncertainty, and anxiety; however, alongside this distress a positive approach to appraising the world and people can also emerge [2]. The investigation of positive life changes, or posttraumatic growth (PTG), after cancer has emerged as an integral component of the post-diagnosis trajectory of adjustment [3].

Posttraumatic growth occurs as the cancer survivor shifts their life schemas to assimilate the significant life changes that have resulted from this major life stressor [4]. Quantitative PTG research has revealed that life changes such as, an enhanced appreciation of life, personal strength, and improvements in relating to other people are often reported by cancer survivors [3]. A commonly used measure of PTG that is utilised across the broader trauma literature, in addition to psycho-oncology, is the Posttraumatic Growth Inventory (PTGI) [5]. The PTGI was developed with undergraduate psychology students who had experienced a significant negative life event (e.g., bereavement, injury-producing accidents, separation or divorce of parents, relationship break-up, criminal victimization, academic problems, unwanted pregnancy) [5]. This measure has since been used in a number of contexts including chronic illness such as cancer [e.g., 6], heart disease [e.g., 7], and multiple sclerosis [e.g., 8]. The PTGI has been used within different cultures and has also been translated into several languages, including Hebrew [9], Turkish [10], Albanian [11], German

[12], Chinese [13], Dutch [14], Japanese [15], Hungarian [16], and Spanish [17].

During the development of the PTGI five subscales describing different domains of positive life change were constructed including; *appreciation for life*, *relationships with others*, *new possibilities*, *spiritual change*, and *personal strength*. The factor structure of the PTGI appears to differ across countries and cultures, with Australian and North American studies finding a five-factor solution [e.g., 5, 18], while four-factor and three-factor solutions were found in Japanese [13] and Latino populations respectively [17]. A study with cancer survivors in Hong Kong found PTGI dimensions to broadly fall into two categories of Interpersonal and Intrapersonal dimensions, with the intrapersonal dimension being comprised of three underlying factors [13]. The PTGI has been widely used in studies of cancer survivors and consistently shows strong internal consistency with this population [3].

In addition to varying component structures found for the PTGI, an emerging body of qualitative research indicates there may be salient domains of PTG that are not emphasised in current measures. For example, a review of qualitative studies of posttraumatic growth and life threatening illnesses shows that in addition to the PTG domains currently assessed in the PTGI, key themes including a new awareness of body and development of compassion were also prominent [19]. Studies conducted within Australian settings have also indicted the richness of increased compassion after trauma [20, 21]. The PTGI contains one item, “Having compassion for others”, which falls under the Relating to Others subscale [5]. Psychometric evaluation of the PTGI across varying cultures has shown that this compassion item tends to fall within different subscales across different contexts. For example, other research has shown that this item fits with the Appreciation of Life subscale [21] and the Spiritual Change subscale [10].

Compassion can be defined as concern for another’s wellbeing, nurturing behaviour towards others in need, and can be elicited by cues of vulnerability, helplessness, and distress

[22]. Compassion can be differentiated from empathy, which is considered a vicarious experience of other's emotions, and sympathy, which is an emotional response in reaction to another's emotions [23]. A newfound or increased compassion for others after a diagnosis of cancer appears to be an important component of the post-diagnosis experience, as exemplified in this quote from a cancer survivor discussing how their life has changed since being diagnosed:

> "[I now] have great empathy and understanding of how others feel when given a diagnosis of cancer" [21, p. 752].

Newfound compassion for others with cancer has been evidenced in a variety of cognitions and behaviours including; becoming an advocate for cancer awareness, volunteer work, greater empathy, and donating time/money to research [21]. Further research is needed to quantitatively assess increased compassion as a result of struggling with the challenges associated with cancer and treatment. Accordingly, the current study aims to address the potential underestimation of positive life change in this area of compassion by including additional items to the PTGI and conducting a psychometric evaluation of the revised measure.

