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Post-Traumatic Growth as Positive Personality Change: Challenges, Opportunities and Recommendations

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Abstract

Objective: Posttraumatic growth typically refers to enduring positive psychological change experienced as a result of adversity, trauma, or highly challenging life circumstances. Critics have challenged insights from much of the prior research on this topic, pinpointing its significant methodological limitations. In response to these critiques, we propose that posttraumatic growth

can be more accurately captured in terms of personality change—an approach that affords a more rigorous examination of the phenomenon.

Method: We outline a set of conceptual and methodological questions and considerations for future work on the topic of post-traumatic growth.

Results: We provide a series of recommendations for researchers from across the disciplines of clinical/counseling, developmental, health, personality, and social psychology and beyond, who are interested in improving the quality of research examining resilience and growth in the context of adversity.

Conclusion: We are hopeful that these recommendations will pave the way for a more accurate understanding of the ubiquity, durability and causal processes underlying post-traumatic growth.

Keywords

posttraumatic growth; methodological approaches to studying adversity; personality change; open science; adversity; character change

The mantra “what doesn’t kill you makes you stronger” resonates with many people and ties into a compelling cultural narrative proclaiming that adversity can be a source of strength and opportunity for *post-traumatic growth* (PTG). Nietzsche famously wrote about it and contemporary popular musicians such as Kelly Clarkson (Elofsson, Tamposi, Gamson, & Kurstin, 2011) and Taylor Swift (Swift, Antonoff, Fairbrass, & Manzoli, 2017) sang about it. Given both the degree and types of adversity individuals confront over the course of their lives, this narrative can be a source of hope and optimism (e.g., King, Scollon, Ramsey, & Williams, 2000).

Despite the strong appeal of this narrative, empirical research provides limited evidence that adversity reliably leads to improved psychological functioning (Jayawickreme & Blackie, 2014; Mangelsdorf, Eid, & Luhmann, 2019). This lack of evidence is due, in part, to a host of challenges making this type of research extraordinarily difficult. For example, most research on PTG (Tedeschi & Calhoun, 2004) has employed cross-sectional designs, which are economical and feasible, but potentially reflect post-hoc reconstruction of change rather than actual change. Several prospective studies have now found very small (or non-significant) correlations between perceived change and actual change (e.g., Boals, Bedford & Callahan, 2019; Frazier et al., 2009; Owenz & Fowers, 2018; Yanez et al., 2011). In cross-sectional studies utilizing quantitative retrospective assessments of self-perceived growth, it is impossible to know whether such perceived change reflects actual change; participants may misremember their prior state, be influenced by social desirability pressures resulting from the cultural narrative, or they may be motivated to perceive growth where it has not occurred (Tennen & Affleck, 2009; see also Davis et al., this issue).

Responses to these methodological challenges (Jayawickreme & Blackie, 2014) proposed that researchers should examine PTG in terms of personality change; that is, changes in any set of “relatively enduring patterns of thoughts, feelings, and behaviors that reflect the tendency to respond in certain ways under certain circumstances” (Roberts, 2009, p. 140). These responses were motivated by two considerations: 1) the need to rectify

methodological shortcomings in PTG research (Tennen & Affleck, 2009) and 2) a desire to take seriously the claim by PTG theorists that “meaningful transformations” can be obtained from trauma and other adverse events. In other words, given that theories of PTG frame the phenomenon in terms of personality change, we believe that it should be evaluated in those terms. That said, we acknowledge that researchers have successfully highlighted methodological limitations of current assessments of PTG (Frazier et al., 2009; Johnson & Boals, 2015) without explicitly reconceptualizing PTG as personality change.

While PTG does not necessarily have to be defined in terms of positive personality change to study it more rigorously, doing so opens a set of interesting questions that can be answered through a personality framework. For example, adopting a personality framework allows us to examine whether changes in people’s life narratives or changes in momentary manifestations of thoughts, feelings and behavior following the experience of adversity leads to changes in specific personality traits (Infurna & Jayawickreme, 2019). Additionally, whereas PTG research in the clinical and counseling psychology literature has focused on trauma, personality psychologists typically focus on a wider set of life events, and can evaluate both the characteristics of these life events (Luhmann, Fassbender, Alcock, & Hähner, 2020; Mangesldorf et al., 2019) and the situations those events place people in (Blackie & Jayawickreme, 2015) that are most likely to lead to personality change.

Examining PTG in terms of personality change can also help clarify theoretical claims. For example, some PTG theories claim that PTG reflects enduring changes in meaning and purpose (Joseph & Linley, 2005). Dynamic personalities theories (e.g., Jayawickreme, Zachry & Fleeson, 2019; McAdams, 1996) claim that meaningful and lasting changes in behaviors are likely driven by changes in specific goals (e.g., someone becoming more generative and care-oriented after the experience of taking care of a sick loved one). Given that people typically report PTG immediately following the experience of an adverse event (Jayawickreme & Blackie, 2014), these immediate changes can be better conceptualized as short-term coping that may or may not lead to long-term growth depending on changes in those goals.

An additional benefit of examining PTG in terms of personality change is that it affords the examination of what type of change is most likely to occur in the wake of adversity. To reference the dynamic personality example in the previous paragraph, PTG may consist of changes in goals (i.e. the “doing” side of personality) that subsequently lead to changes in characteristic thoughts, feelings and behaviors (the “having” side of personality; Cantor, 1990; Fleeson & Jayawickreme, 2021). However, some personality changes following adversity may be best characterized as changes in how an individual narrates their life (the “being” side of personality; Buhler, Weidmann, & Grob, 2020; McAdams, 1996). Understanding the “level” of personality at which PTG occurs, the benefits of such change, and the extent to which PTG occurs across multiple “levels” of personality can help illuminate how life events impact personality and broader developmental outcomes across the lifespan.

Related to this, we note that the methodological limitations of current retrospective assessments of PTG do not necessarily imply that perceptions of PTG are not worthy of

study in their own right (Fleeson, 2014). Of relevance to the current review, it is possible that individuals' perceptions of PTG may in some cases eventually facilitate personality change. For example, consistent with a dynamic view of personality, it is possible that people's perceptions of PTG may result in changes to how they subsequently narrate their life stories, and such changes in narrative identity may consequentially predict tangible health and well-being benefits (Adler, Lodi-Smith, Philippe, & Houle, 2016). In other words, adopting a personality framework can in fact clarify whether there are benefits to perceiving growth following adversity.

Goals of this Article

The present article grew out of discussions at the Pathways to Character capstone conference held at Wake Forest University on August 14th-16th 2019, which was focused on improving the quality of research on PTG. Here, we provide a summary of challenges that researchers face when conducting methodologically rigorous work examining PTG, discuss recent conceptual and methodological development in the personality literature that can help overcome those challenges, and provide recommendations for best practices for overcoming limitations in PTG research (Infurna & Jayawickreme, 2019; Jayawickreme & Blackie, 2016; Tennen & Affleck, 2009). We first discuss a set of *conceptual considerations*; specifically the question of which life events lead to growth; relevant literature both within and outside of personality psychology that should be considered in PTG theorizing, including what is known about possibilities for personality change given the relative stability of traits; the value of measuring PTG as changes to narrative identity; and the value of considering cultural variations in manifestations of PTG. We then highlight specific *methodological issues* with the possibilities and limitations of using large panel surveys and appropriate statistical methods for examining PTG. Finally, we conclude with some *best research practice recommendations* based on recent work by the Open Science framework.

