Expanded version of the Posttraumatic Growth and Depreciation Inventory: Scale validation and refinement among Italian adults

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Abstract

Objective

The main aim of this study was to investigate the psychometric properties of the Italian version of the newly-developed Posttraumatic Growth and Depreciation Inventory (PTGDI-X) in a heterogeneous sample of Italian adults who had experienced a traumatic event.

Method

The instrument was translated following the forward-backward method and completed by 601 participants who met the inclusion criteria. The factorial structure of the PTGDI-X was assessed by means of multiple confirmatory factor analyses (CFA). Convergent and discriminant validity and reliability were also evaluated.

Results

The results of the CFA revealed that the original five-factor model was the best fit for the growth (PTG) dimension of the PTGDI-X, whereas it poorly fit the data with respect to the depreciation (PTD) component. With regard to convergent and divergent validity, positive correlations were found between the PTG scores and the core belief disruption and rumination scores, whereas the PTG factors correlated negatively with depressive and post-traumatic symptom measures. Conversely, positive correlations were identified between the PTD total score and all the other investigated constructs. Finally, the total scales and subscales of the PTG/PTD dimensions revealed good to excellent internal consistency.

Conclusions

The current findings indicate that the Italian version of the PTGDI-X appears to be a valid assessment tool for the multidimensional structure of the PTG component. Future research is needed, on the other hand, to confirm the validity of the PTD dimension in the Italian population.

Keywords: posttraumatic experiences; growth/depreciation; PTGDI; Confirmatory Factor Analysis; Italian validation.

Clinical impact statement

This study supports the use of PTGDI-X in the Italian population, suggesting that it could be considered a valid instrument to evaluate both the positive and negative outcomes of a traumatic event. Indeed, from a clinical point of view, the assessment of both psychological dimensions may allow clinicians to help traumatised individuals give meaning to their life and reappraise their core beliefs, in order to improve their psychological well-being.

Introduction

The terrifying aftermath of trauma can be fertile soil for unexpected positive outcomes that may be observed in individuals. The term 'posttraumatic growth' refers to ‘positive psychological change experienced as a result of the struggle with highly challenging life circumstances’ (Tedeschi & Calhoun, 2004).

The Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is the measure most frequently used to evaluate positive change following a traumatic event. The first version of the instrument included 21 items with a five-factor structure comprising domains of Personal Strength, New Possibilities, Relating to Others, Appreciation of Life, and Spiritual Change (Tedeschi & Calhoun, 1996). Several previous studies have analysed the factorial structure of the PTGI-21 using various statistical approaches on samples having had different traumatic experiences and originating from different cultures.

Various factor solutions have been recognised and the original five-factor structure appears to be the most tested and most valid solution. However, a second order model, which comprises an additional ‘general growth’ factor, has also been proposed, such that the PTGI can be used both as a one-dimensional measure of general growth and as a measure of various growth features through the five subscales (e.g. Maercker & Langner, 2001; Linley, Andrews, & Joseph, 2007; Taku, Cann, Calhoun, & Tedeschi, 2008a; Brunet, McDonough, Hadd, Crocker, & Sabiston, 2010; Lee, Luxton, Reger, & Gahm; 2010; Palmer, Graca, & Ochietti, 2012; Mack et al., 2015).

One limitation of the original version of the PTGI is represented by the Spiritual Change (SC) factor, which consists of just two items. Indeed, a factor with only two items can be considered psychometrically weak (Jaarsma, Pool, Sanderman, & Ranchor, 2006) and it may be unable to grasp the spiritual dimension typical of some secular religions. In order to overcome those issues, Tedeschi et al. (2017) developed four more items, facilitating a

broader assessment of spiritual growth in PTG. The original two-item SC factor was then defined as Spiritual-Existential Change (SEC) and the PTGI-21 was renamed as the expanded version of the PTGI (PTGI-X). PTGI-X has proven to be very reliable and maintains the five-factor structure of the original instrument (Tedeschi et al., 2017).

