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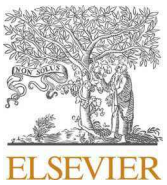

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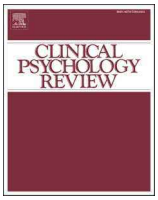

Review

Illusory posttraumatic growth is common, but genuine posttraumatic growth is rare: A critical review and suggestions for a path forward

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ABSTRACT

Over the last 2.5 decades, trauma researchers have increasingly become interested in posttraumatic growth (PTG) – the concept that some people experience growth as a result of trauma exposure. I begin by reviewing extant research on PTG, with a focus on measurement and conceptual issues. Expanding on arguments made by others, I distinguish between three forms of PTG, 1) perceived PTG, which is an individual's beliefs about their own PTG, 2) genuine PTG, which is veridical growth following adversity, and 3) illusory PTG, which is motivated fabrications of PTG. Perceived PTG is extremely common, as over half of individuals exposed to a potentially traumatic event (PTE) report moderate or greater levels of PTG. I review evidence that most self-reports of PTG are greatly exaggerated and argue that perceived PTG is mostly illusory PTG. I propose five reasons for the disconnect between perceived PTG and genuine PTG, including design flaws in the current measurements, emotional biases that favor perceived PTG, the inherent appeal of PTG, cultural expectations, and problems of definition. I then review the empirical evidence concerning the prevalence rate of genuine PTG, coming to the bold conclusion that the occurrence of genuine PTG is very rare, contradicting current fundamental beliefs about PTG. I recommend researchers focus on the key areas of measurement and etiology of genuine PTG, which are necessary to create interventions that foster genuine PTG. I conclude by outlining a path to steer the scientific progression of PTG back in the right direction.

The concept of posttraumatic growth (PTG) has drawn the attention and imagination of both trauma researchers and the lay public. A simple PsycInfo search of the keyword posttraumatic growth generates over 4000 results, with over 3000 of these results coming from the past 10 years (since 2013). A simple Google search of the keyword posttraumatic growth generates over 43 million results, including numerous news stories, blogs, and features on prominent news and scientific outlets. However, in this paper I argue the scientific progress in the area of PTG greatly drags behind its growing popularity. At the heart of this lack of progress is the continued use of flawed measurements of PTG, fueled by a lack of understanding of the different kinds of PTG that may exist.

In this paper I begin by reviewing extant research on PTG, with a focus on measurement and conceptual issues. I am not the first person to review this evidence, as similar reviews have been expertly written by others (Jayawickreme & Blackie, 2014; Jayawickreme, Infurna, Alajak, et al., 2021). The current review aims to build upon these existing reviews and add new perspectives and new evidence. Specifically, I aim to critically discuss differences between three different types of PTG - perceived PTG, genuine PTG, and illusory PTG. I then speculate about reasons behind the flawed measurements and how it is has slowed scientific progress. I argue that if self-report measurements of PTG are flawed, then so are all PTG studies that have used such measures, and we need to reinterpret these studies in the light of what was actually measured. Innovatively, I then discuss the likely prevalence rates of genuine PTG, coming to the bold conclusion that the occurrence of genuine PTG is very rare, contradicting current fundamental beliefs about PTG. I then discuss key barriers to the scientific progress of PTG, including arguing that therapies designed to increase PTG are premature. I conclude by outlining a path around the existing barriers to steer the scientific progression of PTG back in the right direction.

1. Perceived PTG, Genuine PTG, and Illusory PTG

In 1996, Tedeschi and Calhoun (1996) introduced the construct of PTG – the idea that people can grow and benefit from traumatic experiences. This new line of research brought a unique approach to understanding the impact of trauma, and has spawned a plethora of research studies examining everything from associations between PTG

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and mental health outcomes, to examining predictors of PTG, to designing therapies to foster PTG (Helgeson, Reynolds, & Tomich, 2006; Henson, Truchot, & Canevello, 2021; Roepke, Zikopoulos, & Forgeard, 2021). The concept of PTG is both intuitive and appealing - that which doesn't kill you can make you stronger. Many people grew up with stories and movies in which the main character experiences significant adversity or trauma, which ultimately becomes a springboard to personal growth and discovery. As I will review shortly, people who experience a potentially traumatic event (PTE) report experiencing their own PTG at very impressive levels.

In the years after the concept of PTG was introduced, concerns about the veracity of self-reports of PTG began to emerge. Maercker and Zoellner (2004) wrote an influential paper introducing the Janus-Face Model of PTG, which proposes that self-reports of PTG have two sides. One side is genuine PTG, in which an individual not only fully recovers, but also exceeds their pre-trauma level of functioning, as first described by Tedeschi and Calhoun (1996). The other side is illusory PTG, in which an individual convinces themselves they have experienced PTG, mostly via fabricated illusions and motivated biases as a way to cope with the distress associated with the PTE.

Shortly after this paper, empirical evidence began to accumulate that supported the Janus-Face Model. It started with the basic assumption that given that PTG requires substantial recovery from a PTE, researchers should expect PTG to be related to better mental health outcomes. A meta-analysis (Helgeson et al., 2006) found that PTG was at best weakly related and often times entirely unrelated to numerous core mental health outcomes, including depression, anxiety, global distress, and quality of life. Further, the meta-analysis found PTG was *positively* related to PTSD symptoms (PTSS). It should be noted that subsequent research has noted a curvilinear relationship between PTSS and PTG (Shakespeare-Finch & Lurie-Beck, 2014) and this relationship may also vary by gender (Rzeszutek, Oniszczenko, & Firląg-Burkacka, 2016), and possibly by culture (Taku et al., 2021). Further, a study of women with breast cancer revealed that reports of PTG were *negatively* related to mental health functioning (Tomich & Helgeson, 2004). A few years later, Frazier et al. (2009) published the first prospective study that examined whether self-reports of PTG correspond to measured changes in the domains that comprise PTG. They found self-reports of PTG were unrelated to changes in these measures. Further, they found that self-reports of PTG were related to *increases* in distress and engagement in coping efforts. These findings have been replicated several times using similar prospective designs (Boals, Bedford, & Callahan, 2019; Owenz & Fowers, 2019; Yanez, Stanton, Hoyt, Tennen, & Lechner, 2011). A few years later, a cross-lagged study of war veterans from pre- to post-deployment found that more self-reported PTG at 5 months post-deployment predicted *increases* in PTSS at 15 months post-deployment, even after controlling for numerous pre-deployment factors (Engelhard, Lommen, & Sijbrandij, 2015). The accumulating empirical evidence led more researchers to question the veracity of self-reports of PTG, highlighted by Coyne and Tennen's (2010) accusation that "… positive psychology has failed, quite miserably we believe, in its approach to examining growth following adversity" (p. 24).

