Investigating the veracity of self-reported post-traumatic growth: A profile analysis approach.

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Abstract:

Research into post-traumatic growth (PTG) – positive psychological change that people report in their relationships, priorities in life, and self-perception after experiences of adversity - has been severely critiqued. We investigated the degree to which community members' friends and relatives corroborated targets' self-perceived positive and negative changes as measured by the Post-Traumatic Growth Inventory-42 (PTGI-42). We found corroboration only for negative changes when we examined overall (averaged) scores. However, using a profile analysis procedure, we found significant participant-informant agreement on the domains of changes that had relatively higher scores in the target's profile and those that had relatively lower scores. Our results demonstrate that informants were able to observe that targets had changed, and were sensitive to the idiosyncratic ways in which in these changes had manifested in targets' behavior.

Research into post-traumatic growth (PTG; Tedeschi & Calhoun, 2004) – defined as the positive psychological changes experienced in the aftermath of significant adversity – has grown exponentially in the last 20 years (Jayawickreme & Blackie, 2014; Linley & Joseph, 2004). Individuals who have overcome highly challenging situations including heart attacks, diagnosis with HIV, and physical assault (among others) often perceive that their relationships, priorities in life, and self-perception have changed for the better (Helgeson, Reynolds, & Tomich, 2006; Hefferon, Grealy, & Mutrie, 2009). Additionally, such reports are fairly common, with 58-83% of individuals experiencing at least one positive change over time (Affleck, Tennen, Croog, & Levine, 1987; Affleck, Tennen, & Rowe, 1991; McMillen, Smith & Fisher, 1997; Sears, Stanton, & Danoff-Burg, 2003).

The purpose of the present research was to investigate whether an individual's family members and friends can corroborate these changes. It has been argued that researchers can feel more confident in the validity of self-perceived PTG if other individuals notice these changes (Helgeson, 2010). We put the notion of corroboration to a stringent test by examining whether participants and their informants agreed on the participants' overall profile of change across all PTG domains, and how the participants' profiles differed from the average person in the sample. We examined these questions separately both for PTG and post-traumatic depreciation, defined as self-perceived negative changes following adversity (PTD; Baker, Kelly, Calhoun, Cann, & Tedeschi, 2008).

Skepticism about the veracity of self-perceived PTG is due to over-reliance on cross-sectional and retrospective measurement in the majority of existing studies (Jayawickreme & Blackie, 2014; Tennen & Affleck, 2009). The implicit assumption behind these retrospective measures is that individuals can recall their prior standing on each of the domains before the

event occurred, determine how much they have changed, and then determine to what extent the event was responsible for that change (Ford, Tennen, & Albert, 2008). However, many researchers have noted that this method leaves open other plausible explanations. For example, PTG may be more reflective of positive illusions motivated by the desire to restore self-esteem, optimism about the future, and a sense of control in a threatening situation (Taylor, 1983). If true, PTG would constitute an illusory process that protects an individual against the distress caused by the event (Sumalla, Ochoa, & Blanco, 2009). Similarly, other scholars have posited that PTG may represent attempts to cope with negative experiences by deriving meaning from the experience (Roepke, Jayawickreme, & Riffle, 2013; Park, 2010; Wong, Reker & Peacock, 2006).

In light of these critiques, researchers have advocated for the use of multiple methods and assessments (Frazier, Coyne, & Tennen, 2014), and at least three advances have recently been made in the measurement of PTG. First, researchers have developed scales assessing both positive and negative changes (Joseph, Williams, & Yule, 1993; Baker et al., 2008). These scales have been argued to encourage more balanced responding, and reduce the likelihood of a positive response bias. The Posttraumatic Growth Inventory – 42 scale used in this study (PTGI-42; Cann, Calhoun, Tedeschi, & Solomon, 2010) is among the most widely used. The majority of researchers who have used the PTGI-42 have found PTG and PTD to be uncorrelated, and have analyzed each construct separately (Baker et al., 2008; Barrington & Shakespeare-Finch, 2013; Cann et al., 2010; Forgeard, 2013). Second, some researchers have conducted longitudinal investigations to examine the relationship between self-perceived PTG and actual change in PTG domains from pre- to post-trauma (as assessed with *current standing* versions of inventories such as the PTGI). These studies have generally found these two assessments to be either unrelated or modestly correlated (Frazier et al., 2009; Yanez, Stanton, Hoyt, Tennen, & Lechner, 2011;

Joseph, et al., 2012). Third, researchers have assessed the level of agreement between participants' self-reported PTG and family members' and friends' reports of the participants' PTG (discussed below). This method is advantageous for examining the veracity of self-perceived PTG in conditions when it is not feasible to collect baseline data prior to the event. We employ this third method here to critically evaluate the claim that self-perceived PTG may reflect positive illusions.