Another limitation of the PTGI-21 was its focus only on positive changes, which may amplify the likelihood of a positive response bias (Park & Lechner, 2006). Indeed, traumatic experiences are very likely to lead not only to positive outcomes but also to negative ones. One solution to this potential limitation of the PTGI-21 was to 'include both positive and negative effects' (Tomich & Helgeson, 2004, p. 22) in the assessment. The negative effect, consequent to exposure to life crises, has been defined as depreciation.

Baker et al. (2008) then developed a new form of the PTGI, namely the PTGI-42. This consists of 42 items and it assesses both positive changes (i.e. growth) and negative changes (i.e. depreciation) in the same areas. It has been well established that people exposed to highly stressful events can experience significant psychological distress and a sense of depreciation in some aspects of life, at least for a time (e.g. Keane et al., 2006). However, data also support the experience of positive changes, or PTG, from the struggle with these same stressors. Although asking individuals to report both growth and depreciation in the same domains may seem paradoxical, the available evidence suggests that people can experience both those types of outcomes (e.g. Tedeschi & Calhoun, 1996). For instance, a major life crisis may lead one to develop closer relationships with some people but also to experience depreciation in relationships with others.

A final attempt has recently been made to propose an improved version of the PTGI, including both the revised SEC factor and the PTG/PTD dimensions in a single instrument. The latest version of the PTGI was then developed and defined as the expanded version of the Posttraumatic Growth and Depreciation Inventory (PTGDI-X; Taku et al., 2021).

The results of this recent cross-cultural study confirmed the five-factor structure of PTG and PTD and revealed good psychometric properties for the PTGDI-X. Finally, the relationship between PTG and PTD constructs was found to be non-linear in most cases, with different trajectories detected for the various countries involved in the study. These results suggest that PTG and PTD are not on opposite ends of a single dimension across the board but rather co-exist. Indeed, the nature of the trauma people experienced can also be confounded with their cultural background when reporting the events.

Therefore, considering both the presence of cross-cultural variations in the experience of PTG and PTD (Taku et al., 2021) and the specificity of each cultural context, the main goal of this study was to evaluate the factor structure of the Italian translation of the PTGDI-X. More specifically, the aim of this study was twofold:

1. The first objective was to analyse the psychometric properties of the Italian translation of the PTGDI-X and to test if the hypothesised five-factor model of the PTGDI-X (Taku et al., 2020) was the best fit for our data.
2. The second aim of this study was to evaluate the convergent and discriminant validity of the PTGDI-X with respect to posttraumatic stress symptoms, depressive symptoms, intrusive and deliberate ruminations, and core belief disruption.

Material and Methods

Participants

Data were collected using an anonymous online survey. A snowball sampling strategy was employed, wherein the participants were initially recruited via online advertisements and were encouraged to pass the survey link to others. The participants received no reward for taking part in the study. In order to qualify for the study, participants had to meet the following inclusion criteria: at least 18 years of age; Italian mother tongue; sufficient

educational level (>5 years); having experienced at least one traumatic event (based on the DSM-5 definition of trauma; APA 2013) in the past ten years; having been moderately or extremely distressed at the time of the event; classifying the event, identified as most relevant, as a trauma.

601 participants met the inclusion criteria and completed the questionnaires, making up the final sample enrolled in the study. Of the 601 final participants, 429 (71.4%) were women and 172 were men.

The study was approved by the University of Turin Ethics Committee (protocol no. 264810) and was conducted in accordance with the Declaration of Helsinki. All participants gave their written informed consent to participate in the study.

Procedure

The data were collected by means of an anonymous online survey.

Firstly, the PTGDI-X, the Core Beliefs Inventory, the Event-Related Rumination Inventory and the PTSD Checklist for DSM-5 were translated into Italian following the back-translation method to ensure the semantic equivalence of the Italian and English versions.

Thereafter, an individual and unique code for completing the online survey was emailed to those who had agreed to take part in the study. All participants were asked to provide socio-demographic (i.e. age, gender, educational level, and marital status) and trauma-related (i.e. type of traumatic event and distress experienced at the time) information.