I argue that self-reports of PTG do not measure genuine PTG, but rather they assess perceived PTG, a point that has been made numerous times elsewhere (Boals, Jayawickreme, & Park, n.d.; Jayawickreme & Blackie, 2014). I think it is important to establish some terminology that I will use throughout this paper, and hopefully others will adopt these terms for purposes of uniformity and clarity. I want to emphasize that I am not the first person to use these terms, as others have called on researchers to disambiguate genuine PTG from illusory PTG (Jayawickreme & Blackie, 2014). What I am doing is organizing the different terms and distinguishing between them. *Genuine PTG* is the concept that Tedeschi and Calhoun (1996) first introduced – when a person experiences genuine growth from adversity. This involves experiencing an adversarial event that causes an initial psychological struggle and decrease in functioning. Over time, the struggle leads to the rebuilding of assumptions and beliefs in a manner that leads to an increase in functioning that exceeds pre-PTE levels and normal growth over time. *Perceived PTG* is self-reported retrospective perceptions of PTG. This includes, but is not limited to, self-report questionnaires of PTG and self-generated narratives. Importantly, perceived PTG sometimes reflects genuine PTG, as some people do experience genuine growth from trauma, and they are self-aware of their growth. However, perceived PTG can often-times reflect illusory PTG. *Illusory PTG* comes from the aforementioned Janus-Face Model (Maercker & Zoellner, 2004), and occurs when an individual believes they have experienced PTG following a PTE, but this growth exists only in perception, not in reality. A person who experienced a PTE may develop illusory PTG for a variety of purposes (Boals et al., n.d.), but the most common appears to be as a coping mechanism. It is also possible that perceived PTG can reflect a mix of genuine and illusory PTG, as some people may experience authentic growth, but also have greatly exaggerated beliefs about the amount they have grown. The extent to which perceived PTG reflects genuine and/or illusory PTG is a focus of this paper. I will argue that all three types of PTG are interesting and worthy of research efforts. However, critically I will argue in support of the title of this paper – that the occurrence of illusory PTG is very common, but the occurrence of genuine PTG is very rare. To argue these points, I will use a mix of basic observations based in logic and reason, along with supporting empirical evidence.

2. Perceived PTG following trauma is very common

The most common method researchers use to assess PTG is self-report questionnaires. Although there are a number of available questionnaires, the Posttraumatic Growth Inventory (PTGI; Tedeschi & Calhoun, 1996) is by far the most commonly used measure (Jayawickreme, Rivers, & Rauthmann, 2018; Park & Boals, 2021). The PTGI contains 21 items that assess the five domains that comprise PTG - new possibilities, relating to others, appreciation of life, personal strength, and spiritual change. When samples of trauma survivors are asked to complete the PTGI or other similar self-reports of PTG, the levels of reported PTG are remarkably high. Specifically, a meta-analysis of self-reports of PTG following a variety of PTE types (life-threatening illnesses, accidents, and occupational traumas) found that 53% of individuals who experience a PTE report moderate to high levels of PTG (Wu et al., 2019). Thus a little over half of trauma-exposed individuals report that their level of functioning in the aforementioned domains (new possibilities, relating to others, appreciation of life, personal strength, and spirituality) has not only returned to their pre-trauma level of functioning, but has substantially exceeded these levels, as a result of the PTE. I believe such impressive levels of perceived PTG should give researchers strong reason to pause and question the veracity of these self-reports.

As I just reviewed, respondents frequently report positive impacts from PTE exposure, but do people also report *negative* impacts in the domains that comprise PTG? After all, PTE exposure typically leads to worse functioning, such as increases in depression, anxiety, neuroticism, substance use, and suicidality (Boals, Southard-Dobbs, & Blumenthal, 2015; Goldstein et al., 2016; Löckenhoff, Terracciano, Patriciu, Eaton, & Costa Jr., 2009; McKay et al., 2021; Rickman, Bernard, Levendosky, & Yalch, 2021; Wagner et al., 2021). To examine the extent to which PTE-exposed participants report negative impacts on the domains that comprise PTG, Cann, Calhoun, Tedeschi, and Solomon (2010) created the PTGI-42, which contains the exact same 21 items as the PTGI (e.g. "I have a greater feeling of self-reliance"), but then follows with a negative version of the item (e,g. "I cannot rely on myself"). Responses to the negative items has been coined posttraumatic depreciation (PTD). Although self-reports of PTD following PTE exposure is very common, what I find interesting is that participants consistently and overwhelmingly report more PTG than PTD, often-times at a magnitude of 3× (Barrington & Shakespeare-Finch, 2013; Cann et al., 2010; Kunz,

Joseph, Geyh, & Peter, 2019; Michélsen, Therup-Svedenlöf, Backheden, & Schulman, 2017). Thus, not only do over half of participants in trauma studies report moderate to high levels of PTG (Wu et al., 2019), but the majority of participants report more positive impacts than negative impacts.

What if instead of asking about PTG and PTD in separate items, we asked about these two types of impact via a single item? The PTGI and PTGI-42 use a response scale that ranges from 'did not experience this change as a result of my crisis' to 'I experienced this change to a very great degree as a result of my crisis'. This use of a unipolar response scale causes a wording effect (Boals & Glidewell, n.d.), which encourages inflated positive responses. In response, we created the Stress-Related Growth Scale-Revised (SRGS-R; *masked for review*), a modification of a self-report measure of PTG that uses a bipolar response scale that ranges from +3 (a very positive change) to −3 (a very negative change). Using this bipolar response scale, we found that participants once again reported more positive than negative change – specifically, they reported a negative change on 22% of the items, no change on 31% of the items, and a positive change on 47% of the items. Another way we compared self-reports of PTG versus PTD was by asking participants about the amount of change they have experience since the PTE (while not specifying positive or negative change). Next, we gave them a follow-up question that asked whether the reported change was positive, negative, or a mix of positive and negative. We found that 60% of the responses were rated as positive, 20% as negative, and 20% as a mix (*masked for review*). Thus, using a variety of assessment types, respondents consistently report more positive changes than negative changes following a PTE.

What if we examined trauma narratives, as opposed to self-report questionnaires? A synthesis of qualitative studies of trauma narratives found that themes of positive change are very common in trauma narratives (Asgari & Naghavi, 2019). Even when researchers report finding simultaneous themes of PTG and PTD, the themes of PTG are found to occur more frequently. For instance, Zell, Strickhouser, Sedikides, and Alicke (2020) found trauma narratives contained more positive words than negative words. Further, 56% participants reported both positive and negative changes, 36% participants indicated mostly positive change, while only 9% indicated mostly negative change. Thematic analyses of the narratives revealed an overall 3× greater rate of PTG than PTD. Another study found that Holocaust survivors used more positive words than negative words when describing their Holocaust experiences (Boals & Perez, 2009). These findings from narrative studies suggest the high level of reporting of PTG cannot be explained solely by possible demand characteristics of PTG questionnaires. In summary, research using a variety of methodologies has consistently found that most trauma survivors report perceived PTG at a very high rate, a rate that exceeds their reports of perceived negative change.