There are two main reasons that evidence of agreement between participants and informants would cast doubt upon the claim that PTG is illusory: First, to the extent that informants arrive at the same conclusions when judging the target in spite of their own biases and prejudices, it implies a higher likelihood that there is something objective to observe in the targets' behavior (Allport, 1937). Second, agreement across different judges demonstrates the behavioral stability of PTG, as the positive changes manifest in different situations with different people (Helzer et al., 2014). Evidence of agreement therefore provides compelling support for the view that self-perceived PTG is not merely a reflection of the target's illusory beliefs. However, despite the appropriateness of this method (Kenny & West, 2010; Vazire & Carlson, 2010), the study of PTG has some unique challenges that may make it more difficult to find evidence of agreement. PTG is an evaluative (desirable) trait; informants' ratings might be biased by their desire to believe that their loved ones are adjusting well in the face of grave difficulties (Frazier et al., 2014). In addition, PTG might manifest only as internal states (e.g., thoughts and feelings) less visible to informants.

In spite of these challenges, there is evidence demonstrating that informants corroborate participants' self-reports of PTG. For example, Park, Cohen, and Murch (1996) found modest agreement (.21) between undergraduate students' ratings of PTG and ratings made by the

students' friends and partners, using the Stress-Related Growth Scale. These participants answered the questionnaire in reference to the most stressful experience they had in the previous year, including academic difficulties and the dissolution of romantic partnerships. Higher levels of agreement have been found when participants have completed the PTGI in reference to traumatic events: for instance, Shakespeare-Finch and Enders (2008) recruited students who had experienced a trauma (e.g., life-threatening illness or a serious car accident) within a five year period, and found that the students' PTG ratings and their family members' and friends' PTG ratings were highly correlated, ranging from 0.51 to 0.72 across the PTG domains. Similarly, Weiss (2002) found agreement ranging from 0.28 to 0.65 among women diagnosed with breast cancer and their husbands. McMillen and Cook (2003) found comparable levels of agreement (.40) between patients with spinal cord injury and informant ratings given by their family/friends when using the Perceived Benefits Scale (McMillen & Fisher, 1998). On the other hand, Helgeson (2010) found different results when using a unique measurement strategy: participants and their informants were asked for open-ended responses about the lasting effects of breast cancer 10 years after initial diagnosis, and analyses of these responses revealed corroboration only for negative changes in participants' health, self-image, and emotions – not for any of the identified positive changes. These results called into question the longevity of PTG.

In the current study, we aimed to replicate and extend the existing literature by examining the following questions: (1) Can we replicate past work to show that participants and informants agree on the relative standing of the target participant relative to other participants in the sample on overall PTG? (2) Can we extend past research to similarly show that participants and informants agree on the relative standing of the target on overall PTD? The answers to these questions may help determine the extent to which people are able to differentiate between those

who are experiencing better (or worse) outcomes after a traumatic experience. We further extended past work and put corroboration to a stringent test to investigate whether participants and informants agree on the targets' idiosyncratic profile of change across PTG and PTD domains. So far, corroboration studies have focused exclusively on trait-level agreement, examining the extent to which participants and informants agree on the relative standing of the target (relative to other participants in the sample) on overall (or averaged) PTG scores. To examine corroboration more stringently, we utilized a profile analysis procedure (Furr, 2008, 2009) that determines the degree to which participants and informants agree on which domains have relatively higher scores in the target's profile and which have relatively lower scores. This task asks raters to accurately discriminate between domains, which is arguably more difficult than reporting that the target has generally changed.

The present research makes two further contributions to the literature. First, we examined distinctive profile agreement for both PTG and PTD (Furr, 2009), which calculates agreement between the participants and informants while controlling for the average participant in the sample. This ensures that the agreement captured corresponds to the unique characteristics of the target, rather than to general stereotypes or beliefs about the way a typical person grows after trauma (McAdams, 2006; Splevins, Cohen, Bowley, & Joseph, 2010). If individuals are relying on a general script that outlines how people *should* change, then we would not find evidence of distinctive profile agreement. Second, we investigated inter-informant agreement in all of our analyses. Evidence of inter-informant agreement is important to demonstrating the veracity of self-perceived post-traumatic change, because it makes alternative explanations for the participant and informant agreement less plausible (e.g., shared bias or communication between dyads).

Method

Participants:

Our sample (*n* = 240) consisted of 99 target participants and their nominated informants (*n* = 141) who were family members, friends, or coworkers. There were 73 female and 22 male participants (4 unspecified) with a mean age (*SD*) of 45.08 (14.00) ranging from 18 to 75 years of age. The majority of our participants were Caucasian (62.5%) followed by African American (31.8%), and American Indian or Alaska Native (5.7%). At the time of the survey, 41.1% of our sample reported being married, 31.6% were single, 16.8% were divorced and 10.6% were either separated or widowed. The majority of our sample was employed for wages (54.8%), 14.7% of participants were retired, 10.5% were unable to work, and the remaining 19% were unemployed. We did not collect demographic information from informants.

Procedure:

Target participants were recruited from the local community by placing advertisements in local papers, apartment complexes, and online websites including Craigslist and a recruitment website managed by a local medical school. The advertisement informed participants that we were conducting a research study on how people adjust to challenging experiences over time. Interested participants were instructed to phone the study coordinator if they had experienced a "significantly distressing life event" in the past five years. As we were asking participants to retrospectively report on how they had changed since the distressing event occurred, we restricted our time frame to events from the past five years; in keeping with past research that has examined participant and informant corroboration of self-perceived PTG (e.g., Shakespeare-Finch & Enders, 2008; Weiss, 2002).