Measures

Posttraumatic Growth and Depreciation

The PTGDI-X is a 50-item self-report instrument that assesses both PTG and PTD dimensions (Taku et al., 2020). Each item is rated on a 6-point Likert scale ranging from 0 (I

did not experience this change as a result of my crisis) to 5 (I experienced this change to a very great degree as a result of my crisis). The total score for both the PTGI-X and PTDI-X scales ranges from 0 to 125. Higher scores indicate greater growth or depreciation. In addition to the total scores, five subscale scores can be derived for each of the two dimensions assessed (i.e. PTG and PTD): Relating to Others, New Possibilities, Personal Strengths, Spiritual and Existential Change, Appreciation of Life.

Core Beliefs

The Italian translation of the Core Beliefs Inventory (CBI; Cann et al., 2010a) was used for the assessment of core beliefs.

The CBI consists of 9 items, each scored using a 6-point Likert-type scale ranging from 0 (not at all) to 5 (a very great degree). The total score ranges from 0 to 45, with higher scores indicating a greater disruption of core beliefs.

The CBI has shown good psychometric properties, with good internal consistency (Cronbach's α values = .82-.87), acceptable test-retest reliability, and construct validity (Cann et al., 2010). In line with these results, in our sample, the Cronbach's alpha was good for the CBI (α = .80).

Intrusive and Deliberate Rumination

Intrusive and deliberate rumination in relation to the traumatic event identified by the participants was assessed using the Italian translation of the Event-Related Rumination Inventory (ERRI; Cann et al., 2011). This is a 40-item self-report measure, which reflects four kinds of rumination: intrusive rumination in the aftermath of the traumatic event (ERRI-PI); recent intrusive rumination (ERRI-TI); deliberate rumination in the aftermath of the traumatic event (ERRI-PD); recent deliberate rumination (ERRI-TD). Each item is scored

using a 4-point Likert-type scale ranging from 0 (not at all) to 3 (often). Four separate total scores can be derived for intrusive and deliberate rumination, with respect to the present or past time of the evaluation. Each total score ranges from 0 to 30, with higher scores indicating more intrusive or deliberate rumination.

The scale has shown good internal consistency, with Cronbach's alpha coefficients ranging from .88 to .96 (Allbaugh et al., 2016; Cann et al., 2011; Taku et al., 2008a). In line with these results, in our sample, the Cronbach's alpha values were good for both the ERRI-Intrusive rumination (α = .94) and the ERRI-Deliberate rumination (α = .89).

PTSD symptoms

The Italian translation of the PTSD Checklist for DSM-5 (PCL-5; Blevins et al., 2015) was used for the evaluation of PTSD symptoms. The PCL-5 consists of 20 items, each scored using a 5-point Likert-type scale ranging from 0 (not at all) to 4 (extremely). The respondents must indicate the degree to which they have been affected in the past month by DSM-5 PTSD symptoms related to their most currently distressing event (Weathers et al., 2013). The total score ranges from 0 to 80, with higher scores indicating higher levels of PTSD symptoms.

The PCL-5 has shown good psychometric properties, with excellent internal consistency (Cronbach's α = .94), test-retest reliability, and construct validity (Blevins et al., 2015).

In line with these results, in our sample, the Cronbach's alpha was excellent for the PCL-5 total score (α = .95).

Depressive symptoms

The presence of depressive symptoms was assessed using the Beck Depression Inventory-II (BDI-II) (Beck et al., 1996a; Ghisi et al., 2006). It consists of 21 items, each scored using a 4-

point Likert-type scale ranging from 0 (*no symptom*) to 3 (*most severe*). The total score is the sum of all items and ranges from 0 (*no depressive symptoms*) to 63 (*severe depression*).
The BDI-II has shown good psychometric properties, with good internal consistency (Cronbach's α score = .91), test-retest reliability, and construct validity (Beck et al., 1996b). In line with these results, in our sample, the Cronbach's alpha was excellent for the BDI-II (α = .91).