Method

Participants and procedure

Ethical approval was obtained for this study through Griffith University (PSY/35/12/HREC). Participants were recruited through a peer support group for men diagnosed with prostate cancer; the Brisbane Prostate Support Network which is affiliated with the Prostate Cancer Foundation of Australia and Cancer Council Queensland. Members (N = 973) were posted study materials via the support group and 514 surveys were returned to the research team, resulting in a 53% response rate. Participants were 70.04 (SD = 8.36)

years of age and 7.50 (SD = 4.66) years since being diagnosed with prostate cancer. Further descriptive statistics can be found in Table 1.

Measures

Demographic (age, relationship status, country of birth, education, health insurance, work status, income) and health-related variables (time since diagnosis, other diagnosed health conditions, prostate cancer treatment) were assessed via a self-report survey. The Posttraumatic Growth Inventory (PTGI) [5] was used to obtain an overall assessment of positive life changes that may have occurred since being diagnosed with cancer. Participants rated items on a 6-point Likert-scale from 0 (*not at all*) to 5 (*very great degree*), indicating the degree to which each statement had occurred in their life as a result of being diagnosed with cancer. Five items were added to the original inventory to capture the construct of compassion. A list of compassion items were generated from previous qualitative research with cancer survivors and were positively phrased to be consistent with existing PTGI items [21]. Items were chosen to reflect emotional and behavioural aspects of increased compassion. The items were discussed with the PTGI authors and modified or rejected based on their feedback (L. G. Calhoun, personal communication, May 17, 2012).

The compassion subscale of the Dispositional Positive Emotional Scale [22] was also completed to assess convergent validity for the additional PTGI compassion items. The DPES subscale comprised 5 items in which participants indicated their agreement using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). For example, items included “It’s important to take care of people who are vulnerable” and “I often notice people who need help”. Strong internal consistency was found in the current study with a Cronbach’s Alpha coefficient of .84.

Statistical Analyses

Analyses were conducted with SPSS (version 21) and AMOS (version 20). In addition to assessing descriptive statistics, analyses were conducted to explore the component structure of the PTGI with the additional items tapping into the construct of compassion. As this was an exploratory analysis of a new structure, a principal components analysis (PCA) with a oblimin rotation was used. Factorability of the data was assessed through achieving a significant Bartlett's test of sphericity and a Kaiser–Meyer–Olkin measure above 0.60 [24]. Item loadings equal to and above 0.30 were examined as this increased the interpretability of the extracted components and was considered as a level of practical significance [24]. In regards to the confirmatory factor analysis, a number of indices were used to assess model fit as per current guidelines for GFI (>.90), CFI (>.90), and RMSEA (<.60) indicating the appropriateness of the model [25].

Results

Principal Components Analysis

A PCA with an oblimin rotation of the 26 item PTGI revealed a five-component solution with multiple component loadings for several items. The first component was comprised of 13 items comprised of Compassion and Relating to Others items. In addition to this large component, residual correlations above .10 suggested the presence of another component [26]. Therefore, a second PCA with a forced six-component structure was conducted. Complex loadings (≥.30) on two or more components remained for eight items, including one new compassion item. Therefore, these eight items were deleted and a third PCA with a forced six-component structure was conducted with the remaining 18 items. A bivariate correlation of r = .99 between the 26-item and 18-item PTGI revealed that deleting these eight items did not detract from the assessment of PTG and Cronbach's alpha coefficients improved after removing these items. Table 2 contains the component structure of the final PCA (in bold font). To highlight the multiple complex loadings for eight items in

the second PCA, the deleted items with loadings higher than .30 on more than one component are also shown in Table 2.

The strong factorability of the final PCA was demonstrated through a Kaiser–Meyer–Olkin measure of 0.92 and Bartlett's test of sphericity with an approximate χ^2 of 5791.85 (*df* 153, $p < 0.001$). A clear delineation could be seen between the six components relating to *compassion*, *new possibilities*, *relating to others*, *personal strength*, *appreciation of life*, and *spiritual change*. The six components accounted for 79.91% of the variance in the data. Strong internal consistency was shown for each new subscale with Cronbach's Alpha coefficients ranging from .74 to .90. As an additional measure of internal consistency, bivariate correlations were examined to ensure that item-to-total correlations and inter-item correlations exceeded accepted thresholds of .50 and .30, respectively [24]. Component correlations are shown in Table 3. Convergent validity was assessed with the DPES compassion subscale, revealing a strong relationship between the two compassion measures ($r = .50$).