3. Are self-reports of PTG accurate?

Does perceived PTG always, or at least most of the time, reflect genuine PTG? I will cut to the chase - the answer is no. I will support this blunt and curt answer with a mix of basic observations, logical reasoning, and empirical evidence. In this next section I will refer multiple times to whether a set of research findings passes the 'eye test'. I am borrowing this term from football analysts, who use the 'eye test' as a first judgement of the quality of a football team (i.e. do the players on the team have the physical makeup of a potential championship team?). I will use the term eye test here to refer to whether a set of findings involving self-reports of PTG is logical, reasonable, and consistent with other research findings.

As I mentioned earlier, a meta-analysis by Wu et al. (2019) found that 53% of respondents report moderate to high levels of PTG following trauma. I don't believe this percentage passes the eye test. Let's consider what genuine PTG should look like, based on the conceptualization introduced by Tedeschi and Calhoun (1996). An individual experiences a PTE that causes an initial psychological struggle that typically includes a shattering of beliefs about the self and world (Foa, Ehlers, Clark, Tolin, & Orsillo, 1999; Janoff-Bulman, 1992) that creates a period of psychological struggle and challenge (Weststrate & Glück, 2017), resulting in an initial decrease in positive functioning and mental well-being. It should be noted that many researchers assert that an event need not necessarily meet the criteria as traumatic in order to spawn PTG (Jayawickreme et al., 2021; Weststrate, Jayawickreme, & Wrzus, 2022), as the psychological impact of an event is influenced by both objective and subjective factors (Boals, 2018). The important characteristic of the event is that it creates substantial adversity and psychological struggle for the individual. As the individual resolves these struggles, they are able to rebuild their basic beliefs in a manner that allows them to not only return to their pre-trauma levels of functioning, but to 1) a level superior to their pre-trauma levels (Tedeschi & Calhoun, 2004), and 2) levels that exceed normative growth (Weststrate et al., 2022). This transformation would progress beyond transitory changes in thoughts, feelings, and behaviors; genuine PTG would entail enduring changes in personality (Jayawickreme et al., 2021), including the key areas of traits, characteristic adaptations, and narrative identity (Weststrate et al., 2022). Although PTG is typically conceived of as long-lasting changes, there is empirical evidence for the existence of state PTG as well (Jayawickreme, Blackie, Forgeard, Roepke, & Tsukayama, 2022). Tedeschi and Calhoun (2004) state that genuine PTG is not just a recovery to pre-PTE levels, but critically includes deeply profound improvements.

I argue that although some people experience this sequence of transformation following PTE exposure, this progression is not the norm. If the majority of trauma-exposed individuals have achieved a level of superior post-trauma functioning, then we would expect to find that PTE exposure is related to better mental health functioning. Further, we might also expect that previous PTE exposure would predict lower rates of PTSD symptoms to a new PTE, since the person now presumably has improved personal strength, social relationships, and spirituality. Unfortunately, empirical evidence suggests the exact opposite patterns. As mentioned earlier, research consistently finds that PTE exposure is strongly associated with *worse* mental health functioning, including higher levels of depression, anxiety, neuroticism, substance use, and suicidality (Boals et al., 2015; Goldstein et al., 2016; McKay et al., 2021; Rickman et al., 2021; Wagner et al., 2021). Further, experiencing a PTE *increases* risk for PTSD symptoms to a subsequent PTE (Brewin, Andrews, & Valentine, 2000; Gould et al., 2021). This evidence suggests that for most people, PTE exposure does not make one stronger, it makes them more psychologically vulnerable.

Perhaps most people experience an initial decline in functioning, but over time bounce back and then exceed pre-trauma levels of functioning. Thus, if studies simply assessed participants at longer time periods post-PTE to allow for such positive changes to occur, the positive impacts of PTE exposure would become apparent. Indeed, there are a handful of studies that have found some positive benefits of PTE exposure. One study found a positive association between PTE exposure and social support (Grasso et al., 2012), and another found a positive association between PTE exposure and self-reported prosocial behaviors (Frazier et al., 2013). Further, some studies have found a positive link between PTE exposure and spirituality, but other studies have found a negative link (Lee, Park, & Hale, 2016). Unfortunately, these few studies that find positive impacts of PTE exposure are dwarfed by the number of studies that find that PTE exposure is related to worse outcomes. Importantly, many of these studies assessed participants years or sometimes decades post-PTE, which should be more than ample time for any positive impacts to develop. For instance, research consistently finds that adults who experienced childhood trauma (i.e., the PTE took place years or decades earlier) evidence higher rates of psychiatric disorders, unemployment, risk for perpetration of abuse, making healthy decisions about whom to trust (Copeland, Shanahan, Hinesley, et al., 2018; Gobin & Freyd, 2014; McKay et al., 2021; van Nierop et al., 2015; Zimmerman,

Farrell, & Posick, 2017), and lower levels of executive functioning and emotion regulation (Wade, Wright, & Finegold, 2022). This pattern is not specific to childhood trauma. Those who experience a PTE as an adult, and the PTE occurred years or decades earlier, evidence impaired physical health (Schnurr, Wachen, Green, & Kaltman, 2021), and increased rates of substance abuse, mental illness, depression, and suicidal thoughts (Belik, Cox, Stein, Asmundson, & Sareen, 2007; Forman-Hoffman et al., 2016; Harvey et al., 2016), just to name a few. The overwhelming pattern is that PTE exposure is predictive of worse outcomes, not better outcomes, even when the PTE occurred years or decades earlier.

Perhaps PTE exposure negatively impacts some domains of functioning, such as depression and substance use, but not the specific domains that comprise PTG, including quality of life and social functioning with close others. Once again, the empirical evidence supports the exact opposite pattern. PTE exposure is related to worse quality of life (Harrison, Brown, & Cho, 2020; McCabe, Watrous, & Galarneau, 2020; Monson, Caron, McCloskey, & Brunet, 2017; Park et al., 2016), worse social functioning (Afifi et al., 2007; Davidson, Shannon, Mulholland, & Campbell, 2009; Sweeting, Garfin, Holman, & Silver, 2020), higher rates of social isolation (Copeland et al., 2018), lower levels of social support (Van Voorhees et al., 2018), less relationship satisfaction (Blais, 2021), more self-destructive behaviors (Rizeq & McCann, 2021), and greater feelings of vulnerability (Roe-Burning & Straker, 1997). This body of evidence demonstrating the enormity of negative outcomes in the domains that comprise PTG following trauma exposure makes it difficult to argue that, more times than not, PTE exposure leads to a net gain in mental well-being. In short, the finding that most PTE-exposed individuals report moderate or greater levels of PTG does not pass the eye test.

Another manner in which self-reports of PTG fail the eye test is what we would conclude if the aforementioned prevalence rates of perceived PTG and PTD are indeed accurate. Recall that, on average, individuals consistently report more positive change than negative change following PTE exposure. As trauma researcher Crystal Park posed, if we took these self-reports at face value, we would have to conclude that PTE exposure is, all things considered, more helpful than deleterious (personal communication, August 8, 2021). Continuing this line of logic, if PTE exposure results in a net positive change, we might recommend people purposely experience a PTE. Psychologists would have to tell people that although there is an initial downside to PTE exposure such as elevated rates of depression, PTSD symptoms, anxiety, substance use, and suicidal thoughts, for most people the long-term growth they will likely experience will outweigh the short-term costs (i.e., more PTG than PTD). Trauma survivors might even consider recommending PTE exposure to their friends and loved ones. Obviously, this line of thought and conclusions are ridiculous, faulty, and dangerous. In other words, greater levels of perceived PTG than perceived PTD does not fit with empirical evidence that PTE exposure typically causes net detriments to functioning, thus another failing of the eye test.