Statistical analysis

The psychometric properties of the Italian version of PTGDI-50 were examined preliminarily, performing an item description and a reliability analysis. Following the scale structure denoted in previous research, total and sub-scale reliabilities were assessed by means of Cronbach's coefficients, while the contribution to internal consistency at the level of the individual items was evaluated through item-total and item-subscale correlations.
Scale dimensionality and structure were tested using confirmatory factor analysis (CFA). Firstly, the part of the scale dedicated to growth experiences was analysed, in order to replicate the 5-dimensional structure proposed by Prati and Pietrantoni (2014) and to verify whether the sub-dimensions of the scale are orthogonal or oblique. Secondly, the same structure identified for the Growth section was imposed on the 25 items of Depreciation, to determine if the PTGDI-50 scale is structured into 10 sub-dimensions, 5 dimensions of Growth and 5 dimensions of Depreciations.
Considering that item distributions are not normal, both univariate and multivariate, the CFA models were estimated using the MLR method.
The model evaluation and comparison were conducted using the following fit indices: the model chi square (X^2), the comparative fit index (CFI), the root mean square error of approximation (RMSEA) and the standardised root mean squared residual (SRMR).

The Chi-Square value is the conventional measure for evaluating overall model fit, but its use is quite limited as this statistic is sensitive to sample size and requires the multivariate normality of item distributions: the Chi-Square may lead to model rejections even when the model is properly specified (McIntosh, 2006). To overcome these limits, the X^2/df ratio is often used, with a range from as high as 5.0 (Wheaton et al, 1977) to as low as 2.0 (Tabachnick and Fidell, 2007).

The CFI values range between 0.0 and 1.0 (Bentler, 1990), with values closer to 1.0 indicating good fit. A cut-off criterion of CFI $\geq$ 0.90 is considered sufficient, although a value of CFI $\geq$ 0.95 is currently recognised as a strong indicator of good fit (Hu and Bentler, 1999).

The recommendations for the RMSEA cut-off points have been changed several times, but there has recently been a general consensus around a cut-off value close to .06 (Hu and Bentler, 1999) or .07 (Steiger, 2007), with a confidence interval in which the lower limit is close to 0 while the upper limit should be less than 0.08.

Values for the SRMR range from zero to 1.0 with well-fitting models obtaining values of less than .05 (Byrne, 1998; Diamantopoulos and Siguaw, 2000); however, values as high as 0.08 are deemed acceptable (Hu and Bentler, 1999).

Statistical analyses were performed using the IBM SPSS software, version 26, and MPlus, version 8.4.

Results

Socio-demographic and trauma-related data

The socio-demographic and trauma-related data of the Italian sample are presented in **Appendix A**.

With regard to the other trauma-related aspects, the majority of participants reported having been ‘extremely’ distressed at the time of the event (304, 50.6%), followed by ‘quite a bit’ distressed (192, 31.9%), and ‘moderately’ distressed (105, 17.5%).

Descriptive statistics

In light of the descriptive statistics, it can be seen that, in the examined sample, the growth experiences are shared more frequently than those of depreciation: the averages of the items of the sub-dimension Growth are mostly higher than two, while those of the sub-dimension Depreciation are always lower than two, with the exception of items 14 and 20 (**Appendix B**).

The shape indicators of the distributions of responses to the items lead to similar considerations: the items of the Growth dimension tend to have distributions with negative asymmetry, while those of Depreciation show positive asymmetries. Together with asymmetry, kurtosis also indicates a divergence in the distribution of answers, which are mainly platicurtic for the Growth items and leptocurtic for the Depreciation items.

In general, the item distributions violate the conditions of normality.

When considering the average values of the answers, it can be seen that the participants' most frequent growth experiences are those described in items 1 and 2, respectively “I changed my priorities about what is important in life”, “I have a greater appreciation for the value of my own life”, while the least proven experience is “I established a new path for my life”, described in item 8.