Conceptual Considerations

Which life events lead to growth?

One fundamental question regarding the phenomenon of PTG is the critical role of life events in facilitating change. Adverse or traumatic life events are understood as a key mechanism driving what Tedeschi & Calhoun (2004) termed "positive psychological change" (p.1). Some research on PTG has focused on traumatic experiences, which are uniquely characterized by exposure to actual or threatened death, serious injury, or sexual violence through direct exposure, witnessing, learning that the event happened to a loved one, or experiencing extreme exposure to aversive details (American Psychiatric Association, 2013). These changes are potentially threatening because they precipitate the need for adjustment in identity or life routines and are sufficiently important in their potential impact that they cannot be interpreted or treated as relatively routine exigencies of daily life (Gray, Litz, Hsu, & Lombardo, 2004; Turner & Wheaton, 1995). However, PTG has also been studied in the context of other adverse life events, including unemployment, loss of one's spouse or child, marital separation/divorce, or health adversities like cancer and disability (Tedeschi & Calhoun, 2004).

Even though PTG theories highlight the importance of major crises stemming from the experience of significant adversity rather than more mundane daily stressors, it is possible that other characteristics of the event than the level of stress itself are important. In this regard, a newly developed approach involves measuring not only the occurrence of the event but also several event characteristics such as valence or predictability (Luhmann et al., in press).

Challenges in assessing life events.—Studying life events is associated with some unique challenges. First, many life events (e.g., clinical traumas) are relatively rare and therefore require access to a sufficiently large population to ensure that the sample is large enough to provide enough statistical power. Second, the timing of data collection is complicated by the fact that many life events are not predictable and are not restricted to one specific moment in time but rather involve a sequence of multiple minor events. For example, although the life event of divorce can be clearly timed (i.e., the day at which the divorce became legal), it is psychologically better described by a sequence of events that started well before the legal act itself and possibly extend beyond this date. Third, not everyone is equally prone to experience certain life events, such that individual differences may impact both the experience of events and the outcomes of those events (Hammen, 1991, 2006; see also Rakhshani & Furr, this issue). Individual differences in variables such as personality traits (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007) or life satisfaction (Luhmann, Lucas, Eid, & Diener, 2013) also affect the likelihood of certain life events. Life events may be associated with individual differences in the outcome variable of interest before the event (also known as pre-existing differences or selection effects). There are also individual differences in the rate of change in an outcome after the event. Finally, life events that are objectively similar are not necessarily experienced similarly by everyone (Dohrenwend, 2006), and neglecting these idiosyncratic experiences may hinder a complete understanding of the effects of life events.

Given the challenges associated with studying the impact of life events, it is understandable that there were a proliferation of cross-sectional studies using retrospective assessment tools (such as the Post-Traumatic Growth Inventory [PTGI]; Tedeschi & Calhoun, 1996) to assess self-perceived growth. The PTGI required assessing participants once after the adversity occurred. Empirical studies have used the PTGI to assess changes in response to events that occurred anywhere from 3 to 12 months or even longer before the assessment (Helgeson, Reynolds, & Tomich, 2006). However, this does not justify its continued use when concerns about the limitations of the PTGI have been soundly noted (see Jayawickreme & Blackie, 2014; Tennen & Affleck, 2009). One way to overcome this lack of pre-event data is to employ a prospective longitudinal design (Bleidorn, Schwaba, Denissen, & Hopwood, this issue). Many previous longitudinal studies have used life-events checklists (Holmes & Rahe, 1967; Turner & Wheaton, 1997) to measure whether and how often specific life events occur in a specific timeframe. Such multi-event studies were traditionally popular because checklists resolved the problem that many life events are rare.

However, this approach overlooks possible quantitative and qualitative differences between life events. Many studies simply count the number of checked life events to obtain an overall life stress score. To account for this problem, life events are sometimes weighted by their

assumed impact (Holmes & Rahe, 1967; de Moor, Hutteman, Korrelboom, & Laceulle, 2019) before computing the overall score. In these two approaches, however, it may not be possible to bypass the unique challenges and opportunities for growth associated with each event.

The checklist approach to measuring life events has other more general limitations as well. First, only those events that are on the checklist are measured; other events that may have had equal or even more severe impacts are neglected (although such events may be captured using a narrative approach; see below). A checklist developed for one specific population (e.g., older adults) is often inadequate for another (e.g., adolescents). Second, asking participants to retrospectively report which life events they have experienced can be problematic because participants may misremember or misreport their past events (Harkness & Monroe, 2016; Pachana, Brilleman, & Dobson, 2011; Raphael, Cloitre, & Dohrenwend, 1991). Despite these limitations, incorporating life event checklists into longitudinal studies permits the examination of pre- and post-event change for events that occur between waves, thus overcoming a major limitation of assessing PTG using cross-sectional retrospective measures.

Whereas multi-event studies measuring life events with checklists may be appropriate if researchers are careful to ensure that such checklists are appropriate for the target sample, single-event studies bypass this problem by focusing on specific events such as cancer diagnosis, unemployment, or spousal loss (e.g., Infurna & Luthar, 2017). Longitudinal panel surveys, such as the German Socioeconomic Panel Study and the Health and Retirement Study, have been used in this way to examine change following a specific adverse life event. Single-event studies allow a much more fine-grained analysis of how and why a specific event impacts psychological outcomes. For example, a cancer diagnosis comes with unique challenges and opportunities for growth that are not present for other life events and that can be discovered only in a study focused on this particular event.

In single-event studies, life events are measured using various approaches. Many studies rely on self-reports, that is, participants report retrospectively whether and when the life event of interest occurred. Like the checklist approach, these self-reports may be inaccurate in various ways. Other single-event studies infer life events from alternative data sources; for example, repeated data on marital status or work status can be used to infer status changes in these life domains. Both approaches provide only very general data on whether and when a life event occurred. Detailed information about the specific individual circumstances of the event can be gathered using semi-structured interviews (e.g., Brown & Harris, 1978; Paykel, 1997). However, this method is time-consuming and therefore rarely implemented. This is unfortunate, given that such interviews likely provide a more accurate assessment of the impact of specific life events.

The issues raised above are important for PTG researchers to consider. This is because a foundational rationale for examining specific life events (e.g., traumatic life events according to PTG theories) is that they can lead to disruptions in a person's thoughts, feelings and behaviors that can ultimately lead to growth. It remains unclear what types of major life events lead to growth, and which key event characteristics instigate growth

(Mangelsdorf et al., 2019), as well as whether the currently ubiquitous checklist approach to assessing life events is sufficient to understand the event's impact. We encourage researchers interested in PTG to broaden their focus beyond traumatic life events (e.g. Luhmann, Buecker, Kaiser, & Beermann, this issue), consider assessing multiple perceived characteristics of those events, and when possible use structured interviews or written narratives post-event to ascertain the impact of that event. Assessing multiple perceived characteristics (e.g., Luhmann et al., 2020) can be particularly useful for addressing some of the shortcomings of checklist-based studies. By having people rate the psychologically important dimensions of past events, those events can be equalized to some extent across people, at least in terms of those psychologically important dimensions. If researchers carefully select those dimensions, then presumably these dimensions would include the important features of traumatic events.