We screened interested participants over the phone by asking them if they had personally experienced any of the events listed on the Life Events Checklist (Gray, Litz, Hsu, & Lombardo, 2004). We excluded participants who had witnessed or heard about a traumatic event happening to someone else. All of the events on the checklist have the potential to be traumatic (as defined by the Diagnostic and Statistical Manual of Mental Disorders, 4th edition). Participants who indicated that they had experienced at least one of these events within the past five years came to the university to complete a questionnaire booklet. Of the 211 participants who were invited to campus, 91% of these individuals completed the study.

At the end of the survey, participants provided contact information for up to three informants. We asked them to identify people who they believed knew them very well and had known them since before the event occurred. We further specified that informants should be people who were aware of what the participant had experienced, and would be willing to answer questions about the participant's personality, behavior, and well-being. In keeping with past research (Vazire, 2006), we were careful to leave the exact nature of informants' involvement opaque so that participants would not nominate informants who saw them in essentially the same way as they saw themselves. All participants were compensated with $30 in cash at the end of the session. We phoned each nominated informant and asked whether he/she would be willing to participate. If the informant agreed, we either sent an email that contained the link to the online survey or a paper packet through the mail (depending on the informant's preference). Informants were compensated with a $15 Amazon gift card, and entered into a prize drawing to win an additional $200 gift card.

Materials:

Participants completed the PTGI-42 (Cann, Calhoun, Tedeschi, & Solomon, 2010). The PTGI-42 asked participants to indicate the degree to which they had experienced each change on the inventory directly as a result of the distressing life event they had reported in the study screening. The PTGI-42 asked about both positive and negative changes (i.e., each item was presented as a pair of statements) in five life domains – relationships, spirituality, new possibilities, personal strength, and appreciation of life. For example, for the domain of personal strength, participants rated the following pair of statements: "I have a diminished feeling of self-reliance" and "I have a greater feeling of self-reliance." Participants responded using a 6-point Likert scale from "0" ("I did not experience this change as a result of this event") to "5" ("I experienced this change to a very great degree as a result of this event").

Informants answered the same 42 items with the same scale instructions, but were asked to report "the degree to which each change occurred in the target person's life as a result of a traumatic event they experienced in the past five years." Our recruitment materials referenced the full name of the participant to ensure that the informant answered the questionnaire about this person. For participants and informants, we calculated overall PTG and PTD scores by averaging the 21 PTGI-42 items on positive changes and averaging the 21 PTGI-42 items on negative changes. In addition, we calculated the PTGI-42 scores for each of the five domains separately for both PTG and PTD. The means, standard deviations, and reliabilities for participants and informants are reported in Table 2. Baker et al. (2008) have demonstrated that the PTGI-42 has good internal consistency with reliabilities on the PTG items ranging from $\alpha = 0.67$ to 0.82, and reliabilities on the PTD items ranging from $\alpha = 0.64$ to 0.83.

Results

Data Preparation:

We first used the Markov chain Monte Carlo method for arbitrary missing data (Schafer, 1997) to impute missing observations using the MI and MIAnalyze procedures available in R (Version 3.0.1). This method creates multiple imputations by using simulations from a Bayesian prediction distribution for normal data. Individuals who had completed fewer than 50% of the items on any of the measures were omitted from the analyses. Before imputation, 17.2% of the scale data from the PTGI-42 was missing across all the participants/informants. This resulted in full data for 111 participants and 146 informants. After merging the participant and informant data files we excluded 12 individuals, because we did not have full dyad data for them (i.e., we had participant data, but no informant data, or vice versa). This resulted in 99 matched pairs. For forty of these matched pairs, additional data from one more informant was available (total informants = 139).

Preliminary Data Analysis:

The traumatic events in this sample, as recorded with the Life Events Checklist (Gray et al., 2004), are reported in Table 1. The most frequently experienced events included sudden, unexpected death of a loved one, life-threatening illness, and physical assault. Descriptive statistics and scale reliabilities for the PTGI-42 are presented in Table 2. With the exception of the appreciation of life domain on the PTGI-42, all the subscales had acceptable reliability. However, Baker et al. (2008) also reported that the reliability for the appreciation of life domains were lower than the other domains. In general, mean ratings by the participants and informants were quite low for both PTG and PTD – rarely exceeding the midpoint of the PTGI-42 scale. Furthermore, PTG mean scores were lower and PTD mean scores higher when compared to other studies that have used the PTGI-42 (Barrington & Shakespeare-Finch, 2013; Cann et al.,

2010; Baker et al., 2008). Tables 3 and 4 provide the full correlation matrix for all PTG and PTD domains for participant and informant ratings.