The experiences reported in items 14 and 20 were the most widespread on the Depreciation dimension, i.e. “I am less able to accept the way things work out” and “I am less likely to try to change things that need changing”, respectively.

There are many items that describe less shared experiences of Depreciation, particularly items 2 and 17, which refer to the following items: “I have less sense of harmony with the world” and “Fewer opportunities are available than would have been before”.

Reliability

The items of the Growth dimension have a good degree of internal coherence (**Appendix C**). The reliability measured by Cronbach's alpha coefficient over the 25 items is 0.934. The item-total correlations, such as multiple items, are satisfying. The only items that are less homogeneous are 1 and 12. Reliability remains at a good level even if calculated by regrouping the items by five subscales, as envisaged by Prati and Pietrantoni (2014).
The homogeneity of the 25 items dedicated to Depreciation is also satisfying, although lower: alpha, on the total of the 25 items, is equal to 0.938. Several items have multiple correlations lower than 0.3, showing poor coherence with the content investigated by the dimension.
The results reveal that the Appreciation of Life sub-dimension is the weakest in terms of reliability, in terms of both responses related to growth and depreciation experiences.

Confirmatory Factor Analysis

The structure of the PTGDI-X was determined by analysing the Growth and Depreciation components separately, before moving on to a more complex and comprehensive specification. For both components, a five latent factors model was specified – Personal Strength (PS), Relating to Others (RO), New Possibilities (NP), Appreciation of Life (AL) and Spiritual/Existential Change (SEC) – followed by a six-factor model in which Existential Change and Spiritual Change were designed to take account of the Catholic tradition characterising the culture of the participants.

The results of the measurement models (**Table 1**) reveal that for both dimensions of post-traumatic experience, the structure is multidimensional and oblique, as predicted by the inventory (Tedeschi et al., 2017). However, in the examined sample, significant differences between Growth and Depreciation can be observed.

In relation to the Growth dimension, the model that best fits the data has five oblique factors, clearly distinguishable albeit related (CFI==.864, RMSEA=0.071, SRMR=0.056). The minimum correlation is 0.699 between PS and RO, while the biggest is between PS and SEC, of 0.878. The adaptation of this model improves by adding an interaction term between the errors of items 5 and 18, both belonging to the SEC factor, although the indices remain only quite good (CFI==.884, RMSEA=0.066), except for SRMR (0.052). The transition to a six-factor latent model in which Existential Change and Spiritual Change are separated is ineffective: the increase in complexity of the model does not produce any benefit in terms of fit.

Table 1 about here

The Depreciation dimension is more difficult to measure, although apparently the fit indices of the models are better than those mentioned above in relation to Growth. In fact, even for the Depreciation experiences, the most appropriate model seems to have five oblique latent factors, with an interaction between the errors of two SEC items, this time items 5 and 23, rather than item 18. The fit of this model is satisfactory (CFI=.917, RMSEA=0.051, SRMR=0.043) but the correlations between the factors are so wide that SEC, NP, PS and AL are broadly indistinguishable ($R_{SEC,PS}$=0.948, $R_{SEC,NP}$=0.935, $R_{PS,NP}$=0.941, $R_{SEC,AL}$=0.929, $R_{AL,NP}$=0.949). RO is the only latent factor that, despite having high correlation values, at around 0.800, seems to maintain its semantic and statistical identity.

Finally, even in the case of Depreciation experiences, the specification of the model with six factors does not produce any improvement in the fit indices.

The great overlap between the sub-dimensions of Depreciation experiences becomes even more problematic when analysing all 50 items: the model that measures ten factors produces a degenerate solution, with a PSI matrix in which the correlations between latent factors are greater than 1.

The last model, in which the ten latent factors form two second level factors that should measure the Growth and Depreciation experiences, has an unacceptable fit.

In conclusion, the results suggest that the only valid model is the one which measures the experiences of Growth, divided into five latent factors, correlated between them. In this model, presented in **Figure 1**, all items have statistically significant loading greater than 0.5, with the exception of items 5, 18 and 24. Coherently, the same items are those with a lower explained variance: R^2<=0.250, against the majority of items which, on the other hand, presents R^2 between 0.314 and 0.729.