Another consistent research finding that does not pass the eye test is the internal consistency of the PTGI. The reported Cronbach's alpha for the PTGI is $\alpha = 0.90$ (Tedeschi & Calhoun, 1996). At first glance, this is a very solid number and why should any researcher give this number a second thought? I argue this number is suspiciously too high. The PTGI was first constructed by asking trauma survivors about the many different ways in which they experienced positive benefits from their trauma experience (Tedeschi & Calhoun, 1996). This led to the construction of 21 items that comprise five different subscales - new possibilities, relating to others, appreciation of life, personal strength, and spiritual change. Although I have no doubt that some people sometimes experience genuine growth in one or more of these domains, I think it is unlikely that if someone experiences growth in one of the five domains, they almost always experience similar amounts of PTG in the other four domains (see Miller, 2014). As pointed out by Jayawickreme et al. (2021), PTG can consist of changes in various domains of personality, such as changes in goals, thoughts, feelings, and behaviors. PTEs may produce positive changes in life narratives for some personality traits (e.g., Openness), but not others (e.g., Conscientiousness) (Weststrate et al., 2022). I argue that heterogeneity in change across the five domains of PTG is likely more the rule than the exception. For instance, one person may experience PTG in the domains of positive relations with others and appreciation for life, but not in the domain of spirituality. A sexual assault survivor may experience growth in the domains of spirituality and personal strength, but no growth or even depreciation in the domain of relating to others.

To this point, Infurna and Luthar (2017) found vastly different trajectories of change from pre- to post-PTE for five different dimensions that comprise resilience (life satisfaction, positive affect, negative affect, general health, and physical functioning). Although this study examined domains of resilience, two of these dimensions (life satisfaction and positive affect) could also be considered domains of PTG. For the domain of life satisfaction, 66% exhibited a resilient trajectory, while 34% exhibited a recovery trajectory. For the domain of positive affect, these numbers were reversed (25% and 74%, respectively), suggesting heterogeneity in trajectories of change. Further, a meta-analysis (Mangelsdorf, Eid, & Luhmann, 2019) found that when various domains of PTG were assessed separately, participants report increases in some domains (social relationships, self-esteem, and environmental mastery), but not other domains (meaning in life and spirituality). Hence, the different domains evidenced heterogeneity as opposed to uniformity in terms of change following adversity.

Given that it is common for trauma victims to experience different trajectories of change in the different domains that comprise PTG, we should expect that the items within each domain or subscale of the PTGI would have high internal consistency, but the overall internal consistency across the five domains would be modest, at best. Then why is the internal consistency of the 21 items of the PTGI that cut across all five domains so high? I argue that perceived PTG is mostly comprised of illusory PTG. If an individual creates illusory PTG as a coping mechanism, it is highly unlikely they would convince themselves they have grown in some domains, but not others. Rather, the most cognitively efficient strategy would be to believe growth has occurred in all domains at roughly equal rates, which would result in $\alpha \approx 0.90$.

Yet another research finding that does not pass the eye test is the percentage of people who report significant levels of PTG over time. The time course for the emergence of genuine PTG is likely highly idiosyncratic (Jayawickreme et al., 2021). For some people it may emerge a few weeks or months post-PTE, whereas for others it could takes years or even decades. Since the time course is not uniform, we would expect that as time-since-trauma increases, the percentage of respondents reporting moderate or greater PTG should also increase. A study by Hokes and Adams (2022) assessed burn injury survivors at six, 12, and 24 months posttrauma. The percentage of participants who reported moderate or greater PTG did not significantly change over these three time points. Why did the percentages not increase over time? I propose three possibilities. The first is that most PTG experienced emerged within the first six months, with no new substantial levels of PTG between six and 24 months posttrauma. This possibility seems unlikely. The second possibility is that some participants initially experienced genuine PTG, but the shelf-life of this PTG was short, and the levels of PTG quickly dissipated. Further, the percentage of participants who experienced this short-lived PTG was equivalent to the percentage of participants who experienced newly emerged genuine PTG. This possibility seems even more unlikely than the first. The third and most likely possibility is that most perceived PTG is illusory, and illusory PTG is relatively stable over the first two years post-PTE, as the individual attempts to cope with their distress and maintain their positive self-views.

Thus far I have reviewed findings that I believe do not pass the eye test, but what about more direct empirical tests of the veracity of self-reports of PTG? The majority of this research has attempted to link self-reports of PTG to more objective measures of PTG. I will keep this

section brief, since this evidence has been reviewed in detail elsewhere (Boals et al., n.d.; Jayawickreme & Blackie, 2014; Park & Boals, 2021). As I mentioned earlier, multiple prospective studies have found that self-reports of PTG are unrelated to actual changes in the domains that comprise PTG (Boals et al., 2019; Frazier et al., 2009; Owenz & Fowers, 2019; Yanez et al., 2011). These same studies further find that self-reports of PTG are significantly related to *increases* in distress and engagement in coping efforts.

Several other studies have examined relationships between self-reports of PTG and longitudinal changes in domains that comprise PTG such as spirituality (Trevino, Naik, & Moye, 2016), self-efficacy and purpose in life (Kunz et al., 2019), and personal attributes (Ransom, Sheldon, & Jacobsen, 2008). The results of these studies are mixed, finding only weak or no relationships. There is a study that found that self-reports of PTG from sexual assault survivors were modestly correlated with anti-sexual assault activism (Swanson & Szymanski, 2021). However, this study examined self-reports of activism. The one study I know of that examined an actual behavioral measure of activism (breast cancer survivors volunteering or not to help other survivors) found no relationship between self-reports of PTG and volunteer behavior (Cohen & Numa, 2011). In summary, the empirical evidence suggests that more times than not, perceived PTG does not reflect genuine PTG.

4. Why do people overreport PTG?

I propose at least five reasons why respondents may overreport PTG. The first reason is the design and structure of the self-report measures. All of the items on the PTGI are positively worded, coupled with a response scale that only includes positive responses. This design may cause unintended demand characteristics, such as implicitly suggesting to the respondent that surely they have grown, it is just a matter of how much they have grown (Boals & Schuler, 2018). Further, as Coyne and Tennen (2010) have pointed out, answering questions about PTG is cognitively complicated for respondents. Most psychological questionnaires require respondents to make one judgement (e.g., 'how sad do you feel'). Assessing genuine PTG requires four complicated steps: 1) assess how you are doing now, 2) recall how you were doing before the PTE, 3) calculate the change, and 4) make an attribution about how much of this change is due the PTE. These four steps are ripe for occurrences of memory biases, memory errors, and misattributions. Indeed, research shows people are not very good at accurately recalling how much they have personally changed over time (Robins, Noftle, Trzesniewski, & Roberts, 2005). Further, four cognitive steps per item is likely more time and effort than most participants are willing to put forth when they are trying to quickly complete a survey. Indeed, experimental evidence using mental chronometry demonstrates that the vast majority of respondents engage in only one cognitive step when completing self-reports of PTG (Boals, Griffith, & Park, 2023). Conveniently, self-reporting illusory PTG only requires one cognitive step. In summary, unintended demand characteristics and complicated cognitive requirements of self-report questionnaires of PTG likely contribute to inaccurate and/or inflated responses.