Confirmatory Factor Analysis

To confirm the applicability of the six component structure of the 18 item PTGI, two confirmatory factor analyses (CFA) were conducted. We firstly examined a first-order CFA and this model fit the data well, NFI = 0.948, CFI = 0.966, RMSEA = 0.059. The χ^2 was significant suggesting this model did not have goodness of fit, $\chi^2(118) = 318.93$, $p = .000$. However, relying on χ^2 as a goodness of fit index is problematic when sample sizes are large [27]. We also examined a second-order model to assess whether the individual factors, or PTG subscales, were explained by an overarching higher order structure of general posttraumatic growth. Although the fit indices were close to acceptable cut-offs, the RMSEA suggested that this model did not fit the data as well as the first-order CFA, NFI = 0.940, CFI = 0.959, RMSEA = 0.062, $\chi^2(127) = 369.49$, $p = .000$. Figure 1 shows the standardised

regressions weights for the first-order CFA. Item 9 ("I am able to do better things with my life") showed a standardised regression weight greater than one indicating the potential for multicollinearity. Item 9 also showed moderate to large bivariate correlations (ranging between r = .6 and .7) with the other items in this subscale ("I developed new interests", "I established a new path for my life", "New opportunities are available which wouldn't have been otherwise").

Descriptive statistics

The mean for the original 21-item PTGI was 50.20 (*SD* = 22.99), which is consistent with another study of men diagnosed with prostate cancer [28]. Descriptive statistics for the original and revised PTGI can be found in Table 4. Examination of item means show that "I feel compassion for other people who are facing challenges" was the greatest type of positive life change (*M* = 3.32, *SD* = 1.34), with 75% of the sample rating this item as 3 or above on the 0–5 Likert scale (equal to or greater than a moderate degree). This was followed by "Being able to accept the way things worked out" (*M* = 3.19, *SD* = 1.45) and "An appreciation for the value of my own life" (*M* = 3.14, *SD* = 1.49), with 76% and 74% of the sample rating these items as 3 or above, respectively.

Discussion

The results of this study confirm compassion as a key PTG domain that has occurred as a result of struggling with the challenges presented by their prostate cancer and treatment. Specifically, the compassion subscale accounted for half of the variance in the PCA model and participants also rated a new compassion item with the highest item mean. Convergent validity of the newly constructed compassion items was shown in relation with the DPES, highlighting that the new subscale assessed the applicable construct. The CFA confirmed that the six subscales of the PTGI, including compassion, were separate but interrelated PTG domains. Collinearity may be evident in the New Possibilities subscale with item 9 showing a

a standardised regression loading above one, and moderate to large correlations with the other items in this subscale. The applicability of the first-order CFA over the second-order structure highlighted the multidimensional nature of the six PTG domains.

The psychometric evaluation of the PTGI including compassion items provides supporting evidence for the importance of this domain in previous qualitative research with cancer survivors [21]. The original PTGI has one compassion item within the Relating to Others subscale, which contains items related to developing or strengthening existing bonds with others. However, the broader nature of the dimension of compassion has now been captured in the current study with the addition of items that assess both the emotional (e.g., "If I see someone who needs help I have a stronger desire to help them") and the behavioural aspects (e.g., "When possible I donate my time and/or money to support other people") of compassion.