Fig. 1 about here

Convergent and discriminant validity

In line with the previous results, the analysis of convergent and discriminant validity was carried out on the Growth and Depreciation dimensions. In spite of the result of the CFA and as the internal reliability was found to be excellent (α=.938), we decided to preserve the Depreciation content, considering the total score on the respective 25 items.

In general, the correlation analysis revealed a network of consistent and expected relationships, in line with the significance of the measured growth factors (**Table 2**).

The correlations of the five factors with the BDI score were all negative and indicated that any growth experience is associated with a lower score of depressive symptoms, especially if related to PS ($R_{BDI,PS}$= -.343). Coherently, albeit with lower levels of correlation, the presence of post-traumatic symptoms is negatively correlated with having experienced a personal development following the traumatic event, and even in this case the highest correlation value concerns the PS ($R_{PCL,PS}$= -.211).

The growth experiences measured through PTG are positively correlated to CBI scores and, in this case, the closest relationship is with the NP factor ($R_{CBI,NP}$= .402).

With regard to Depreciation experiences, the correlations of the single factor (Total Score) with the BDI score were positive and indicate that depreciation experience is associated with a higher score of depressive symptoms. Overall, the presence of post-traumatic symptoms is positively correlated to having experienced a personal development following the traumatic event. Moreover, the depreciation experiences were found to be positively correlated with CBI scores.

Table 2 about here

With regard to rumination, the most significant correlations are with deliberate rumination. All factors are related to ERRI-PD, but the closest relationship is with the growth factor NP ($R_{PD,NP}$= .422) and this result remains in place even when considering the ERRI-TD sub-scale, although the correlation levels are more contained. The intrusive rumination measured through the PI sub-scale is slightly related only to the RO and NP factors (R=.107 for both), while the one measured by the TI sub-scale is not related to any post-traumatic growth experience.

Discussion

This study aimed to investigate the psychometric properties of the Italian version of the PTGDI-X in a heterogeneous sample of Italian adults who had experienced a traumatic event in the past ten years. More specifically, the hypothesised five-factor model of the PTGDI-X (Taku et al., 2021), convergent and discriminant validity and reliability were assessed.

With regard to the factor structure, these results provide support for the original five-factor structure at least for the PTG dimension of the PTGDI-X. Indeed, the five-factor model was found to have the best fit for the PTG component when compared with the other tested structures (i.e. six-factor model; ten-factor model; second order model), consistently with the majority of validation studies carried out in both clinical (Prati & Pietrantoni, 2014; Liu et al., 2015; Mack et al., 2015; Ramos et al., 2016) and non-clinical (Tedeschi & Calhoun, 1996; Morris et al., 2005; Taku et al., 2008a; Hooper, Marotta, & Depuy, 2009; Silva et al., 2018) populations. Conversely, in our sample of Italian participants, it was not possible also to measure with the same validity the PTD dimension of the PTGDI-X. Indeed, neither the hypothesised five-factor model, nor the other tested models (i.e. six-factor model; ten-factor model; second order model) were found to produce adequate fit indices.

Those findings appear to be at least partially in contrast with the only available study that examined the factor structure of the PTGDI-X (Taku et al., 2021). The results of this study have revealed that each of the PTG/PTD five factors appear suitable for assessing the same constructs in the same way across different countries. Those mixed findings could be explained when considering the contextual administration of the PTG and PTD items, originally suggested for the improved version of the PTGI (i.e. the PTGI-42; Baker et al., 2008) and retained for the newly-developed PTGDI-X. In fact, the questionnaire requires the participants to fill in, firstly, the growth version of the PTGDI-X and, immediately thereafter, the mirror version of the instrument for the assessment of depreciation. For reasons of

consistency, the participants may have found it difficult to give a negative connotation to an experience that they had just been asked to consider positively in order to complete the growth subscale. Cognitive processes that can be explained by the well-known theory of dissonance cognitive (Festinger, 1975) or by the presence of self-serving bias (Campbell et al., 1999) could thus account for those contradictory results.