What does the literature on personality change tell us about growth following adversity?

When considering trait change, it is necessary to compare these changes to normative personality change among a comparison group of people who did not experience the event but are otherwise similar in age and other demographic characteristics, in order to increase confidence that changes did in fact result from the experience of a significant life event. This is especially important given that trait changes observed in those affected by adversity may be caused either by normative changes that would have occurred regardless of the adverse event or by the adverse event itself (Anusic & Yap, 2014). In the personality trait development literature, this type of change is referred to as mean-level change (e.g., Bleidorn & Hopwood, 2019). Multiple cross-sectional and longitudinal studies have found that on average, people's levels of agreeableness, conscientiousness and openness to experience decline from late childhood to early adolescence, then increase again from late adolescence to early adulthood. Levels of agreeableness, conscientiousness and emotional stability increase in middle adulthood, while levels of agreeableness, conscientiousness, extraversion and emotional stability decrease in old age (Bleidorn & Hopwood, 2019). Of relevance to the question of whether adversity can lead to shifts in traits, these changes may be driven in part by changes in social roles and environmental demands at different life stages, which may be precipitated by the experience of adversity (Jayawickreme et al., 2019).

Changes at the trait level.—Research on the relationship between adverse life events and the Big Five personality traits provides a mixed picture. Neuroticism (or negative emotionality/low emotional stability) has been found to increase following the experience of negative life events (e.g., Bleidorn, Hopwood, & Lucas, 2018; Damian, Serrano, & Hill, this issue, Löckenhoff, Terracciano, Patriciu, Eaton, & Costa, 2009; Milojev, Osborne, & Sibley, 2014; Rakhshani & Furr, this issue; Riese et al., 2014; Shiner, Allen, & Masten, 2017) especially if negative life events occur early in life (Ogle, Rubin, & Siegler, 2014). Although shifts toward greater neuroticism are typically considered maladaptive, some research has also indicated adaptive changes for other Big Five traits (see below), though the results (unlike those pertaining to neuroticism) have not been consistent across studies (Bleidorn et al., 2018; Costa, McCrae, & Löckenhoff, 2019).

The meta-trait framework, which distinguishes between stability traits (neuroticism, agreeableness and conscientiousness) and plasticity traits (openness to experience and extraversion), is worth mentioning in this context (DeYoung, 2006; Digman, 1997). In this framework, plasticity traits inherently represent the tendency for flexibility and exploration and the broader capacity to learn and change based on interactions with the environment (DeYoung, 2006; DeYoung, Peterson, & Higgins, 2002). Based on this model, one might expect greater growth in openness and extraversion following adversity, as highly stressful events may compel individuals toward greater consideration and exploration of information from the environment. Notably, plasticity traits may be involved in both positive and negative changes (e.g., Lüdtke, Roberts, Trautwein, & Nagy, 2011)—in other words, these traits may be most sensitive to positive or negative changes following the experience of life events.

Scholarship examining potential changes in plasticity traits have produced mixed findings. Past longitudinal studies have not documented changes in extraversion following adversity (Costa et al., 2019). The experience of stress/trauma in childhood is associated with higher levels of openness to experience in cross-sectional studies (Allen & Lauterbach, 2007; Williams, Rau, Cribbet, & Gunn, 2009), but other variables may determine whether adversity leads to specific types of changes in openness. For example, in a large sample from the German Socio-Economic Panel, negative events were associated with increases in openness for men, but not for women (Specht, Egloff, & Schmukle, 2011). In another brief (3 month) longitudinal study of college students, experiencing an adverse event rated as high in centrality (as opposed to low in centrality) was associated with small increases in openness to experience (Boals, Southard-Dobbs, & Blumenthal, 2015). In contrast, Löckenhoff et al. (2009) found that the experience of extreme adversity among participants in the East Baltimore Epidemiologic Catchment Area study predicted an increased endorsement of conservative values (i.e., an increased tendency to embrace authority and tradition). These findings are consistent with previous PTG research showing reduced tolerance following violence and terrorism (Hobfoll et al., 2007).

Studies examining changes in stability traits have also produced mixed results. For example, one study found that adverse experiences during adolescence predicted decreases in both agreeableness and conscientiousness from childhood to adulthood, but only if the adversity likely arose as a result of the person's own behaviors ("dependent adversity"; Shiner et al., 2017). Similarly, the experience of extreme adversity in an urban context predicted decreases in the compliance facet of agreeableness (Löckenhoff et al., 2009). In contrast, the experience of highly-central negative events predicted small increases in conscientiousness (in addition to openness; Boals et al., 2015).

Altogether, the contradictory nature of previous findings in this area suggests that more research is needed to determine the conditions under which any of these traits may change (and in which direction) following adverse events. Given the mixed findings observed for plasticity and stability traits, the value of this distinction for examining PTG may be limited. Examining changes at the level of the meta-trait may obscure the observation of meaningful changes that may occur at the facet level, such as specific facets of agreeableness (e.g. tender-mindedness or modesty). More broadly, it may be that changes following adversity

may be found in other personality characteristics beyond that of the Big Five. We next discuss this below by focusing on character strengths, wisdom, and narrative identity.

Changes in character strengths.—Prospective longitudinal research on the development of specific moral personality traits (or *character strengths*) is rare, with most studies relying on cross-sectional data (e.g., Peterson, Park, Pole, D’Andrea, & Seligman, 2008). One study conducted both before and after 9/11 by examining cohorts of individuals across 24 character strengths suggested those who were assessed after 9/11 reported higher levels of self-reported gratitude, hope, kindness, leadership, love, spirituality, and teamwork (Peterson & Seligman, 2003). The rare longitudinal studies examining character strengths in the context of adversity have found mixed results and mostly small effects. A conceptual replication of the 9/11 study by Peterson and Seligman (2003) examining changes in character strengths for individuals living in three communities affected by mass shootings (Virginia Tech, Aurora CO, and Sandy Hook Elementary School) showed only small and mixed evidence of changes in character strengths (Schueller, Jayawickreme, Blackie, Forgeard, & Roepke, 2015; see also Lamade, Jayawickreme, Blackie, & McGrath, 2020, for a critique of these studies). Assessing twenty-four character strengths and five health and well-being indices among two samples in a longitudinal design, Gander and colleagues (2020) did not find evidence that adverse health or well-being states predicted growth in character strengths. The most rigorous of studies on changes in character strengths following adversity was done by Frazier and colleagues (2009) who assessed their sample at two time points with an adversity occurring between the two time points. The examined outcomes mapped onto the PTGI and results showed that the amount of reliable increase following adversity across the outcomes ranged from 5% to 25% of the sample (Frazier et al, 2009).

Although the findings pertaining to mean-level change in personality traits or character strengths show little change, there are likely to be individual differences in the extent to which adversity impacts the outcomes of interest. In other words, adversity may lead to growth for some people and may even lead to decrements for others, pointing to the importance of research on moderators of change. Conversely, findings corroborate the idea that when things go well (instead of poorly), character strengths can flourish. For example, across several large samples, well-being was associated with increased gratitude, and this association remained stable at different periods in the life course (Chopik, Newton, Ryan, & Kashdan, 2017). Lifespan changes in character strengths (such as empathy or lack of self-criticism) may depend on other personal factors, such as cognitive functioning (Ze, Thoma, & Suchan, 2014) or gender (e.g., Kopala-Sibley, Mongrain, & Zuroff, 2013). Future research disentangling the moderators of change will be an important direction for better understanding the capacity for character growth across the lifespan.