A second reason respondents may overreport PTG is emotional biases. This is based on the aforementioned Janus-Face Model (Maercker & Zoellner, 2004). Research in social psychology has demonstrated that people are quick to perceive positive change in themselves (O'Brien & Kardas, 2016), fueled by motivations to maintain positive illusions about the self (Taylor, 1989; Zell et al., 2020). PTEs can shatter existing beliefs and assumptions about the self and world (Janoff-Bulman, 1992), and thus are a threat to one's positive illusions. As social psychologist Daniel Gilbert has pointed out, people have a 'psychological immune system' that is comprised of a variety of defense mechanisms designed to maintain positive illusions (Wilson & Gilbert, 2005). I argue that unknowingly creating illusory perceptions of PTG is one such defense mechanism that can help individuals cope by maintaining positive illusions in the face of distress. Indeed, people have a tendency to denigrate perceptions of their past self as a way to perceive self-improvement over time (Conway & Ross, 1984; Keuler & Safer, 1998), and this tendency is exacerbated when focused on a distressing event (McFarland & Alvaro, 2000).

Given this line of reasoning, it is not a surprise that self-reports of PTG are strongly related to a variety of coping strategies (Ersahin, 2020; Pollard & Kennedy, 2007). Although self-reports of PTG are related to many forms of adaptive coping such as support coping, problem-focused coping, and positive reappraisal coping, these effect sizes are typically small (for a meta-analysis see Prati & Pietrantoni, 2009). Further, positive reappraisal may not be entirely adaptive as it promotes overly positive biases in memory recall of the stressful experience (Levine, Schmidt, Kang, & Tinti, 2012).

Reports of PTG may also reflect maladaptive reality distortions as a form of coping (Tennen & Affleck, 2009). After all, most autobiographical narratives are less so pinpoint accurate accounts of what happened, and more so ever-changing constructed stories with purposeful gaps and self-serving revisions (McAdams, 2001; Pennebaker, 1993). Consistent with this proposition, self-reports of PTG are also positively correlated with avoidance coping, denial coping, and negative religious coping (Boals & Schuler, 2018; Gerber, Boals, & Schuettler, 2011; Henson et al., 2021). One study found that over half of breast cancer survivors self-report both PTG and high levels of helplessness-hopelessness coping (Cheng, Ho, Hou, Lai, & Wang, 2020). These generally maladaptive coping styles are the opposite of the coping processes believed to promote genuine PTG - reflective processing, involving openness to self-reflection with attempts to resolve, manage, and constructively rebuild following an adverse event (McLean, 2008; Weststrate et al., 2022). Further, self-reports of PTG are not significantly related to forgiveness of self, forgiveness of others, or self-efficacy, but they are related to less psychological closure of the PTE (Schuettler & Boals, 2011). Lastly, self-reports of PTG are related to a number of cognitive biases including making downward social comparisons and positive attention bias (Gower, Pham, Jouriles, Rosenfield, & Bowen, 2022). In summary, perceived PTG is highly related to engagement in a variety of coping strategies, with no discrimination between adaptive or maladaptive coping.

A third reason people may report inflated levels of PTG is one of appeal. The concept of PTG has an inherently intoxicating allure (Tiberius, 2021). People want to believe they have learned from the adversities they have suffered, to make the suffering seem worthwhile. When researchers ask respondents how much they have grown as a result of their crisis, it would be utterly deflating to choose "0 = Not at All" for each item. It is much more appealing to believe you have turned your adversity into personal growth. To this point, one study found that if respondents are given an attractive alternative option to reporting PTG, they self-report significantly less PTG (*masked for review*). Specifically, we asked respondents after each item on the PTGI whether the positive change they reported was *because* of the event (i.e. PTG) or *despite* the event (i.e. an attractive alternative to reporting PTG). Approximately 40% of the time, respondents stated they experienced the positive change *despite* the event, suggesting respondents may simply report whatever response is attractive.

The old adage that 'what doesn't kill you only makes you stronger' is similarly attractive and offers hope to people in difficult situations (Jayawickreme et al., 2021). The problem is that, at least when it comes to PTE exposure, this adage is false. If it were true, then experiencing a PTE would make people stronger and more resilient, and thus less likely to develop PTSD if they experience a subsequent PTE. As previously mentioned, research finds the exact opposite pattern - the greater the number of previous PTEs, the greater the probability of developing PTSD symptoms to a subsequent PTE (Brewin et al., 2000; Gould et al., 2021). These findings reinforce that what most people choose to believe is strongly influenced by what is appealing and helps maintain positive illusions of the self.

A fourth reason people may report inflated levels of PTG is cultural

expectations. The narratives people create about their experiences and the subsequent implications for the self are heavily influenced by social contexts (Nelson & Fivush, 2004), and many trauma survivors perceive PTEs they experienced to be highly central to their life story (Berntsen & Rubin, 2006, 2007). Society and culture teach people how they are expected to respond to trauma (Weststrate et al., 2022), often times through what are called master narratives (McLean & Syed, 2015). Master narratives "…are culturally shared stories that tell us about a given culture, and provide guidance for how to be a 'good' member of a culture; they are a part of the structure of society." (McLean & Syed, 2015, p.320). Such master narratives likely encourage positive biases in autobiographical narratives, as people have a strong preference for redemptive narratives and the people who tell them (McLean, Delker, Dunlop, Salton, & Syed, 2020).

Pop culture is filled with stories in which the protagonist goes through a stressful or traumatic experience (Jayawickreme et al., 2021; Tiberius, 2021). Instead of emotionally crippling the protagonist, the PTE experience ends up spawning newfound personal strength for the protagonist. This follows Joseph's Campbell's well-known "Hero's Journey" storyline that originated in Greek mythology and is the basis for many popular movies today such as 'Star Wars', 'Lord of the Rings', and 'Harry Potter' (Campbell, 1949). In these storylines, the protagonists begin as an everyday person who suddenly faces extraordinary and/or traumatic circumstances. Their survival and ultimate mastery of the adversity transforms the everyday person into a wise and strong hero. Hero's journey stories reinforce master narratives in Western cultures that people are expected to grow following adversity. Indeed, one study found that experimentally priming participants with a hero's journey movie storyline (as opposed to a control movie) resulted in subsequent increases in self-reports of PTG (Boals et al., 2023).