One possible solution to overcome this issue could be represented by the randomised administration of the two subscales (i.e. firstly, growth, then depreciation, and vice versa), which might assist in avoiding any biased answers to the second section of the inventory.

Although our findings show that model fit indices are not sufficiently adequate for the PTD dimension of the PTGDI-X, they provide strong evidence for the multidimensional structure of the PTG, with five distinct and correlated factors characterising the growth dimension.

As far as internal consistency was concerned, it was found to be excellent for both the PTG and PTD dimensions ($\alpha > .90$). Despite the results of the CFA, in light of those findings, we considered it advisable to preserve the depreciation content, taking account of the total score from the respective 25 items. Therefore, convergent and discriminant validity were evaluated for both the growth and depreciation dimensions of the PTGDI-X with respect to post-traumatic symptoms, depressive symptoms, intrusive and deliberate ruminations, and core belief disruption.

With regard to the growth experience, our data showed a negative correlation between growth, particularly with the personal strength dimension, and both depressive and post-traumatic symptoms. Although it is already known that depressive and post-traumatic symptoms and PTG are not mutually exclusive and could present a curvilinear relationship (Shakespeare-Finch & Lurie-Beck, 2014; Romeo et al., 2019), these results suggest that people who have recently experienced high levels of depressive and post-traumatic symptoms perceive less personal strength. To our knowledge, only one previous study has investigated

the discriminant validity of the PTGI-21, revealing non-significant associations between depression and PTG (Mack et al., 2015).

Conversely, positive associations were detected between the growth factors, particularly the new possibility subscale, and the disruption of core beliefs. These results are consistent with both previous pieces of research (Cann et al., 2010b) and the PTG model (Calhoun & Tedeschi, 2006), which revealed that the shaking of core beliefs about the world triggered growth processes.

As regards the relationship between PTG and rumination, our results showed that the presence of deliberate rumination, both immediately after the event and over time, was positively associated with growth. Moreover, intrusive rumination soon after the event was found to be slightly related to the Relating to Others and New Possibility dimensions, whereas recent intrusive rumination was not associated with any growth factors. In line with the available literature, both styles of rumination should be important for eventual growth in the period soon after the event, but deliberate rumination will be more likely to facilitate growth over time (Calhoun & Tedeschi, 2006; Taku et al., 2009b; Cann et al., 2010b).

As far as depreciation is concerned, our results revealed the presence of positive correlations between PTD total score and both depressive and post-traumatic symptoms. In line with a previous longitudinal study (Michélsen et al., 2017), these findings suggest that individuals who experience high levels of depressive and post-traumatic symptoms, even long after the traumatic event, may be more prone also to reporting high levels of depreciation. Moreover, consistently with Cann et al. (2010b), depreciation was positively correlated with the disruption of core beliefs and with intrusive rumination.

In conclusion, the validity of the instrument is also supported by the pattern of correlations found between the PTGDI-X and theoretically related constructs.

This study also has some limitations that should be acknowledged. Firstly, a large proportion of the sample was made up of female and relatively young participants. Secondly, we were not able to specify an adequate model for the PTD dimension of the PTGDI-X. Therefore, this section of the inventory is worthy of further reflection and research in Italy. As mentioned above, it would be useful, for instance, to administer the two subscales of the instrument on separate occasions, controlling (that is, randomising) the order of presentation to the participants.

Despite these limitations, this is the first study to validate the Italian version of the PTGDI-X. These findings indicate that the Italian version of the PTGDI-X is able to provide valid and reliable scores for the assessment of PTG, supporting the reliability and validity of the five-factor model for PTG. Conversely, in our sample of Italian participants, it was not also possible to endorse, with the same validity, the five-factor model for PTD, but it was advisable to preserve and use the PTD total score. Therefore, future research should be carried out to examine the validity of the PTGDI-X in the Italian context, investigating the psychometric properties of the instrument in other clinical and non-clinical populations (e.g., soldiers or cancer patients) and specific traumas (e.g., COVID-19 pandemic).