One intriguing area of research is the growing literature on increased prosocial behavior following adversity, a type of growth known as “altruism born of suffering” (Frazier et al., 2013; Staub & Vollhardt, 2008; Vollhardt, 2009). This phenomenon extends to members of out-groups (Vollhardt & Staub, 2011), may be explained by greater empathy and compassion (Lim & DeSteno, 2016), and may also relate to higher engagement at work (Eskreis-Winkler, Shulman, & Duckworth, 2014).

Changes in wisdom.—One set of character strengths likely to exhibit growth following adverse experience is wisdom-related character aspects, which include intellectual humility, open-mindedness to diverse perspectives on an issue, understanding the multiple ways in which situations may unfold, and empathy (for a review see Grossmann, 2017). Several theories suggest that the virtue of wisdom is developed by coping with and overcoming adversity (Jayawickreme & Blackie, 2016; Staudinger & Glück, 2011; Weststrate & Glück, 2017). However, existing empirical evidence is only beginning to uncover the processes through which mastering adversity can lead to growth in wise character (see Dorfman, Oakes, Santos & Grossmann, this issue). One process that may promote growth in wisdom-related character concerns gaining a distanced perspective from the self when working through adversity (Grossmann & Kross, 2010; McIsaac & Eich, 2004; see also Kross & Ayduk, 2017 for a review). A self-distanced perspective on adversity can promote a bigger picture view of an event and enhance open-mindedness, the realization that life circumstances are constantly changing, and acknowledgment of other perspectives (Grossmann & Kross, 2014; Kross & Grossmann, 2012). In contrast, adopting the habitual immersed reflection on adverse events may lead to re-experiencing the negative emotions evoked by the event and ruminating about the event (Kross, Ayduk, & Mischel, 2005; Nolen-Hoeksema & Morrow, 1991), which may inhibit growth in wisdom-related character.

Changes in narrative identity.—The stories people tell about themselves can show the significance attached to certain life experiences and can also illuminate individual differences in the interpretations of such experiences in the context of one's life (e.g., Adler et al., this issue; McAdams & McLean, 2013). This notion of narrative construction and interpretation is central to the study of narrative identity and is understood to be critical to how one understands the self, as well as a potential mechanism for growth and development (e.g., McAdams & Olson, 2010; see also Adler, 2012). On this account, it is not the occurrence of the event that is the target of investigation, but rather the subjective interpretation revealed in a person's narration. For example, many people have experienced divorce, but the way it is interpreted and narrated is considered key to identity, well-being, and development. In support of this notion, research has found that narrating health challenges with greater themes of agency and redemption predicted improved trajectories of mental health over four years (Adler et al., 2015), finding meaning in high and low points was associated with better emotion regulation two years later (Cox & McAdams, 2014), and narrating a redemptive story was associated with sobriety over four months among newly-sober alcoholics (Dunlop & Tracy, 2013).

Furthermore, the process of narrating and revising stories about key life events over time may facilitate changes in the individual's self-concept (McLean et al., 2007). When revising life stories in light of new events and experiences, individuals interpret past events in relation to current and future conceptions of the self, and use the meaning from past experiences to narrate who they were, are and wish to be (Pasupathi et al., 2007). It is this narrative reconstruction process that may eventually facilitate positive personality change at the level of narrative identity. While research utilizing longitudinal repeated narration designs is nascent and still has some important theoretical questions to address (see Adler, 2019), it offers a novel and potentially fruitful avenue for research into PTG. Adler (2012),

for example, found increases in themes of agency in individuals' narratives of their experiences of psychotherapy, and these increases in agency predicted changes in mental health symptoms over the course of 12 sessions. Thus, demonstrating that personality change in the form of narrative identity can occur, and these changes may facilitate greater adjustment and well-being.

Examining new theoretical perspectives to identify mechanisms of change

Researchers interested in PTG should also consider literatures beyond clinical, social psychological, and personality research when developing theory and research questions. The research on positive personality change following adversity is often based on theoretical approaches that are closely tied to the clinical literature (e.g., research on rumination, meaning making). However, other areas of research can inform and be informed by what is known about the mechanisms of positive personality change.

Learning.—The literature on learning provides a useful lens for understanding the circumstances under which personality change following adversity can occur. Environmental influences on organisms can cause lasting changes to the sensitivity and excitability of neural circuits (Kandel, Dudai, & Mayford, 2014), affecting emotions, cognitions and behavior. Although research on learning and memory are often thought of as isolated and independent from one another, accumulated aversive or appetitive experiences in similar contexts can lead to fundamental changes in the way organisms engage with their environment. The idea that learning is core to how personality changes has been inherent in various clinical conceptualizations from Dollard and Miller to Rogers to Beck (among others) and is the basis of developmental change in normal personality traits for at least one modern theory of traits (Whole Trait Theory, Fleeson & Jayawickreme, 2015). Experimental and technical advances have shed new light on these processes.

For circumstances in which positive personality change occurs following an adverse event, the process of extinction—the formation of new memory traces indicating that contexts or stimuli that were previously unsafe are now safe (Dunsmoor, Niv, Daw, & Phelps, 2015)—is a particularly useful framework. When extinction indicates that contexts or stimuli that were previously unsafe are now safe, extinction permits greater exploration, social engagement, and well-being. Notably, multiple clinical studies have found that extinction-based psychotherapy appears to be associated with positive trait change (Roberts et al., 2017).

Evidence from animal models suggests that certain circumstances can make extinction particularly robust, leading to experiencing the world in a less threatening way, and engendering sustained change in affect and behavior. One pathway is the degree to which one has control over the presence of environmental stressors. In the extinction literature, this is referred to as “stressor controllability” (Maier & Seligman, 1976). In one paradigm (Baratta et al., 2007), rodents were threat conditioned in one context using electric shock. A day later, the rodents were exposed to a different context in which they were electrically shocked. However, one group could escape these shocks, whereas another group could not escape shocks. A third group was not shocked. After this second stage, the threat associated

with the initial context was extinguished. Interestingly, rats that on the second day experienced the escapable shocks (i.e., learned that there might be threat in the environment, but that the threat was controllable) demonstrated better and more sustained extinction relative to both the inescapable shock and no-shock groups. A similar study that used a comparable paradigm in humans found similar results (Hartley, Gorun, Reddan, Ramirez, & Phelps, 2014). These findings indicate that the perception of agency and control after aversive events, may be one pathway to firmly establish positive changes in behavior (see also Adler, 2012).

A second pathway to promote learning is increasing one's exposure to novel stimuli and contexts (Pearce & Hall, 1980). In studies of both humans (Dunsmoor, Ahs, Zielinski, & LaBar, 2014) and nonhumans (Myskiw, Benetti, & Izquierdo, 2013), exploration of novel environments facilitated neural plasticity and learning. In one study (Myskiw et al., 2013), following threat conditioning to a specific context (cage), rats were given "weak" extinction trials (i.e., that is, a relatively short period of no shocks in that context). Surprisingly, rats who explored a novel open field immediately before or after these "weak" extinction trials showed significantly more sustained learning that the previously conditioned context was now safe.