Agreement at the trait level:

To replicate past research (Shakespeare-Finch & Enders, 2008; McMillen & Cook, 2003; Weiss, 2002), we examined trait level agreement for PTG. Additionally, we examined trait agreement for PTD. Trait level agreement analyses examine the degree to which participants and informants agree on the relative standing of the target on each construct relative to the other participants in the sample. Given that the number and type of informants varied across the targets, we used a path analytic procedure proposed by Furr and Wood (2013), which analyzed the dyads as non-distinguishable (Kenny, Kashy, & Cook, 2006). With this procedure, we analyzed the PTG and PTD constructs in separate models, to estimate the correlation between targets' and informants' ratings. We held the means and standard deviations constant across all informants to account for the exchangeability among the ratings. The comparison of the model with all paths freely estimated to the model with constrained paths showed a non-significant change in model fit for both PTG ($\chi^2\Delta = 2.436$ (3), $p = .487$) and PTD ($\chi^2\Delta = 6.836$ (3), $p = .077$). Furthermore, this procedure enabled us to estimate inter-informant agreement by estimating the correlation between informants. As shown in Table 5, self-other agreement for overall PTG was weak and only marginally significant, whereas self-other agreement for overall PTD was moderate and significant. Furthermore, there was significant inter-informant agreement for PTD. Thus, we found that participants and informants were able to reliably agree only on how the targets had changed for the worse (PTD) since the event occurred.

Agreement at the profile level:

We next examined self-other agreement on participants' overall profiles of change, analyzing the PTG and PTD domains separately. Analyzing profiles allows for a more nuanced understanding of PTG (compared to simply analyzing overall/trait-level PTG). For example, a woman battling a breast cancer diagnosis may report experiencing PTG in so far as she feels closer to her family and God and has realized the importance of making time for the small things. Were we to plot this woman's profile of PTG, we would see that she has higher scores on the relationships, spirituality, and appreciation of life domains compared to the new possibilities and personal strength domains. Profile agreement is calculated with a simple Pearson correlation representing the relationship between ratings by two different people. A positive correlation indicates that there is agreement among the participants and informants on their overall profile of change – indicating that participants and informants agree on which PTG domains have high scores and which have low scores in the participant's profile. A negative correlation indicates inverse agreement, and a zero correlation indicates that there is no systematic agreement between the participant and informants.

We calculated two separate profile correlations for each target-informant pair (see Furr, 2008). The first was an overall self-other agreement profile, which indicates the extent to which the target and informant agreed on how the target had changed across the PTG (or PTD) domains since the traumatic event occurred. We correlated the targets' self-ratings for all five PTG (or PTD) domains with each of their informants' ratings. To obtain a single index of overall profile agreement, we performed a Fisher's r-to-z transformation on each pairwise correlation, averaged the z-scores across all informants, and then averaged all of these scores together. We calculated a second profile correlation: distinctive agreement, which estimates self-other agreement while controlling for the average participant in the sample's profile. We subtracted the mean of each of

the five PTG (or PTD) domains from the targets' self-ratings on the corresponding domain. We similarly subtracted the mean of the informants' PTGI sub-domains from their informant-ratings on the corresponding domain. We correlated each target participant's distinctive profile with his or her informants' distinctive profile, z-transformed these pairwise correlations, and averaged these into a single index of self-other distinctive agreement. To determine statistical significance of each profile correlation, we used a one-sample t-test using the averaged (z-score transformed) mean, standard deviation, and sample size to determine whether the correlation was significantly different from zero (Helzer et al., 2014).

As shown in Table 6, we found evidence of overall self-other profile agreement for PTG and PTD, indicating that target participants and informants agreed on how the target had changed across the PTGI-42 domains since the trauma occurred. Furthermore, we found evidence for distinctive self-other profile agreement for both PTG and PTD, indicating that targets and informants agreed on how the target had changed across all the associated domains when controlling for the average participant in the sample's profile. We used the same procedures to calculate inter-informant agreement for participants for whom we had responses from two separate informants. We observed significant overall profile agreement for PTG and PTD, but the correlations for distinctive agreement were not significant.

General Discussion

Our results demonstrated that targets and informants agreed on how the target's overall profile had changed across the five domains of PTG and the five domains of PTD (Baker et al. 2008). Thus, informants were able to notice idiosyncratic differences in the extent to which their targets participants' behavior had changed for the better and the worse across all the PTGI-42

domains. These results were further supported by evidence of distinctive agreement between the targets' self-reported PTG and PTD and their informants ratings', which casts doubt upon the notion that informants' reports rely on a stereotype about the way individuals are typically expected to change following adverse life experiences (Splevins et al., 2010). Thus, our results demonstrate that individuals can not only observe that a target has changed, but they are also sensitive to the idiosyncratic ways in which in these changes are manifested in their target's behavior. This study thus provides evidence countering the claim that self-perceived PTG is merely a positive illusion on behalf of the participant with little bearing in reality (Tedeschi, Addington, Cann, & Calhoun, 2014). Despite the fact that real concerns remain about current measures of PTG (Jayawickreme & Blackie, 2014), these results suggest that at least some proportion of the variance in PTGI-42 scores might be attributed to an observable and verifiable phenomenon.