To date, it is not yet clear how the post-diagnosis experience acts as a catalyst for newfound or increased sense of compassion for others and in this regard there is a paucity of research regarding compassion and cancer. A recent meta-analysis aimed at understanding the association between self-compassion (treating oneself with kindness, seeing one's experiences as part of a shared humanity, balanced awareness) and mental health revealed the importance of this construct for overall psychological well-being, including reducing depression and anxiety and promoting resilience [29]. An empirical review of literature regarding compassion directed toward others, defines compassion as a distinct construct from love, empathic concern, sympathy, and pity due to differences in motivations, appraisals, emotions, and behaviours [23]. Goetz et al (2010) suggest that the primary function of compassion is to protect the weak and those experiencing undeserved suffering. It may be that compassionate acts, such as taking on a role of cancer advocacy or providing support to peers, contributes to a sense of altruism [30]. However, this newfound compassion for others

going through the same experience may not be solely altruistic as it may also allow the cancer survivor to attribute meaning to their own cancer experience [31]. Constructing new meaning based on compassion for others may allow the cancer survivor to transcend the adverse events surrounding the diagnosis and treatment, and expand their view of themselves and their role in the world [31]. A shared understanding between survivors that comes from being diagnosed with cancer may also be a catalyst for helping others in similar situations and normalising the experience with peers [31].

Strengths, Limitations, Future Directions

The current study builds on previous qualitative data and provides A psychometric evaluation of the PTGI including compassion items. Increased compassion occurring after diagnosis and treatment of cancer has been shown to be an important type of positive life change for cancer survivors [21]. The inclusion of items tapping into the construct of compassion is an important addition to the PTGI, as PTG may have been potentially underestimated for cancer survivors. Importantly, despite five items being added to the PTGI, the psychometric evaluation of the revised inventory revealed a clear component structure after removing eight items. Therefore, potential participant burden is reduced with the resulting 18-item inventory with six factors.

Limitations of the current study design must be noted, including the length of time passed since diagnosis. As approximately 7.5 years had passed, the salience of trauma associated with diagnosis and treatment relies on retrospective recollection of life change that has resulted from struggling with the challenges presented by the cancer. While the current study enhances the body of PTG literature by moving beyond breast cancer survivors [31], the generalisability of results to other cancer types and across gender is limited to prostate cancer survivors. Before utilising these additional items tapping into increased compassion after cancer, further research should be conducted with cancer diagnostic types other than

prostate cancer. As the compassion subscale represented a large portion of the variance in the PCA, perhaps the salience of newfound compassion after cancer warrants a separate scale assessing this construct. Further studies with other cancer diagnostic groups should examine the psychometric properties of the PTGI when including these items. In addition, generalisability of the results of the current study is limited to the Australian/North American context as previous research has shown the differences in factor structure across other cultures and countries.

Conclusion

Cancer survivors may report positive life change that occurs as they shift their life schemas to assimilate the significant challenges presented by this major life stressor. Posttraumatic growth is commonly reported after cancer and previous qualitative research has shown the importance of a newfound or increased sense of compassion towards others in this context [19, 21]. The current study contributes to the emerging body of PTG research with cancer survivors by conducting a psychometric evaluation on the PTGI with additional items directed toward assessing compassion, resulting in an 18-item inventory assessing the five original PTG domains (*new possibilities*, *relating to others*, *personal strength*, *appreciation of life*, and *spiritual change*) and a sixth domain assessing *compassion*. The results of the current study have important implications for researchers who assess positive life change in the context of a cancer diagnosis by providing a comprehensive assessment of PTG. Further research can assess this measure, which has been shown to be psychometrically sound with prostate cancer survivors, and further explore the construct of PTG.

Conflict of Interest: The authors have no disclosures in regards to financial relationships with organisations that sponsored this research. The authors have full control of all primary data and we agree to allow the journal to review the data if requested.