The Italian version of the PTGDI-X could also be employed in the clinical practice for the evaluation of post-traumatic outcomes. This assessment may allow clinicians to intervene in existential dimensions experienced by traumatised individuals, helping them give meaning to their life after a traumatic event, in order to improve their psychological well-being.

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Conflict of interest

The authors declare that they have no conflict of interest.

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Table 1. PTGDI-X: factor structure and dimensionality: fit indices.

4A. Growth

Model	chi	df	RMSEA	min	max	SRMR	CFI	AIC
Five factors, ort	261.696	275	0.119	0.115	0.123	0.304	0.605	51063.654
Five factors, obl	1068.65	265	0.071	0.067	0.076	0.056	0.864	49249.466
Five factors, obl, e-cov	948.865	264	0.066	0.061	0.070	0.052	0.884	49109.321
Six factors	938.906	260	0.066	0.061	0.070	0.051	0.885	49104.782

4B. Depreciation

Model	chi	df	RMSEA	min	max	SRMR	CFI	AIC
Five factors, ort	2354.004	275	0.112	0.108	0.116	0.318	0.578	50166.818
Five factors, obl	766.335	265	0.056	0.051	0.061	0.047	0.898	48022.455
Five factors, obl, e-cov	671.110	264	0.051	0.046	0.055	0.043	0.917	47895.427
Six factors	857.759	274	0.060	0.055	0.064	0.049	0.881	48136.575

4C. Growth and Depreciation

Model	chi	df	RMSEA	min	max	SRMR	CFI	AIC
Second order specification	5286.687	1164	0.077	0.075	0.079	0.074	0.719	97226.088

Note: e-cov=covariance between errors.

Table 2. PTGDI-X convergent and discriminant validity assessment using BDI-II, CBI, PCL-5, and ERRI.

	PS	RO	NP	SEC	AL	DEP TS	BDI-II	CBI	PCL-5	ERRI_PI	ERRI_PD	ERRI_TI	ERRI_TD
BDI-II	**-.343**	**-.280**	**-.239**	**-.275**	**-.274**	**.641**	1						
CBI	**.276**	**.332**	**.402**	**.364**	**.365**	**.153**	.091	1					
PCL-5	**-.211**	**-.100**	-.042	**-.108**	-.056	**.647**	.671	.199	1				
ERRI_PI	.008	**.107**	**.107**	.020	**.124**	**.333**	.286	.373	.456	1			
ERRI_PD	**.318**	**.362**	**.422**	**.353**	**.323**	**.087**	.061	.515	.207	.388	1		
ERRI_TI	-.080	.022	-.036	.009	.064	**.412**	.386	.194	.620	.461	.219	1	
ERRI_TD	**.148**	**.190**	**.233**	**.230**	**.213**	**.293**	.292	.342	.544	.294	.393	.650	1
M	**10.62**	**17.57**	**11.58**	**11.07**	**9.01**	**31.40**	12.18	27.07	23.47	36.30	33.47	23.33	24.79
SD	**4.84**	**7.54**	**5.96**	**6.40**	**3.50**	**23.18**	10.47	8.50	18.34	9.52	9.02	10.88	11.39

Note: BDI-II= Beck Depression Inventory, CBI= Core Beliefs Inventory, PCL-5= PTSD Checklist for DSM-5, ERRI= Event-Related Rumination Inventory, PI= Past Intrusive, PD= Past Deliberate, TI= Today Intrusive, TD= Today Deliberate, M=mean, SD=standard deviation, PS= Personal Strength, RO= Relating to Others, NP= New Possibilities, SEC= Spiritual-Existential Change, AL= Appreciation of Life, DEP TS= Depreciation, total score.

Figure 1. PTGDI-X: Growth factor structure (standardised solution).