These specific empirical examples may seem divorced from the broad circumstances required for sustained personality change. Yet, in the same way that repeated experiences with uncontrollable aversive outcomes across a variety of contexts lead to increases in neuroticism and lowered well-being (Maier & Seligman, 2016), it is not difficult to imagine how accumulation of novel experiences or circumstances in which one perceives a level of efficacy and control could lead to fundamental positive changes in personality. As noted above, future research is needed to examine the key perceived characteristics of these experiences associated with positive changes (Luhmann et al., in press). Additionally, the results from the non-human studies discussed above suggest some intriguing questions regarding the role of consciousness in PTG. For example, is it always possible to be self-aware about one's growth? Given that PTG is hypothesized to occur in domains of eudaimonic well-being (which involves self-reflection on the substantive quality of one's life), under what condition is consciousness a prerequisite for PTG? Results pertaining to the impact of stressor controllability and the overall environment on adaptation to adversity point to how the context or the circumstances surrounding the adversity contribute to between-person differences in the extent to which PTG is possible. As mentioned above, PTG is not similarly experienced across persons and the key for future research is to determine reliable moderators of change.

Habit formation and stability.—The literature on the formation, persistence, and alteration of habits also offers relevant insights into the possibility of positive personality change after adversity. First, habits tend to be highly stable, particularly when an individual's context is stable (Wood & R nger, 2016). Stress also tends to increase reliance on previously formed habits (Schwabe & Wolf, 2013). These findings highlight the importance of studying the time-course of positive personality change, as it may be that individuals indeed experience meaningful personality change by struggling through a difficult event, but that this change is sometimes temporary rather than transformative as the

individual returns to previously established habits over the long run. If the new habits are not reinforced, they are especially likely to be temporary. Conversely, if adversity disrupts an individual's habits and forces the individual into new contexts, especially contexts that reinforce new ways of acting, the formation of positive new habits can be long-lasting.

Second, research on habit suggests that people may make inferences about their own intentions based on observing their own habits. For example, if one witnesses herself changing her behavior in a certain way, she may conclude it is because of change in her desires, goals, or priorities, even if habits are strongly influenced by context (Wood & Rünger, 2016). This possibility is relevant to ongoing debates within the field of PTG regarding the extent to which retrospective perceived post-trauma changes are associated with objective changes (Frazier et al., 2009; Tennen & Affleck, 2009). Prevailing theories of PTG imply that individuals first experiences changes in worldview, which then lead them to change their behavior (Tedeschi & Calhoun, 2004). It may be that, in some cases, an adverse event first changes an individual's context, available reinforcers, and contingencies between behaviors and outcomes, which subsequent leads to behavior change. Such environmental and behavioral changes may lead to later changes in perspective/worldview as individuals make sense of their new habits.

What is the role of culture and context in facilitating growth following adversity?

One intriguing avenue of investigation to come from adopting a narrative approach to PTG is the extent to which culture shapes the narration of people's stories about challenge, adversity and failure (Shweder, Much, Mahapatra & Park, 1997). Narration of difficult and traumatic past events does not only depend on individual differences. The narrative reconstructive and interpretative process occurs in a social context (e.g., McAdams, 2006; Nelson & Fivush, 2004). The search for meaning from these experiences is shaped by cultural scripts, known as master narratives, which are embedded within a culture and implicitly shape beliefs, values and behaviors through shared stories that outline how to live a good and meaningful life (e.g., McLean & Syed, 2015). The notion of '*what does not kill you makes you stronger*' invoked at the beginning of the paper has become influential in Western culture and therefore may actually represent a master narrative structure, outlining that the adaptive and socially acceptable way to recover from adversity involves learning and growing from one's suffering (McAdams, 2006).

People who tell their stories of adversity in line with this master narrative may therefore report higher levels of well-being than those who do not narrate their experiences through this cultural lens (e.g., McAdams, Reynolds, Lewis, Patten, & Bowman, 2001), and are also perceived by others to be healthier, more likeable, and to have more desirable traits (McLean, Delker, Dunloip, Salton, & Syed, 2020). These results align with the research on PTG and provide an explanation for why reports of positive changes after trauma are common (Joseph & Linley, 2008). However, this master narrative has the potential to be harmful for the people whose stories deviate from it. People whose stories are not aligned with the master narrative of redemption in their culture may diverge from socially acceptable strategies to recover from trauma, which could lead to poorer adjustment (Infurna, 2020; Delker, Salton, McLean, & Syed, 2020; McLean et al, 2020). Individuals may also provide

socially desirable responses to assessments of growth in order to align their experience with the master narrative (Salsman, Segerstrom, Brechting, Carlson, & Andrykowski 2009; Zoellner & Maercker, 2006), which may also have the consequence of upholding, and further instantiating, the master narrative to which people are responding (McLean & Syed, 2015). It is possible that master narratives do not only vary between cultures but also change over time, raising questions about applicability of prior insights and research findings obtained in other temporal cultural contexts to the here and now (Varnum & Grossmann, 2017).

More broadly, the current literature on PTG indicates that most theorizing (Splevins, Cohen, Bowley, & Joseph, 2010) and findings concern samples of people from Western, Educated, Industrialized, Rich, and Democratic societies (WEIRD; Henrich, Heine, & Norenzayan, 2010; for a more nuanced discussion of the complexities of WEIRD see Syed & Kathawalla, 2020). Therefore, it is not clear how generalizable posttraumatic processes and outcomes are for individuals from cultures that are not well-represented in the psychological literature. This includes people who do not come from a WEIRD society, and/or people from marginalized groups, specifically those who have been systematically excluded from mainstream, social, economic, cultural, or political life because of power inequalities (Causadias & Umaña-Taylor, 2018). Emerging literature on emotion regulation, for example, suggests that the generalizability of research on emotion regulatory processes beyond White, American college students may not be warranted. For example, whereas reflection on adverse experiences lead to and prolong depressive symptoms among American samples (King et al., 2000), this effect is less pronounced among Eastern European (Grossmann & Kross, 2010), Asian American (Chang, Tsai, & Sanna, 2010) and Japanese samples (Taku, Cann, Tedeschi & Calhoun, 2009).

One framework for expanding PTG research to non-WEIRD populations and populations who experience marginalization is to lean on extant cultural-psychological perspectives. These perspectives assume that psychological notions about adversity, growth, and growing in response to adversity should be defined within a given *bounded group-community* (Fuller & Garcia Coll, 2010). A bounded group-community exists within social context, time, and space. Many social contexts, including the U.S., rely upon social position variables – like race, ethnicity, gender, sexuality, ability, citizenship, and social class - to stratify individuals into existing social hierarchies (García Coll et al., 1996). Thus, these social position variables both help to define bounded group-communities, to influence the types of exposures those communities have (e.g., to adversity, to different traumas), and to shape their desired competencies (e.g., character strengths). Members of any given bounded group-community are constantly adapting to the particular opportunities and challenges they encounter across contexts and settings (White, Nair, & Bradley, 2018). In this way, the types of adversities encountered, the notions of competence, and the mechanisms of growth – all key features of PTG – may depend on the specific bounded group-community under investigation and extending PTG research to more diverse populations and setting will depend upon definitions of adversity, trauma, character, and growth in those bounded group-communities.

Methodological Issues

Can we observe growth using existing methods?