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Table 1

Frequencies of Participant Demographic and Cancer-related Variables (N = 514)

	%
Relationship status	
Married/partner	84
Single/divorced/separated/widowed	14
Country of Birth	
Australia	79
United Kingdom/Europe	13
New Zealand	3
Education	
University/college degree	36
Trade or technical college or diploma	33
Senior high school	13
Junior high school	12
Primary school/did not attend school	5
Private Health Insurance	
No	13
Yes, full cover (including DVA)	76
Yes, partial cover	11
Work status	
Retired	67
Employed full-time	18
Employed part-time/casual	10
Permanently ill/unable to work	2
Self-employed	2
Income	
<$20,000	10
$20,000 - $39,999	26
$40,000 - $59,999	21
$60,000 - $79,999	12
$80,000 and above	24
Other diagnosed health conditions	
High blood pressure	38
High cholesterol	30
Heart disease	20
Arthritis	28
Osteoporosis	9
Diabetes	9
Stroke	4
Lung disease (e.g., emphysema, asthma)	10
Depression	14
Anxiety/nervous disorder	12
Other cancers (e.g., melanoma, bowel)	21
Types of PC treatment (non-exclusive)	
Radical prostatectomy	57
External beam radiation	33
Hormone therapy	24
Brachytherapy	13
Orchidectomy	2
Active surveillance	5
Watchful waiting	7

Note. DVA = Department of Veterans Affairs health insurance, PC = prostate cancer

Table 2

Component loadings for the PTGI including Compassion items (six components)

	Component Loading					
PTGI item and component	1	2	3	4	5	6
Compassion (50.35% variance)						
1. I feel compassion for other people who are facing challenges [a]	**.82**					
2. When possible I donate my time and/or money to support other people [a]	**.74**					
3. Having compassion for others	**.69**					
4. If I see someone who needs help I have a stronger desire to help them [a]	**.66**					
5. I try to encourage people when they feel low [a]	**.65**					
I'm more likely to try to change things which need changing	.39				.30	
New Possibilities (6.56% variance)						
6. I developed new interests		**.88**				
7. I established a new path for my life		**.85**				
8. New opportunities are available which wouldn't have been otherwise		**.81**				
9. I'm able to do better things with my life		**.62**				
A willingness to express my emotions		.33				.32
Spiritual Change (5.35% variance)						
10. I have a stronger religious faith			**.97**			
11. A better understanding of spiritual matters			**.90**			
I discovered that I'm stronger than I thought I was			.47		.31	
Appreciation of Life (4.33% variance)						
12. My priorities about what is important in life				**.95**		
13. An appreciation for the value of my own life				**.88**		
I am more aware of other people's experiences and viewpoints	.43			.51		
Personal Strength (4.05% variance)						
14. Being able to accept the way things worked out					**.88**	
15. Knowing I can handle difficulties					**.75**	
Appreciating each day				.30	.50	
A feeling of self-reliance		.31			.46	
Relating to Others (3.27% variance)						
16. Knowing that I can count on people in times of trouble						**.83**
17. I accept needing others						**.74**
18. I learned a great deal about how wonderful people are						**.71**
A sense of closeness with others		.38				.55
Putting effort into my relationships	.33					.36

Note. Total variance explained = 79.91, PTGI = Posttraumatic Growth Inventory, a = compassion items added in this study, **bold font** = retained items in the final model

Table 3

Component correlations

	Compassion	New possibilities	Spiritual change	Appreciation of life	Personal strength
New possibilities	.43				
Spiritual change	.41	.42			
Appreciation of life	.41	.44	.32		
Personal strength	.47	.35	.20	.33	
Relating to others	.55	.36	.35	.36	.38

Table 4

Descriptive statistics for original PTGI and PTGI including compassion

	Original PTGI	New structure PTGI
	M (*SD*)	*M* (*SD*)
Total score	50.20 (22.99)	43.78 (19.06)
New Possibilities	9.69 (6.43)	7.07 (5.41)
Relationships with Others	19.00 (8.32)	8.72 (3.86)
Spiritual Change	3.01 (3.25)	3.01 (3.25)
Personal Strength	10.75 (4.77)	6.10 (2.53)
Appreciation for Life	9.42 (3.80)	5.97 (2.81)
Compassion	-	14.22 (5.96)