Hero's journey stories are embedded into many cultures and reinforce the message that trauma is an opportunity for growth. This storyline has been recycled from generation to generation without losing popularity in part because growth from adversity has such a strong, intuitive allure. Indeed, research finds that many autobiographical narratives of everyday people facing adversity follow the 'redemptive narrative', in which personal growth and good comes from stories of challenge and failure (McAdams, 2006). Maybe these stories are an example of life imitating art, maybe it is art imitating life, or perhaps some combination of these. Either way, a strong possibility as to why respondents often times overreport PTG is they want to believe in their own hero's journey storyline, whether in stories about fictional characters or fictional stories of their own lives.

A fifth reason people may report inflated levels of PTG is confusion about the definition of PTG. As some philosophers have pointed out, there is no satisfactory definition of PTG (Miller, 2014; Tiberius, 2021). PTG is often defined as positive change as a result of trauma or adversity, but deciding what qualifies as positive change is highly subjective (Tiberius, 2021). Further, does the change have to be relatively permanent, or can fleeting changes be considered PTG (Miller, 2014)? Can we claim PTG for an individual whose life is much worse off following trauma in some aspects, but is slightly improved in other aspects (Miller, 2014)? Does the change have to be behavioral, or is a change in perspective enough to qualify as positive change?

Another potential problem of definition is whether PTG refers to positive change since pre- PTE, or shortly after the PTE. PTG is defined by researchers as positive change since pre-PTE. However, when asked about PTG, trauma victims may be thinking about positive change since shortly after the PTE. For instance, a person who experienced a PTE suffers a subsequent major decrease in their appreciation for life. In the months following, their level of appreciation for life greatly rebounds, but may still be slightly lower than their pre-PTE level. When going through their one cognitive step when thinking about PTG (Boals et al., 2023), the person correctly perceives they have experienced significant positive change in their appreciation for life since the initial decrease. This pattern technically fits the definition of recovery, but it is much more satisfying for an individual to think of this positive change as PTG. Hence it may be easy for a trauma victim contemplating their personal level of PTG to conveniently use a different timeline of change in their definition of PTG.

5. What is the true prevalence rate of genuine PTG?

It is difficult to empirically assess the prevalence rate of genuine PTG because we do not yet have an adequate assessment. Retrospective self-reports of PTG assess perceived PTG, and perceived PTG is a mix of genuine and illusory PTG. As philosopher Valerie Tiberius recently pointed out, "We won't find anyone who has experienced both a life with no trauma and a life with trauma who can decide which is preferable" (Tiberius, 2021, p. 17). Until we have a measure of genuine PTG, we are left to guess.

To speculate about the prevalence of genuine PTG, consider how difficult it is for individuals to return to pre-trauma levels of functioning. For instance, as unfortunate as it is, most people who are sexually abused at a young age struggle for the rest of their lives and find it extremely difficult to achieve a level of functioning in adulthood they would have achieved if the abuse never took place. Some wounds simply never fully heal. Even after years of therapy, a regaining of pre-abuse levels of functioning would be a minor miracle. To not only regain, but then exceed, pre-abuse levels of functioning would require an extraordinary amount of mental toughness, grit, determination, a supportive environment (Weststrate et al., 2022), and the employment of healthy coping strategies over the course of months or years. Although I believe this is absolutely possible and some trauma survivors achieve genuine PTG, I also believe it is very rare.

What empirical evidence is there that might allow us to speculate about the prevalence rates of genuine of PTG? George Bonanno and colleagues have conducted a multitude of research on trajectories of PTSD symptoms following PTE exposure (Bonanno & Mancini, 2012; Lam et al., 2010; Mancini, Bonanno, & Clark, 2011). These studies are great for examining various trajectories of PTSS and depression post-PTE exposure. However, because they were not intended to examine PTG, they are limited in identifying trajectories of PTG because they 1) typically lack pre-PTE assessments, and 2) typically do not include measures of the domains that comprise PTG. Despite these limitations, PTSS trajectory studies can still offer useful clues about the prevalence of genuine PTG. Bonanno and colleagues find that following PTE exposure, there are four primary trajectories of distress levels (Bonanno & Mancini, 2012). The first trajectory is called resilience, denoted by consistently low levels of PTSS over time. I argue that the rates of genuine PTG from individuals in this trajectory are likely very low, and maybe close to zero, since there is little evidence of an initial and impactful psychological struggle, and according to Tedeschi and Calhoun (2004, p.1), PTG occurs "as a result of the struggle with highly challenging life crises". In short - no struggle, no PTG. The second trajectory is called chronic, marked by consistently high levels of PTSS over time. This group experiences a substantial crisis and subsequent struggles, but evidences little recovery. According to Tedeschi and Calhoun (2004), PTG is only likely to emerge after healthy resolution of the struggles. Hence, I argue that the rates of genuine PTG from the chronic group are also likely very low, and maybe close to zero. In short - no major recovery, no PTG. The third trajectory is called delayed, denoted by initial moderate levels of PTSS, followed by an increase. I argue the rates of genuine PTG from this trajectory are also low, maybe close to zero, for the same reasons as the chronic trajectory. In short - no major recovery, no PTG.

The fourth and final trajectory is called recovery, denoted by initially high levels of PTSS, followed by a subsequent substantial decrease of PTSS over time. I argue individuals in this trajectory have the best chance of experiencing genuine PTG. This group checks the boxes of going through an initial struggle, followed by some level of resolution. However, it should be noted that not all individuals who recover will go

on to exceed their pre-PTE levels of functioning. The percentage of people who follow this recovery trajectory across studies is typically in the range of 0% - 25% (Bonanno & Mancini, 2012; Johannesson, Arinell, & Arnberg, 2015; Lam et al., 2010; Lowe, Galea, Uddin, & Koenen, 2014; Mancini et al., 2011). I argue the aforementioned 0%–25% range provides an estimated ceiling of the prevalence rate of genuine PTG. Of note, this 0%–25% range is substantially lower than previously cited 53% of participants who self-report significant levels of perceived PTG (Wu et al., 2019).

One trajectory study did find some improvement following trauma exposure. Mancini, Littleton, and Grills (2016) assessed depression and anxiety before and after the Virginia Tech shootings in 2007. A small percentage of participants evidenced a trajectory of decreases in depression (7%) and anxiety (13%) from pre- to post-shooting. Unfortunately, this study did not include any measures of domains that would comprise PTG. As the authors point out, this trajectory is not PTG, as the improvements were immediate, as opposed to a period of distress, followed by long-term improvement. Noting that they did not find relationships between initial distress levels and long-term improvements, the authors concluded, "In contrast to theories of posttraumatic growth, our findings suggest that elevated and persistent distress is an impediment to rather than a catalyst of growth" (p. 413). In short, despite the fact that most trauma survivors self-report moderate to high levels of PTG (Wu et al., 2019), trajectory studies rarely find patterns of growth following trauma (Weststrate et al., 2022).