By definition, personality broadly represents the relatively stable patterns of people's thoughts, feelings, and behaviors, goals and values, and integrative life stories (McAdams & Pals, 2005). These patterns that show some degree of consistency over weeks, months, years, and even decades (Köber & Habermas, 2017; Roberts & DelVecchio, 2000; Roberts, Walton, & Viechtbauer, 2006; see also Rakhshani & Furr, this issue). This defining aspect of personality creates some tension for researchers (both basic and applied) who hope to understand whether and how personality can change. However, given that there are multiple levels of personality that are relevant for the study of PTG, it is important to consider various research designs for examining the extent to which growth is possible following adversity or trauma in specific personality characteristics.

In addition to this evidence regarding the strong average stability of traits over the lifespan and the lack of evidence that major life transitions are associated with corresponding changes in conceptually relevant traits (discussed above), there are additional reasons why expectations for finding trait growth after adversity may be challenging. First, it seems likely that this type of growth will necessarily result from an interaction between the event that occurred and the characteristics of the individual who experienced that event. In other words, this phenomenon may be dominated by interaction rather than main effects, and the ability to detect such effects may be limited, even in the largest available studies. For example, to detect such effects, researchers need a large sample of people who have experienced the event, enough waves of data to capture reliable changes in personality characteristics, appropriate timing of assessments, and adequate assessment of whatever moderating factor produces the interactive effect. In addition, the precise form of growth that occurs may differ across individuals who experience the same event: Some people may respond to adversity by investing in friends (extraversion and agreeableness), others may devote themselves to their work (conscientiousness), still others may focus on expanding their experiences (openness). Developing studies that can capture these potential interactive effects can be challenging to say the least (see Bleidorn et al., 2020 for a detailed discussion of these challenges).

Second, widely used measures of traits may not be appropriate for capturing change (Bleidorn et al., 2019). Most existing measures of traits were developed under the assumption that personality is stable over time, and the wording of such measures may pull for responses that emphasize stability. For instance, questionnaire measures that ask what a respondent is "typically like" may prompt those respondents to base their judgments on the aggregate of their life experiences, including periods before the event occurred. New measures that are appropriate for detecting veridical trait change may be required (e.g., experience sampling methods; Blackie et al., 2017, diary methods; Dorfman et al., this issue, or electronically activated recording; Bollich et al., 2016). Assessments of trait change in daily life may also help test predictions related to life events and trait change posited by integrative dynamic accounts of traits (e.g., Brienza et al., 2018; DeYoung, 2015; Fleeson & Jayawickreme, 2015; Jayawickreme et al., 2019; Wrzus & Roberts, 2017). These approaches

have in common a recognition of the dynamic nature of personality function and the reciprocal relationship between underlying trait mechanisms and daily behavior (Borghuis et al., 2020).

A related measurement issue is that growth following adversity may manifest in changes in specific facets of traits rather than in the broad domains. Because the large-scale studies that have adequate power to detect trait change following life events typically focus on many topics besides traits, these studies may often only include brief measures that tap the broadest personality trait domains. Focusing on specific facets could also enable a cardinal shift away from a “wholistic” exploration of PTG to the exploration of intra-individual change in specific traits and virtues, as well as examination of psychological mechanisms and circumstances affording adaptive (as compared to maladaptive) change in these characteristics.

Finally, as noted above in the discussion of habit formation, it is possible that the growth that follows adversity may be difficult to detect because the timing of growth itself may be idiosyncratic. In other words, some individuals who experience growth may do so very quickly following the event. For others, the growth may be delayed, occurring only after the individual has had time to process the event or to experience intervening events that shape his or her understanding of the event itself. If these trajectories vary, the links between events and growth at any point in time after the event may be difficult to detect. Again, this will be dependent on the design of the research design in how close or far apart the assessments are. Experience sampling methods and diary methods are positioned to examine short-term changes in the days, weeks, and months in relation to the adversity, whereas longitudinal panel surveys allow for the examination of long-term change because their assessments are yearly or biennially. Longitudinal designs that employ multiple bursts of experience sampling or diary methods may allow researchers to tease apart both shorter- and longer-term changes within and between individuals (although different forms of intensive sampling likely provide different types of information; Lucas, Wallsworth, Anusic, & Donnellan, 2020).

How can existing datasets improve our understanding of positive personality change following adversity?

Any strong study investigating personality change following adversity would have a few basic elements: longitudinal data, a number of assessments prior to and following the adversity, detailed information about the adversity, and a large enough sample to detect moderate or small changes (or at least stable individual differences) in personality (Luhmann et al., 2014). As one might expect, it is challenging to get all of these things right in just one study. Data collection can be incredibly difficult. Even if researchers did have access to populations experiencing adversity, getting those people to participate prior to the onset of the event and continuing their involvement long beyond the event is yet another difficulty. These issues, and those related to reducing participant burden and ensuring a large enough sample size, often prevent researchers from studying important questions.

One solution is to use secondary data sources and panel studies to capitalize on prospective assessments of personality. Large secondary data sets often have the added benefit of

tracking a large number of people who will eventually experience some sort of adversity (e.g., disability, unemployment; Infurna & Luthar, 2016, 2018; Lucas, 2007a, 2007b). In fact, some studies that eventually serve as secondary data are specifically designed to capture a specific adversity (e.g., spousal bereavement in the Changing Lives of Older Couples [CLOC] study; Carr, 2008). Such designs are particularly beneficial for researchers because some forms of adversity are (thankfully) quite rare. But even for events that are relatively rare, these large data sets are often large enough to guarantee that a sizable number of people experiencing an adverse life event have provided information on their personality before and after an event.

The availability of secondary data has been useful for characterizing how and why personality changes following adverse life events (Bleidorn et al., 2018). For example, optimism was found to be relatively unaffected by adverse events but increased in response to positive life events in data from the California Families Project (Schwaba et al., 2019). This study, among others (Mangelsdorf et al., 2019; Bleidorn et al., 2018), have shed light on whether personality changes are possible following adverse life events. Particularly impressive are studies that pool *multiple* secondary data sources to characterize personality change (Hakulinen & Jokela, 2019; Jokela, Hakulinen, Singh-Manoux, & Kivimaki, 2014). However, they are also the best evidence to date (in addition to the articles in this special issue) that positive personality change following adverse events can be quite difficult to find, suggesting that such changes are quite rare (see the review above).

Secondary data are also becoming increasingly more accessible and convenient for researchers to use, with minimal barriers preventing researchers from answering research questions. For example, studies of prospective personality change have been conducted using the British Household Panel Survey (BHPS); the Household, Income and Labour Dynamics in Australia (HILDA); the German Socio-Economic Panel Survey (G-SOEP); the Health and Retirement Study (HRS); the Study of Midlife in the United States (MIDUS); the Wisconsin Longitudinal Study; the Intergenerational Studies (IGS), the Longitudinal Internet Studies for the Social Sciences in the Netherlands (LISS), and many other high profile studies (e.g., Chopik, 2018; Denissen, Luhmann, Chung, & Bleidorn, 2019; Donnellan & Lucas, 2008; Helson, Jones, & Kwan, 2002; Hill, Weston, & Jackson, 2018; Lucas & Donnellan, 2011; Pusch, Mund, Hagermete, & Finn, 2019; Springer, Pudrovskaya, & Hauser, 2011; Turiano et al., 2012; Wortman, Lucas, & Donnellan, 2012). The impressive number of participants and long (and short) lags between assessment waves allow researchers to answer a seemingly infinite number of questions about development, change, context, and measurement.