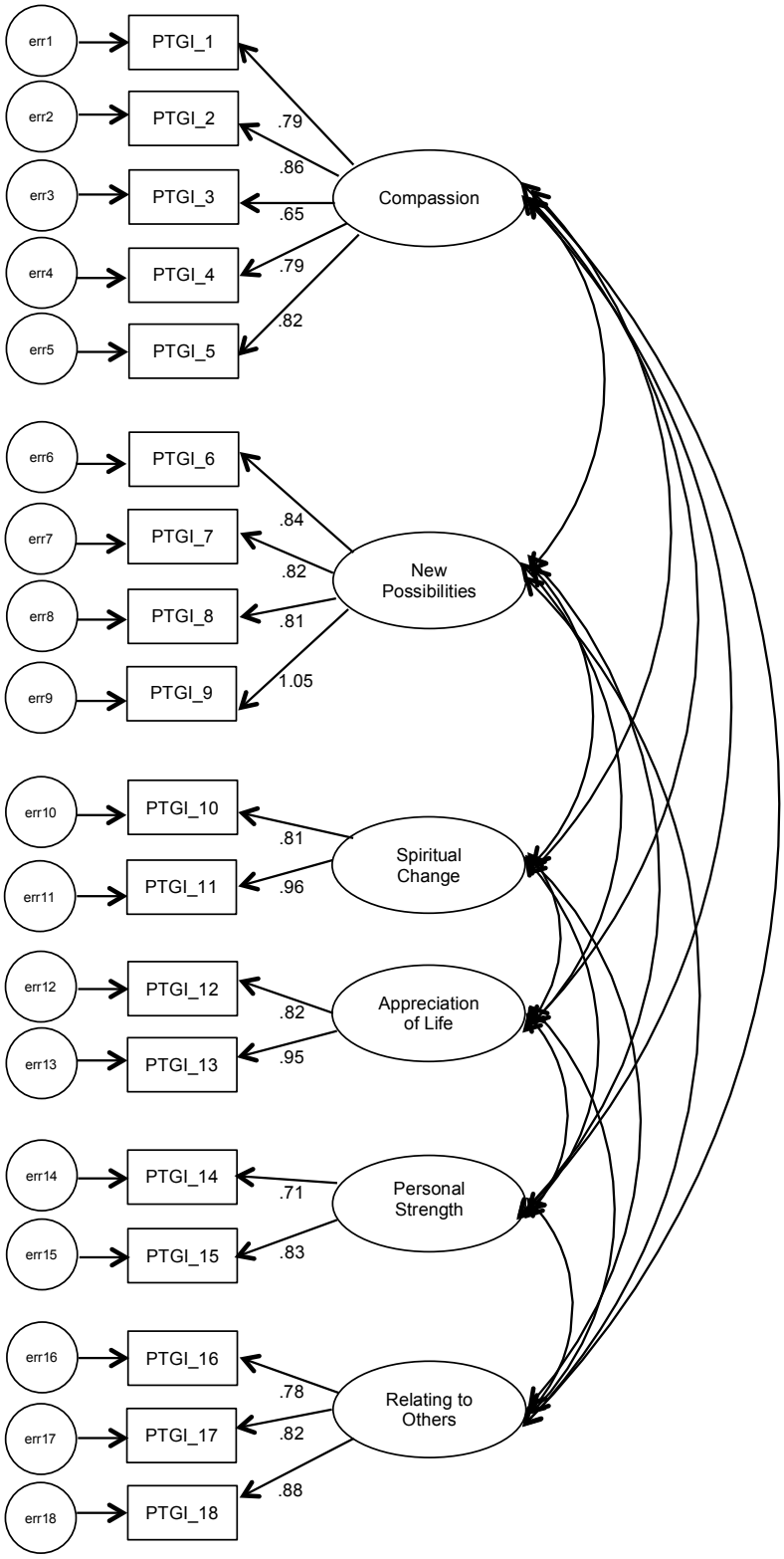

Figure 1. Confirmatory factor analysis of 18-item PTGI.