Nonetheless, our findings should be interpreted with caution. Informant reports provide unique information over and above self-reports about an individual's personality (Vazire, 2006), but it is also true that certain informants may be susceptible to shared biases given the nature of their relationship with the targets (Leising, Erbs, & Fritz, 2010). For example, it is possible that informants were able to corroborate target participants' reports because they were just reporting back on what the participants had told them (Frazier et al., 2014). This alternative cannot be completely ruled out in the present study. Another related explanation is that agreement was a function of target participants' and informants' shared "positivity bias," driven by a desire to believe that the target was coping well in the aftermath of adversity. However, it is important to note that this bias will only inflate agreement levels in a very unlikely circumstance. As explained by Helzer et al. (2014), evaluative processes will produce artificial agreement only if

each pair of raters shares the same bias with each other, and this bias is different from the bias shared by a different pair of raters about their own target. Furthermore, we did not find evidence of distinctive agreement among multiple informants; although this is not necessarily surprising given the conservative nature of distinctive profile agreement and our relatively small sample of additional informants.

We did not replicate research that has demonstrated trait-level agreement on overall PTG (Shakespeare-Finch & Enders, 2008; McMillen & Cook, 2003; Weiss, 2002). The correlation we found was small and only marginally significant. Instead, we observed significant self-other and inter-informant agreement only for overall PTD. Our results are therefore consistent with Helgeson (2010), who observed that negative changes are particularly likely to capture the attention of others. It is unclear why our trait-level agreement findings differed from prior work that utilized a similar recruitment method (Shakespeare-Finch & Enders, 2008; Park et al., 1996), but it is worth noting that we employed a more conservative analytic model following recommendations by Furr and Wood (2013) regarding the appropriate techniques to analyze profile similarity. This model accounted for unsystematic differences in the number and type of nominated informants across the targets.

In summary, our results suggest that scores on the PTGI may reflect genuine personality change. However, given the retrospective self-report nature of the measure, we cannot know for certain what proportion of the agreement reflects actual change experienced in daily life (Fleeson, 2014). This method nevertheless represents an important step in developing a systematic approach to rigorously assessing the construct validity of self-perceived PTG measures (Blackie & Jayawickreme, 2014; Frazier et al., 2014). To further establish the veracity of self-perceived PTG, longitudinal research investigating self-other corroboration on current-standing reports of

PTG is needed. Such methodologically rigorous research will help scientists answer critical questions about the degree to which individuals' daily behavior changes following experiences of significant adversity.

References:

Affleck, G., Tennen, H., & Rowe, J. (1991). *Infants in crisis: How parents cope with newborn intensive care and its aftermath*. New York: Springer-Verlag Publishing.

Affleck, G., Tennen, H., Croog, S., & Levine, S. (1987). Causal attribution, perceived benefits, and morbidity after a heart attack: An 8-year study. *Journal of Consulting and Clinical Psychology*, *55*, 29–35. doi:10.1037/0022-006X.55.1.29

Allport, G. W. (1937). *Personality: A psychological interpretation*. Oxford England: Holt.

Ashton, M. C., & Lee, K. (2009). The HEXACO–60: A short measure of the major dimensions of personality. *Journal of Personality Assessment*, *91*, 340–345. doi:10.1080/00223890902935878

Baker, J. M., Kelly, C., Calhoun, L. G., Cann, A., & Tedeschi, R. G. (2008). An examination of posttraumatic growth and posttraumatic depreciation: Two exploratory studies. *Journal of Loss and Trauma*, *13*, 450-465. doi:10.1080/15325020802171367

Barrington, A. J., & Shakespeare-Finch, J. (2013). Working with refugee survivors of torture and trauma: An opportunity for vicarious post-traumatic growth. *Counseling Psychology Quarterly*, *26*, 89-105. doi: 10.1521/soco.1989.7.2.113

Blackie, L. E. R., & Jayawickreme, E. (2014). Promoting change in post-traumatic growth research: Response to commentaries. *European Journal of Personality*, *28*, 351-361. DOI: 10.1002/per.1970.

Cann, A., Calhoun, L. G., Tedeschi, R. G., & Solomon, D. T. (2010). Posttraumatic growth and depreciation as independent experiences and predictors of well-being. *Journal of Loss and Trauma*, *15*, 151–166. doi:10.1080/15325020903375826

Fleeson, W. (2014). Four ways of (not) being real, and whether they are essential for post-traumatic growth. *European Journal of Personality*, *28*, 336-337. DOI: 10.1002/per.1970

Ford, J. D., Tennen, H., & Albert, D. (2008). A contrarian view of growth following adversity. In S.

    Joseph & P. A. Linley (Eds.), *Trauma, recovery, and growth: Positive psychological*

    perspectives on posttraumatic stress. (pp. 297–324). Hoboken, NJ US: John Wiley & Sons Inc.

Forgeard, M. J. (2013). Perceiving benefits after adversity: The relationship between self-reported

    posttraumatic growth and creativity. *Psychology of Aesthetics, Creativity, and the Arts*, *7*, 245-

    264. doi:10.1037/a0031223

Frazier, P., Coyne, J., & Tennen, H. (2014). Post-traumatic growth: A call for less, but better, research.