Despite the ostensible benefits that secondary data sources provide, it is important to note that they are not a panacea for all the issues that plague primary data collection. These panel studies are often initiated for entirely separate reasons from those related to growth following adversity. For example, the very nature of secondary data sources necessarily entails that alterations to the instruments and data structure are often very difficult or impossible. Oftentimes secondary data sets have very superficial measures of adverse life events, usually measured in the form of a checklist on which people endorse life events that have occurred since the previous wave. Left unexplored are individual interpretations of life

events, the severity of life events, and how long they have disrupted a person's life (Luhmann et al., in press). A rare exception is the in-depth questions about spousal bereavement measured in the CLOC study. The inclusion of these items has already contributed to our understanding of adjustment to bereavement, such as the observation that people who unexpectedly become bereaved report worse adjustment (Carr, 2012; Pai & Carr, 2010). Likewise, researchers are often only provided with broad measures of more traditional taxonomies of traits (e.g., the Big Five personality traits). Missing are measures of constructs more closely implicated in adversity and growth (e.g., humility, open-mindedness). There is also the issue that available data structures force researchers to measure change at a particular time scale even if positive trait change might only be detectable at more finite intervals or different levels of abstraction entirely.

These limitations notwithstanding, the use of large samples and complex survey designs provide special opportunities for people studying processes of change. Despite the possibilities of these data, they largely go underutilized, whether it be from an acknowledgement of their limitations, an ignorance about their existence, or another reason entirely (Trzesniewski, Donnellan, & Lucas, 2011). For example, a meta-analysis of all wait list groups utilized in psychotherapy randomized-controlled trials could offer a fruitful window into the natural course of PTG¹ However, given that measuring personality changes following adversity is so difficult, secondary data sources will likely occupy a central place in the study of growth following adversity moving forward.

Statistical methods for assessing growth following adversity

Assessing growth after trauma typically requires longitudinal data (Baltes & Nesselroade, 1979). Multilevel models, including those that are estimated using a structural equation modeling framework, can isolate within-person changes from between-person differences and are often quite useful when analyzing these longitudinal data. Such models are typically used with data from longitudinal panel surveys (as well as daily survey designs) that have the advantage of assessing many individuals and selecting those who have experienced specific major life events. They also provide the flexibility to examine multi-phase changes, such as whether drastic changes are likely to occur before the adverse event, at the onset of the event, or after the event. An advantage of using multilevel modeling is the ability to observe potential between-person differences in degrees and rates of change in the outcome of interest and, importantly, predictors of these between-person differences.

For example, Infurna and colleagues (2017) examined changes in life satisfaction before and after spousal loss and included socio-demographic factors and health indices of the individual and spouse who passed away. Younger age at spousal loss was associated with a stronger decline in life satisfaction at the time of spousal loss, but stronger improvements in the years thereafter. Furthermore, social participation and better health status of the individual were associated with better adaptation in the years following spousal loss. Depending on the dataset and the types of factors available, other indicators that are of theoretical relevance can be modeled.

¹We thank Jon Adler for this insight.

Multilevel modeling can also be augmented through the inclusion of control groups identified through propensity-score matching. One could argue that most research designs are unable to fully determine that the adversity itself was the “causal” force in the change observed in the outcome. One way to circumvent this challenge is to include a control group or set of participants in the panel survey who did not experience the adversity of focus and who are matched to characteristics of the sample who did experience the adversity (Rohrer, 2018). Using propensity-score matching (Harder, Stuart & Anthony, 2010) the researcher can match participants who experienced the adversity to participants who did not using a pre-determined set of key factors, such as socio-demographics. For example, Anusic and colleagues (2014) examined changes in life satisfaction before and after the major life events of marriage, childbirth, unemployment, and widowhood. They observed that changes in the groups who experienced these events were distinct from those in the control groups, suggesting that the adversity was a causal force in predicting changes in life satisfaction.

A natural extension of multilevel modeling is growth mixture modeling. Growth mixture modeling allows researchers to extract distinct subgroups or trajectories from longitudinal data. Multilevel modeling provides a population-level trajectory of change from averaging across participants in the sample and assesses the extent to which there are between-person differences in change. Growth mixture modeling takes this one step further by trying to determine whether there are multiple distinct trajectories in the sample based on between-person differences in change. In the context of examining changes in an outcome before and after adversity, researchers can examine the extent to which participants exhibit and belong to various trajectories, such as resilient, recovery, or growth trajectories (Infurna & Jayawickreme, 2019; see also Chopik et al., this issue). As discussed by Infurna and Luthar (2018), there are important considerations that researchers need to take into consideration when using growth mixture modeling, such as model specification and methodological assumptions underlying each trajectory. Infurna and Luthar (2018) systematically determined that in resilience research using growth mixture modeling, resilience was not the common trajectory in response to adversity; instead, a recovery trajectory characterized by a decline at the time of the adversity, followed by gradual improvements to near-previous levels over time, was far more common.

How can this approach be applied to the study of personality change following adversity? Researchers will need large samples and multiple assessments that are temporally close together to identify whether a growth trajectory exists. Growth mixture modeling has been applied to wide number of datasets involving many adversities, ranging from cancer diagnosis, unemployment and spousal loss to natural disasters, 9/11, and military deployment. Only a few studies have been able to identify growth trajectories (e.g. Mancini, Littleton, & Grills, 2016). However, because these studies used the faulty methodological assumptions described briefly above, finding a growth trajectory may be a methodological artifact (for discussion, see Infurna & Luthar, 2018; Sher, Jackson, & Steinley, 2011). More generally, while there are a range of longitudinal models that one can employ to examine trajectories of change following adversity, a careful consideration of the assumptions behind each model is necessary for choosing one that is most appropriate for the data.

Best Research Practices Recommendations

Consistent with the notion of the bounded group-community, both exposure to trauma/adversity *and* growth take place in individual niches, which are characterized by unique combinations of cultural and environmental features (Super & Harkness, 1986). In addition to influencing individuals' exposures to various environmental demands and affordances (e.g., adversities, socialization, belief systems), these niches work to define competencies within a bounded group and community (Fuller & García Coll, 2010): The opportunities and constraints commonly encountered in groups' environments (historically and currently) work to influence the types of competencies that are valued by those groups and the strategies used to achieve them (White et al., 2018). Consequently, studies of growth following adversity in sensitive populations should actively theorize about the roles of race, ethnicity, and culture for identifying growth competencies, for identifying the range and types of adversities, and for identifying mechanisms that may support growth.

Relatedly, we echo the recent call for academic psychology to prioritize descriptive research. Such work can help develop grounded descriptions of PTG, especially in samples that are hard to access in generalizable, representative numbers (Cooper, 2015; Rozin, 2009). The work of Adler (this issue) is one compelling example of how such work can lead to rich and nuanced understandings of how individuals can be impacted by adversity. One important implication of considering the importance of context and differences in environments for PTG is that research findings for specific samples and communities may not be similarly "bounded" and therefore may not replicate across different contexts. This highlights the vital role that descriptive studies should play in future research, as they can establish the boundary conditions for the predictions we can make for specific contexts.