As pointed out by Jayawickreme et al. (2021), the type of research designs necessary to detect PTG is vital. Longitudinal studies are a marked improvement over cross-sectional studies, particularly because of their ability to elucidate trajectories over time. For instance, a trajectory study of people living with HIV found two separate trajectories for perceived PTG – one that starts elevated and increases over time and a second that starts lower and then decreases over time (Pięta & Rzeszutek, 2022). However, research designs that do not include pre-PTE assessments risk finding false evidence for PTG (Jayawickreme et al., 2022). Perhaps the best methodology for examining the prevalence of genuine PTG is prospective longitudinal trajectory studies that include at least one assessment pre-PTE (to determine levels of pre-PTE functioning), multiple assessments post-PTE (to determine changes in levels of post-PTE functioning) (Bleidorn, Schwaba, Denissen, & Hopwood, 2021; Infurna & Jayawickreme, 2019), and would also include both positive outcomes (i.e., domains that comprise PTG such as satisfaction with life, etc.) and negative outcomes (e.g., PTSS). A trajectory of genuine PTG would start with, relative to pre-PTE functioning, an initial decrease in positive outcomes and concomitant increase in negative outcomes (i.e., reflecting a psychological struggle in the PTE aftermath). Over time, there would be an eventual increase in positive functioning (and likely concomitant decrease in negative functioning) that eventually not only returns to pre-PTE levels, but substantially exceeds pre-PTE levels.

Because such study designs are very challenging and resource-intensive to conduct, I know of only three studies that 1) utilize a research design comparable to the aforementioned prospective longitudinal trajectory design, and 2) contained measures of positive functioning. The first study was by Mancini et al. (2011), which examined change in subjective well-being once a year for the four years prior to divorce or bereavement of spouse, and four years post-divorce/bereavement. They found that of those who experienced spousal bereavement, only 5% evidenced a trajectory of improvement from pre- to post-bereavement; for those who experienced spousal divorce, only 9% evidenced a trajectory of improvement. It is possible that some of those who improved did not improve due to an initial struggle with the divorce (i.e., genuine PTG), but rather the improvement was caused by getting out of an undesirable marriage. Hence, this study suggests a 7% rate of genuine PTG would be an optimistic ceiling.

The second study is by Infurna and Luthar (2017) that examined changes in life satisfaction and positive affect from 5 years before to 5 years after a spousal death. Growth mixture modeling found two main trajectories: resilience and recovery. Of particular note for our purposes, their analyses did not reveal a trajectory of PTG, once again suggesting the percentage of participants who experienced genuine PTG is very low, perhaps not much greater than zero.

The third study is by Chopik et al. (2020) that examined changes in character strengths in over 200,000 Army soldiers from pre-deployment to three time periods post-deployment. They found two trajectories – a resilience group that started high and remained high, and a declining group that started with moderate scores and declined over time. Importantly, once again no trajectory of growth emerged. Thus, of the three known prospective longitudinal studies, two found no substantial trajectories of genuine PTG, while the third study found only a small percentage of individuals (< 10%) that would fit a possible pattern of genuine PTG. Of note, these percentages fall within the aforementioned ceiling range of 0% - 25% we estimated from PTSS trajectory studies, and suggests a 10% ceiling may be optimistic.

There are two studies (Peterson & Seligman, 2003; Schueller, Jayawickreme, Blackie, Forgeard, & Roepke, 2015) that were not prospective, but did compare character strengths (a presumed component of PTG) between a large group of participants before a mass shooting, and a separate, but similar large group of participants after a mass shooting (Sandy Hook Elementary in 2012, movie theatre shooting in Aurora, Colorado in 2012, and Virginia Tech shooting in 2007). These studies revealed mixed findings – higher levels in the post-shooting sample for some character strengths, but lower levels in the post-shooting sample for other character strengths. Of importance, the effect sizes for these changes were small, which does not paint a picture of large, unequivocal positive change in character strength following adversity. As concluded by Jayawickreme et al. (2021), "… positive personality change following adverse events can be quite difficult to find, suggesting that such changes are quite rare" (p.155). In sum, the empirical evidence suggests the prevalence rate of genuine PTG is likely very low (0%–10%), and almost certainly substantially less than the aforementioned 53% of participants who self-report significant levels of perceived PTG (Wu et al., 2019).

Further support for the notion that genuine PTG is rare comes from research examining growth over time, as part of the normal developmental process (see Weststrate et al., 2022). Research in personality demonstrates that positive changes over time is part of normal maturation, as over the life span, people on average evidence increases in personality traits such as self-confidence, self-control, and emotional stability (Roberts & Mroczek, 2008). In concert with these findings, a meta-analysis by Mangelsdorf et al. (2019) charted changes from before to after stressful events. Consistent with the findings of Roberts and Mroczek, the results revealed that for those who experienced a PTE, some positive change over time is common. However, people who experienced a PTE evidenced an equivalent amount of positive change as those who did not experience a PTE. This finding is consistent with other studies that found that major negative life events do not lead to long-lasting changes in personality traits such as optimism (Bleidorn, Hopwood, & Lucas, 2018; Schwaba, Robins, Sanghavi, & Bleidorn, 2019). In fact, an eight-year prospective study of changes from pre- to post-PTE found those who experienced an adverse event evidenced increases in neuroticism and decreases in openness in values (Löckenhoff et al., 2009), once again demonstrating that more times than not, adverse events lead to worse outcomes.

In summary, empirical investigations fail to find evidence that PTE exposure results in any more positive change than occurs in the absence of PTE exposure. Following this work, many perceptions of PTG may be rooted in misattributions. When people make judgments about whether they have grown as a result of a PTE, it is easy for the individual to forget about the amount they would have grown if they never experienced the PTE, resulting in a misattribution of growth to the PTE, as opposed to natural development over time. Consistent with the findings from the Mangelsdorf et al. (2019) meta-analysis, empirical evidence

demonstrates that when participants are forced to complete the aforementioned four cognitive steps required to report PTG, participants report a very small of positive change (Boals et al., 2023). Further, participants only attributed about 1/3 of this change as caused by the trauma. Thus, when participants are forced to think through each cognitive step required to self-report PTG, the result is they perceive very small amounts of positive change, and they attribute less than half of this growth to the PTE.

Another clue to the rate of genuine PTG is an examination of intergeneration cycles of abuse and maltreatment. If the majority of individuals who experienced abuse when they were younger ultimately developed genuine PTG, as is commonly self-reported in this sample type (Kaye-Tzadok & Davidson-Arad, 2016), we would expect this group, on average, to perpetrate less abuse when they eventually become parents. It has been suggested that PTG may help individuals "reinterpret perception of future stressors….to cope with threatening aspects of events" (Groarke et al., 2017, p. 973). After all, someone who was abused as a child but has since grown as a result of the abuse should be very unlikely to become perpetrators of abuse by engaging in abusive behaviors against their own children. Further, they should exhibit superior parenting practices. Unfortunately, research consistently finds the exact opposite pattern – people who were abused in childhood are more likely to become abusers as adults, perpetuating intergenerational cycles of abuse (Greene, Haisley, Wallace, & Ford, 2020; Lange, Condon, & Gardner, 2019; Madigan et al., 2019; Savage, Tarabulsy, Pearson, Collin-Vézina, & Gagné, 2019). These findings make it difficult to believe that genuine PTG from childhood abuse is more common than not. Hence, when we examine more objective behavioral outcomes, we consistently find the unsurprising results that experiencing childhood abuse has more of a negative impact than positive impact.