    European Journal of Personality, *28*, 337-338. DOI: 10.1002/per.1970

Frazier, P., Tennen, H., Gavian, M., Park, C., Tomich, P., & Tashiro, T. (2009). Does self-reported

    posttraumatic growth reflect genuine positive change? *Psychological Science*, *20*, 912-919.

    doi: 10.1111/j.1467-9280.2009.02381.x

Furr, R. M. (2008). A framework for profile similarity: Integrating similarity, normativeness, and

    distinctiveness. *Journal of Personality*, *76*, 1267–1316. doi:10.1111/j.1467-6494.2008.00521.x

Furr, R. M. (2009). The double-entry intraclass correlation as an index of profile similarity: Meaning,

    limitations, and alternatives. *Journal of Personality Assessment*, *92*, 1–15.

    doi:10.1080/00223890903379134

Furr, R. M., & Wood, D. (2013). On the similarity between exchangeable profiles: A psychometric

    model, analytic strategy, and empirical illustration. *Journal of Research in Personality*, *47*, 233–

    247. doi:10.1016/j.jrp.2013.01.009

Furr, R. M., Dougherty, D. M., Marsh, D. M., & Mathias, C. W. (2007). Personality judgment and

    personality pathology: self-other agreement in adolescents with conduct disorder. *Journal of*

    Personality, 75, 629-662. DOI: 10.1111/j.1467-6494.2007.00451.x

Gray, M. J., Litz, B. T., Hsu, J. L., & Lombardo, T. W. (2004). Psychometric properties of the Life Events Checklist. *Assessment*, *11*, 330–341. doi:10.1177/1073191104269954

Hefferon, K., Grealy, M., & Mutrie, N. (2009). Post-traumatic growth and life threatening physical illness: A systematic review of the qualitative literature. *British Journal of Health Psychology*, *14*, 343–378. doi:10.1348/135910708X332936

Helgeson, V. S. (2010). Corroboration of growth following breast cancer: Ten years later. *Journal of Social and Clinical Psychology*, *29*, 546–574. doi:10.1521/jscp.2010.29.5.546

Helgeson, V. S., Reynolds, K. A., & Tomich, P. L. (2006). A meta-analytic review of benefit finding and growth. *Journal of Consulting and Clinical Psychology*, *74*, 797–816. doi:10.1037/0022-006X.74.5.797

Helzer, E. G., Furr, R. M., Hawkins, A., Barranti, M., Blackie, L. E. R., & Fleeson, W. (2014). Agreement on the perception of moral character. *Personality and Social Psychology Bulletin*, 0146167214554957. doi:10.1177/0146167214554957

Jayawickreme, E., & Blackie, L. E. R. (2014). Post-traumatic growth as positive personality change: Evidence, controversies and future directions. *European Journal of Personality*, *28*, 312–331. doi:10.1002/per.1963

Joseph, S., Maltby, J., Wood, A. M., Stockton, H., Hunt, N., & Regel, S. (2012). The Psychological Well-Being—Post-Traumatic Changes Questionnaire (PWB-PTCQ): Reliability and validity. *Psychological Trauma: Theory, Research, Practice, and Policy*, *4*, 420-428. http://dx.doi.org/10.1037/a0024740

Joseph, S., Williams, R., & Yule, W. (1993). Changes in outlook following disaster: The preliminary development of a measure to assess positive and negative responses. *Journal of Traumatic Stress*, *6*, 271-279.doi:10.1007/BF00974121

Kenny, D. A., & West, T. V. (2010). Similarity and agreement in self- and other perception: A meta-analysis. *Personality and Social Psychology Review*, *14*, 196-213. doi:10.1177/1088868309353414

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. Guilford Press.

Leising, D., Erbs, J., & Fritz, U. (2010). The letter of recommendation effect in informant ratings of personality. *Journal of Personality and Social Psychology*, *98*, 668–682. doi:10.1037/a0018771

Linley, P. A., & Joseph, S. (2004). Positive change following trauma and adversity: A review. *Journal of Traumatic Stress*, *17*, 11–21. doi:10.1023/B:JOTS.0000014671.27856.7e

McAdams, D. P. (2006). The redemptive self: Generativity and the stories americans live by. *Research in Human Development*, *3*, 81–100. doi:10.1080/15427609.2006.9683363

McMillen, J. C., & Cook, C. L. (2003). The positive by-products of spinal cord injury and their correlates. *Rehabilitation Psychology*, *48*, 77–85. doi:10.1037/0090-5550.48.2.77

McMillen, J. C., Smith, E. M., & Fisher, R. H. (1997). Perceived benefit and mental health after three types of disaster. *Journal of Consulting and Clinical Psychology*, *65*, 733–739. doi:10.1037/0022-006X.65.5.733

Park, C. L. (2010). Making sense of the meaning literature: An integrative review of meaning making and its effects on adjustment to stressful life events. *Psychological Bulletin*, *136*, 257–301. doi:10.1037/a0018301

Park, C. L., Cohen, L. H., & Murch, R. L. (1996). Assessment and prediction of stress-related growth. *Journal of Personality*, *64*, 71–105. doi:10.1111/j.1467-6494.1996.tb00815.x

Roepke, A. M., Jayawickreme, E., & Riffle, O. M. (2014). Meaning and health: A systematic review. *Applied Research in Quality of Life*, *9*, 1055–1079. doi:10.1007/s11482-013-9288-9

Schafer, J. L. (1997). Analysis of incomplete multivariate data. London, England: Chapman & Hall.