It is also important to consider how researchers can include individuals from these samples, so they become stakeholders in the research (e.g., Brydon-Miller, 1997; Chevalier & Buckles, 2019; Prilleltensky & Nelson, 2002). One avenue to explore is the communication of project progress through social media and/or newsletters with resources that can be shared with the participants. Another possibility is to provide feedback about the participants' own behavior over some prespecified window of time. It is worth noting that these activities may alter the data somewhat because providing feedback to and communicating with participants can be seen as an intervention, but these efforts may also facilitate recruitment and improve protocol adherence. At the conclusion of the research, researchers should consider ways in which key findings can be communicated back to people from the specific sample, for example, in a community event.

Many samples used in psychology are convenience samples, or other types of non-probability samples. Samples derived from non-probability sampling strategies, when compared to samples derived from well-executed probability-based sampling approaches, demonstrate unclear generalizability. Under circumstances of unclear sample generalizability, estimates describing the associations between variables (e.g., trauma and altruism) can be biased. Due to challenges outlined elsewhere (Jayawickreme & Blackie, 2014), the feasibility of probability-based sampling in research on growth following adversity remains low. Continued reliance on convenience samples in research on PTG, therefore, is highly likely. In light of such circumstances, it is critical to identify ways to

augment the advantages and minimize the disadvantages of non-probability convenience samples in research on PTG (Jager, Putnick, & Bornstein, 2017). To this end, homogenous convenience samples—samples drawn from sampling frames intentionally constrained to specific sociodemographic groups (e.g., a specific bounded group-community) or characteristics—“should, on average, provide more accurate population estimates, albeit of a more circumscribed population” than more conventional convenience samples derived from socio-demographically broader sampling frames (Jager et al., 2017; p. 23). Jager et al. effectively move the question away from a comparison between convenience samples versus probability samples (the latter of which have low feasibility in PTG research) and toward a hard look at which types of convenience samples are likely to produce more accurate estimates of the association between trauma/adversity and positive personality change.

As noted above, it is not clear how much of what has been found regarding post-traumatic processes and outcomes can generalize to non-WEIRD groups. Nevertheless, there is likely merit in conducting this research, even when sample sizes are small. When thinking about the extent to which small samples can be considered “problematic,” it may be useful to focus on the nature of the study and the unit of analysis that is needed to address the research question. For example, if the study aim is quantitative and concerns the relations between variables across people within one point in time, then larger sample sizes are needed (although this would depend on the size of the expected effect). Power analyses, especially those conducted via simulation studies (Bolger & Laurenceau, 2013; Lane, Hennes, & West, 2016) are helpful for identifying the number of observations or people needed.

When quantitative measures are the focus of the research and the unit of analysis is small, we recommend that researchers emphasize the descriptive nature of the research and be open and transparent about the strengths and limitations of such work. For example, by providing initial sketches of processes in specific samples, descriptive work can add much-needed breadth and diversity to this area of inquiry and point future research focused on the specific sample in a fruitful direction. However, the use of inferential statistics should be considered carefully, and discussion of power and measured interpretation of the results (e.g., constraints on generalizability; Simons, Shoda, & Lindsay, 2017) are necessary. Recently, researchers have been making use of Bayesian statistics for small samples such as the ones described here, referred to as limited data situations (van de Schoot, Sijbrandij, Depaoli, Winter, Olf, & Loey, 2018). This direction may be promising for researchers who wish to examine PTG longitudinally, although it is important to note that background information via previous literature or expert knowledge is necessary when conducting Bayesian statistics.

Qualitative methodology may be particularly suited for research conducted on specific samples, especially when the research question is being asked for the first time within the population. Qualitative methodology is useful for obtaining a richer understanding of the target constructs and individuals within a specific sample, typically through observations, interviews, and open-ended questions. In qualitative research, the focus is not so much on sample size, but on sampling adequacy, such that enough depth and breadth of information about the target construct and individual is obtained (O'Reilly & Parker, 2012).

Amid the credibility revolution (Vazire, 2018), a researcher interested in examining PTG as positive personality change in a specific sample may wonder how well preregistration can work for them. Although a researcher can preregister anything, there are difficulties having to do with deviating from what the researcher preregistered due to the possibility of unforeseen circumstances that can come with conducting longitudinal research in specific samples. For example, it could be that the target sample size was not obtained, making the planned analytic approach inappropriate. Alternatively, the measures the researcher planned to use may not make sense to the participants or turn out to not be valid or reliable in the specific sample (Knight, Roosa, & Umaña-Taylor, 2009). That said, preregistration is not impossible and may still be tremendously useful later. By documenting how the research deviated from what was preregistered, the researcher can share valuable information for other researchers to use in their own future studies. We also encourage researchers to think more broadly about how they can engage in other open science practices, such as providing open materials and data, and preregistering secondary data analyses (Weston, Ritchie, Rohrer, & Przybylski, 2019).

Research with specific groups contributes to an understanding of the potential for growth following adversity by advancing specificity relative to the range and types of adversity exposures, the domains of growth (e.g., spirituality, altruism, and solidarity), and the specific mechanisms that might facilitate growth following adversity. Here, researchers interested in PTG are invited to consider expanding the search for replication from exact replication to broader conceptual replications, as the specific adversity exposures, growth competencies, and mechanisms are likely to vary across populations and niches.

Conclusion

PTG is an intriguing topic that intuitively resonates with many people. Despite (or indeed perhaps because of) this appeal, many have been willing to accept past findings despite their methodological limitations. This means that many unanswered questions remain about the ubiquity, durability and causal processes underlying PTG (Jayawickreme & Blackie, 2014). We have reviewed a series of questions that we believe personality (and beyond, including clinical, developmental, and health) researchers interested in examining PTG should consider when both theorizing about change and designing appropriate research designs. However, we see these challenges as opportunities for new research on how life events impact different levels of personality, whether growth is possible and how durable these changes are. We also highlighted some recent innovations in the assessment of life events, personality and statistical methods that may help provide answers to these questions. We also encourage researchers to set an example to the field by using Open Science practices.

In conclusion, our view is that researchers interested in doing credible research examining PTG should consider the following recommendations:

1. Clarify the types of life event being examined in a study, examine different perceived characteristics of those events, and (where possible) consider using structured interviews or written narrative to verify the events' influence

2. Plan deliberately how to obtain a sufficient sample of individuals who have experienced an event or type of event, ideally prospectively
3. Examine the influence of adversity on a variety of traits, and develop theoretical rationales for the traits that may be sensitive to change following adversity based on past findings and exploratory research
4. Explore the relation between adversity and narrative identity, and the links between changes in narrative identity and manifested behaviors. We recommend that narrative identity change be measured prospectively using coded personal narratives unprompted by mention of a potentially traumatic event, as well as studies combining assessments of multiple personality characteristics across levels (Bühler et al., 2020).
5. Develop theories (and appropriate assessments) that are sensitive to cultural variations in how adversity, narrative identity, and emotion regulation are understood
6. Use measures that are sensitive to changes in persons and cultures
7. Take advantage of existing longitudinal studies, while being open about the limitations of using data from studies that have not been explicitly designed to examine PTG and utilize measures that may not be sufficiently sensitive to change
8. Use appropriate statistical methods (e.g., growth mixture modeling; propensity score matching) while being aware of the assumptions behind these methods
9. Adopt open science methods

This review is meant as a primer on past, current, and future topics pertaining to research on PTG in hopes of encouraging future high-quality and credible research. We look forward to personality and other psychological researchers further illuminating this phenomenon.

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