6. An attempt to steer the science of posttraumatic growth forward

Up to this point in time, the focus of research in the area of trauma has been on Posttraumatic Stress Disorder (PTSD), with emphases on defining PTSD, developing a basic understanding of the development and maintenance of PTSD symptoms, and the development of informed and effective treatments of PTSD. The field has made remarkable progress in the areas of definition and etiology (Brewin et al., 2000; Keane, Marshall, & Taft, 2006). Researchers were then able to use the understandings of definition and etiology to create informed treatments of PTSD, including exposure therapy, cognitive-behavioral therapy, acceptance and commitment therapy, and cognitive processing therapy (Han et al., 2021; Watkins, Sprang, & Rothbaum, 2018). The result of these efforts is that people suffering from PTSD today have many more effective treatment options than people even just 30 years ago, and many more options than those who suffered from PTSD following the first two World Wars that first garnered interest in this disorder.

Although we should continue our efforts in the three key areas of definition, etiology, and treatment of PTSD, Tedeschi and Calhoun (1996) seminal paper on the concept of PTG introduced a new and exciting area of trauma research – the idea that not only is recovery possible, but some people might go beyond just recovery, and grow in important ways and prosper as a result of trauma. PTG marks an important piece of our understanding of the totality of the impact of trauma on mental health and everyday functioning. My hope is that one day in the future, research in PTG has advanced so much, clinicians will be able to skillfully teach their clients how to use their trauma as a springboard towards growth. I or someone else could then write a paper arguing that the prevalence rate of genuine PTG in trauma survivors has gone from rare to common. This would be a great achievement and gift from the field of psychology to humanity. If disseminated properly, therapies could not only help people recover and grow from trauma, but potentially also help reverse long-standing cycles of intergenerational abuse and maltreatment.

However, before any of this is possible, I argue the science of PTG needs to make significant changes in its focus. Specifically, we must first make progress in the foundational areas of measurement and etiology. Numerous researchers have argued that after 25 years of PTG research, we are still struggling with matching our measurements to our definitions, an issue that unfortunately is still not recognized or fully understood by all trauma researchers (Jayawickreme & Blackie, 2014). The all-too-common assumptions that current self-reports of PTG reflect genuine growth have stymied progress. If our measures of PTG are biased, so are the results from every study that has used these measures. Consequently, we know quite a bit about perceived PTG, but we know very little about genuine PTG. It is critical that researchers recognize that perceived PTG is a mix of genuine and illusory PTG.

Further, a number of therapies have already been designed to promote PTG (Li et al., 2020; Roepke et al., 2021). I argue such therapies are premature. How would we know if the therapy is increasing illusory PTG, genuine PTG, or both? Should we encourage illusory PTG? Maybe there are times when illusory PTG is adaptive, because positive illusions are sometimes useful for coping. Perhaps illusory PTG is adaptive during the initial coping stages as one tries to get their feet back under themselves again, but illusory PTG has to eventually be transformed or abandoned for genuine PTG to become a possibility. On the other hand, spreading the message that PTG is common following trauma may be harmful, as trauma survivors who feel devastation as opposed to growth following trauma may incorrectly and dangerously believe their psychological struggle is abnormal (Tiberius, 2021). As memory researcher Dan McAdams stated, "Might it be an affront to those who have suffered the greatest calamities and heartaches to expect, even to suggest, that things will work out nice and happy in the end?" (McAdams, 2008, p. 25). Perhaps there are other times when illusory PTG is maladaptive, stunting the recovery process. Are there some instances in which we should be attempting to decrease illusory PTG? Does the nature and utility of PTG vary greatly by culture? Until we have satisfactory answers to these questions, therapies designed to increase perceived PTG are likely to have limited value. Until we know more about the measurement and etiology of genuine PTG, therapies designed to increase genuine PTG will likely find limited success.

Creating a measure of illusory PTG that is free of genuine PTG would be a challenge, but less important than creating a measure of genuine PTG that is free of illusory PTG. A measure of genuine PTG would require an assessment that 1) ensures respondents go through the aforementioned four cognitive steps outlined by Coyne and Tennen (2010), 2) eliminates biases and errors in memory recall when going through the second cognitive step (judge how you were doing before the traumatic event), 3) eliminates misattributions of growth to the traumatic event, as opposed to normal growth over time, when going through the fourth cognitive step (judge how much of the change was caused by the traumatic event), and 4) eliminates emotional biases and motivations to create illusory PTG. Perhaps such a measure can be quantitative, perhaps qualitative, or perhaps only achieved by a combination of quantitative and qualitative assessment. Improving our assessments of PTG is only one challenge. A great starting place would be the detailed suggestions for improvement to overall methodology described by Jayawickreme et al. (2021). Creating measures that disambiguate illusory from genuine PTG and improving our methodologies is a difficult challenge, but it is also the crucial next step in advancing the science of PTG research.

In conclusion, I believe genuine PTG is a real psychological phenomenon and is worthy of basic and applied research efforts. I also believe illusory PTG is a real psychological phenomenon that is often times very helpful to traumatized individuals as they cope with difficult situations and distress. However, I also believe that illusory PTG is much more common than genuine PTG, and at the very least, genuine PTG does not occur at anywhere near the rates reported on self-report measures. Most published studies that use self-reports of PTG make little to no mention that such measures have serious validity issues. Hence, a

reading of the PTG literature would lead one to believe that genuine PTG is extremely common following trauma. Such beliefs are grossly inaccurate and misrepresent the more complicated nature of PTG.

It is critical that PTG researchers heed the messages to disambiguate genuine from illusory PTG that many researchers have been shouting from the rooftops (i.e. Jayawickreme & Blackie, 2014), but only a small percentage of researchers seem to hear or pay attention to. An understanding of this distinction precedes advancement in the area of assessment. Most studies involving PTG examine correlates of self-reports of PTG in an attempt to answer questions of etiology. I argue these studies only tell us about the possible etiology of perceived PTG. I am certainly not the first researcher to suggest that the prevalence rate of genuine PTG is lower than what we see from self-reports (Frazier et al., 2009; Jayawickreme et al., 2021; Maercker & Zoellner, 2004). However, I believe this is the first attempt to narrow the prevalence rate of genuine PTG into a specific range. Based on the reviewed evidence, I estimate a floor of 0% and a ceiling of 10%, which is drastically lower than any estimate I have seen suggested thus far. Since a valid assessment of genuine PTG has yet to be created, I argue we currently know little to nothing about the causes of genuine PTG. Only once we have made satisfactory progress in the areas of assessment and etiology can we begin the creation of informed interventions that foster genuine PTG. In other words, significant progress needs to be made in the areas of basic research before more advanced applied research can be skillfully attempted. I encourage researchers to invest their attention and efforts to following the outlined progression, as it is our most direct path to advancing the science of PTG.

Declaration of Competing Interest

None.

Data availability

No data was used for the research described in the article.

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