Sears, S. R., Stanton, A. L., & Danoff-Burg, S. (2003). The yellow brick road and the emerald city: Benefit finding, positive reappraisal coping and posttraumatic growth in women with early-stage breast cancer. *Health Psychology*, *22*, 487–497. doi:10.1037/0278-6133.22.5.487

Shakespeare-Finch, J., & Enders, T. (2008). Corroborating evidence of posttraumatic growth. *Journal of Traumatic Stress*, *21*, 421–424. doi:10.1002/jts.20347

Splevins, K., Cohen, K., Bowley, J., & Joseph, S. (2010). Theories of posttraumatic growth: Cross-cultural perspectives. *Journal of Loss and Trauma*, *15*, 259–277. doi:10.1080/15325020903382111

Sumalla, E. C., Ochoa, C., & Blanco, I. (2009). Posttraumatic growth in cancer: Reality or illusion? *Clinical Psychology Review*, *29*, 24–33. doi:10.1016/j.cpr.2008.09.006

Taylor, S. E. (1983). Adjustment to threatening events: A theory of cognitive adaptation. *American Psychologist*, *38*, 1161–1173. doi:10.1037/0003-066X.38.11.1161

Tedeschi, R. G., & Calhoun, L. G. (2004). Posttraumatic growth: Conceptual foundations and empirical evidence." *Psychological Inquiry*, *15*, 1–18. doi:10.1207/s15327965pli1501_01

Tedeschi, R.G., Addington, E., Cann, A., & Calhoun, L.G. (2014) Post-traumatic growth: Some needed corrections and reminders. *European Journal of Personality*, *28*, 350-351. DOI: 10.1002/per.1970

Tennen, H., & Affleck, G. (2009). Assessing positive life change: In search of meticulous methods. In C. L. Park, S. C. Lechner, M. H. Antoni, & A. L. Stanton (Eds.), *Medical illness and positive life change: Can crisis lead to personal transformation?* (pp. 31–49). Washington, DC US: American Psychological Association.

Vazire, S. (2006). Informant reports: A cheap, fast, and easy method for personality assessment. *Journal of Research in Personality*, *40*, 472–481. doi:10.1016/j.jrp.2005.03.003

Vazire, S., & Carlson, E. N. (2010). Self-knowledge of personality: Do people know themselves?

Social and Personality Psychology Compass, *4*, 605–620. doi:10.1111/j.1751-

9004.2010.00280.x

Weiss, T. (2004). Correlates of posttraumatic growth in husbands of breast cancer survivors. *Psycho-*

Oncology, *13*, 260–268. doi:10.1002/pon.735

Wong, P. T. P., Reker, G. T., & Peacock, E. J. (2006). A resource-congruence model of coping and

the development of the coping schema inventory. In P. T. P. Wong & L. C. J. Wong (Eds.),

Handbook of multicultural perspectives on stress and coping (pp. 223–283). Dallas, TX US:

Spring Publications.

Yanez, B. R., Stanton, A. L., Hoyt, M. A., Tennen, H., & Lechner, S. (2011). Understanding

Perceptions of Benefit Following Adversity: How Do Distinct Assessments of Growth Relate to

Coping and Adjustment to Stressful Events? *Journal of Social and Clinical Psychology*, *30*, 699-

721. doi:10.1521/jscp.2011.30.7.699

Table 1

Most Commonly Experienced Traumatic Events on the Life Events Checklist

Traumatic Event:	% of Participants:
Sudden, unexpected death of someone close to you.	60
Life-threatening illness or injury.	32
Physical assault.	21
Transportation accident.	15
Other unwanted or uncomfortable sexual experience.	13
Severe human suffering.	12
Serious accident during work, home, or recreational activity	10
Assault with a weapon.	6
Sexual assault.	7

NB: The total exceeds 100%, because participants indicated that they had experienced multiple events.

Table 2
Descriptive statistics and reliabilities for the PTGI-42 domains

Variable	Reliability		Mean (SD)	
	Target	Informant	Target	Informant
PTG	0.95	0.92	2.85 (1.24)	2.62 (0.80)
PTD	0.93	0.94	1.37 (1.09)	1.99 (0.82)
Appreciation of Life (PTG)	0.61	0.73	3.34 (1.23)	2.88 (1.01)
New Possibilities (PTG)	0.87	0.82	2.81 (1.46)	2.59 (0.98)
Personal Strength (PTG)	0.88	0.69	3.09 (1.47)	2.63 (0.90)
Spiritual Change (PTG)	0.81	0.81	2.56 (1.84)	2.66 (1.34)
Relationships (PTG)	0.86	0.85	2.61 (1.31)	2.50 (0.91)
Appreciation of Life (PTD)	0.46	0.69	1.05 (1.03)	1.97 (0.99)
New Possibilities (PTD)	0.84	0.79	1.41 (1.35)	2.02 (0.91)
Personal Strength (PTD)	0.82	0.78	1.32 (1.33)	2.03 (0.97)
Spiritual Change (PTD)	0.67	0.79	0.98 (1.37)	1.67 (1.12)
Relationships (PTD)	0.84	0.83	1.63 (1.24)	2.04 (0.86)

NB: All descriptive statistics and reliabilities are based on a sample size of 99.

Table 3
Correlation Matrix of the PTGI-42 domains (Participants)

VARIABLE	PTD	PTG_AL	PTG_NP	PTG_PS	PTG_SC	PTG_RO	PTD_AL	PTD_NP	PTD_PS	PTD_SC	PTD_RO
PTG	0.20*	0.82**	0.91**	0.87**	0.79**	0.91**	0.17	0.15	0.12	0.16	0.24*
PTD	--	0.11	0.30*	0.12	0.15	0.15	0.74**	0.91**	0.90**	0.69**	0.89**
PTG_AL		--	0.72**	0.67**	0.61**	0.66**	0.07	0.10	0.00	0.10	0.16
PTG_NP			--	0.77**	0.66**	0.74**	0.23*	0.21*	0.20*	0.27*	0.36**
PTG_PS				--	0.62**	0.68**	0.06	0.08	-0.03	0.08	0.24*
PTG_SC					--	0.67**	0.18	0.14	0.09	0.04	0.16
PTG_RO						--	0.16	0.12	0.15	0.16	0.11
PTD_AL							--	0.61**	0.69**	0.49**	0.52**
PTD_NP								--	0.80**	0.56**	0.74**
PTD_PS									--	0.65**	0.68**
PTD_SC										--	0.50**
PTD_RO											--

NB: "AL" (appreciation of life), "NP" (new possibilities), "PS" (personal strength), "SC" (spiritual change), & "RO" (relationships). All correlations based on a sample size of 99.

Table 4

Correlation Matrix of the PTGI-42 domains (Informants)

VARIABLE	PTD	PTG_AL	PTG_NP	PTG_PS	PTG_SC	PTG_RO	PTD_AL	PTD_NP	PTD_PS	PTD_SC	PTD_RO
PTG	0.32**	0.75**	0.78**	0.83**	0.67**	0.92**	0.21*	0.27*	0.27*	0.21*	0.34*
PTD	--	0.22*	0.39**	0.15	0.09	0.31*	0.87**	0.88**	0.91**	0.72**	0.91**
PTG_AL		--	0.40**	0.61**	0.41**	0.68**	0.19	0.19	0.21*	0.12	0.21*
PTG_NP			--	0.61**	0.38**	0.60**	0.29*	0.34**	0.31**	0.30**	0.39**
PTG_PS				--	0.42**	0.68**	0.12	0.11	0.05	0.07	0.22*
PTG_SC					--	0.61**	-0.03	0.04	0.11	0.13	0.13
PTG_RO						--	0.19	0.28*	0.29*	0.18	0.31*
PTD_AL							--	0.68**	0.77**	0.62**	0.76**
PTD_NP								--	0.76**	0.59**	0.69**
PTD_PS									--	0.62**	0.75**
PTD_SC										--	0.53**
PTD_RO											--

NB: "AL" (appreciation of life), "NP" (new possibilities), "PS" (personal strength), "SC" (spiritual change), & "RO" (relationships). All correlations based on a sample size of 99.

Table 5

Trait Agreement on PTG & PTD

	PTG	95% CI	PTD	95% CI
Self-other	0.16^{+}	[-.01, .32]	0.40^{***}	[.25, .55]
Inter-informant	0.13	[-.14, .36]	0.31^{*}	[.04, .59]

$^{+}p = .08,$ $^{*}p <.05,$ $^{**}p <.01,$ $^{***}p <.001,$ CI = confidence interval

Table 6

Profile Agreement on PTG & PTD

	PTG Overall			PTG Distinctive			PTD Overall			PTD Distinctive		
	$\bar{\bar{r}}$	N	95% CI	$\bar{r}$	N	95% CI	$\bar{\bar{r}}$	N	95% CI	$\bar{\bar{r}}$	N	95% CI
Self-other	0.36***	96	[.23, .48]	0.31***	99	[.17, .44]	0.30***	87	[.17, .42]	0.16*	99	[.02, .29]
Inter-informant	0.32**	40	[.13, .48]	0.21	40	[-.24, .44]	0.30**	37	[.07, .50]	0.16	40	[-.03, .35]

$^{*}p <.05,$ $^{**}p <.01,$ $^{***}p <.001,$ CI = confidence interval

NB: The sample sizes differ across analyses, because a correlation could not be computed when one of the individuals' responses were constant across all the domains.