

Post-Traumatic Growth: A Paradigm for Psychological Change

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ABSTRACT

Traumatic or difficult life experiences happen to nearly everyone. Most individuals have heard of post-traumatic stress disorder, or PTSD. It is understood that traumatic events are problematic both in the immediate present and the emotional long run. Negative impacts of difficult or unfair situations have been researched to a considerable length. Less well-known and considered are the positive repercussions from an event that pushes us to or past our limits. This idea of finding or recognizing the positive effects of dealing with difficult challenges is called post-traumatic growth (PTG). This term highlights the idea that traumatic events can give a person new purpose and strength. Finding this strength and determination inside oneself can be beneficial in many aspects of life. This mindset is hard-earned and a valuable tool in life. Post-traumatic growth can be found in resilient people who experience challenges and persevere. It gives one the opportunity to find and realize what makes life worth living, and in process inspires people to live a life that they are proud of. This lowers regrets at the end of life and provides a feeling of fulfillment to those who experience this growth. This review will explore the concept of PTG, how this affects a person neurologically and throughout their lives, as well as how to obtain the benefits of PTG without experiencing traumatic situations (post-ecstatic growth). The review will also focus on what characteristics, mindsets, and paradigm a person may adopt to harness the power of PTG to change their lives.

Introduction

It is estimated that up to 90% of adults in the U.S. have experienced at least one traumatic event in their lifetime (Kilpatrick et al., 2013). Traumatic events severely “shake, challenge, or sometimes shatter” an individual’s perception of the world (Calhoun et al., 2014). These metaphorical “seismic events” can turn an individual’s life upside down. While much of the current trauma-related research focuses on the negative impacts of trauma, there is an emerging group of researchers devoting their studies to the positive impacts that individuals can experience after trauma. This concept has been coined “post-traumatic growth” (PTG) (Tedeschi & Calhoun, 1995). PTG is considered to be the positive psychological effects that may occur after an individual experiences a significant traumatic event.

The magnitude of a challenge matters when it comes to PTG. “PTG theory dictates that an event must be upsetting enough to challenge the individual’s goals, beliefs, and ability to manage distress, or produce changes in the individual’s view of the world or self, in order for growth to occur,” (Shakespeare-Finch et al, 2003). Factors of a traumatic event include but are not limited to a sense of fear, helplessness, and significant stress. Traumatic events are often something that individuals are fortunate to survive; however, certain individuals seem to thrive after trauma. The following paper will explore current research on the topic of PTG and outline the paradigm of developing overall psychological growth through traumatic or challenging experiences by examining the factors, prevalence, and effects of both PTG and PEG (post-ecstatic growth) in a variety of circumstances.

Post-traumatic growth is most simply defined as the positive aspects of traumatic experiences. Trauma comes in many shapes and sizes, and most individuals experience some level of trauma in their lives at least once. While there are many potential negative side effects of trauma, such as PTSD, depression, and dissociation, there is an emerging field of study on the surprising positive aspects of traumatic or difficult events (Dewey, 2021). Just as

negative impacts of trauma are not guaranteed to occur, neither are the positive impacts. Experiencing PTG takes time, effort, and action. There are certain areas where PTG is most commonly seen in individuals' lives:

- (1) a growth in the appreciation of living, the clarity and grace of living moment to moment; (2) a deeper sense of relationships and a greater involvement with intimacy and trust; (3) a striking embrace of spirituality, a willingness to connect with greater powers, whether manifested in institutional religions or pursued through more individual regimens; (4) a wider perception of life goals, a recognition of multiple paths to satisfaction, and a willingness to experiment with life planning; and (5) a greater faith in individual strength and personal resilience. (Dewey, 2021)

Traumatic events are often far-reaching matters and can ultimately bring a lot of pain and suffering to an individual's life. Anger, depression, substance abuse, and social abnormalities can all be results of trauma that are incredibly difficult to overcome (Center for Substance Abuse Treatment (US), 1970). The good news is that not all PTG must come from these traumatic types of experiences. Post-ecstatic growth is a concept examined further in a later portion of this paper and results from choosing to face a difficult challenge and then grow from it.

Arguably the most serious potential negative impact of traumatic events is Post-Traumatic Stress Disorder, or PTSD. PTSD refers to a wide variety of negative symptoms a person may experience from trauma. Although the exact cause of PTSD is unknown, there are many events that can trigger this disorder such as war, rape, natural disaster, car accidents, or any other event where an individual is made to feel fearful, helpless, or horrified (Riley, 2021). Certain risk factors can potentially influence a person's likelihood to develop this disorder such as previous trauma, a lack of social support, the use of alcohol or other substances, and a history of mental health issues in the family (Center for Substance Abuse Treatment (US), 1970). PTSD can manifest in several ways, the most common including intrusive flashbacks, avoidance, anxiety, feelings of detachment or numbness, and irritability. PTSD is known to lead to more serious problems such as substance abuse, medical conditions such as cardiovascular disease, and the development of depression (Boscarino, 2012).

While the negative impacts of traumatic events can be both serious and harmful, there are ways to develop positive change from trauma and experience personal growth. In an early 2022 article (Mackey, 2022) regarding mental health published by the most widely read magazine in America (Parade, 2022), *Parade*, Jane McGonigal's *Superbetter* is a highly recommended tactic for overcoming trauma and experiencing growth. Her personal experience of suffering a concussion that did not heal properly inspired her to create a way to build personal resistance. In her New York Times Bestselling book *Superbetter* (McGonigal, 2015), she provides a way for everyday life to become full of opportunities for growth and optimism. A key element McGonigal writes about is the top five things that people with PTG claim to experience:

1. My priorities have changed. I'm not afraid to do what makes me happy.
2. I feel closer to my friends and family.
3. I understand myself better. I know who I really am now.
4. I have a new sense of meaning and purpose in my life.
5. I'm better able to focus on my goals and dreams (p.5).

McGonigal quotes an article published by Bronnie Ware (2009), an Australian hospice worker who compiled the most commonly held regrets that patients expressed at the end of their lives. She narrowed down the top five regrets as being:

1. I wish I hadn't worked so hard.
2. I wish I had stayed in touch with my friends.
3. I wish I had let myself be happier.
4. I wish I'd had the courage to express my true self.
5. I wish I'd lived a life true to my dreams, instead of what others expected of me (McGonigal, 2015, p.6).

The striking opposites between these two lists are noteworthy. PTG appears to promote the creation of desires, understanding, and goals that directly combat the most common regrets at the end of life. This powerful idea has begun to be studied and experienced on larger scales.

Relevant PTG Research

In some of the early concepts of PTG, three categories were distinguished in which it could be measured: perceived changes in self, changes in interpersonal relationships, and a changed philosophy of life (Tedeschi & Calhoun, 1996). Changes in self-perception reflect an enhanced view of self-reliance which in turn improves an individual's self-evaluation of competency. If these individuals experience future traumas, they have a source of confidence they can draw on from their pasts. Living with that kind of confidence is almost like having a superpower. Interpersonal relationships saw improvement in both depth and quality, with the realization of their importance and how rapidly they can potentially dissipate. Certain traumatic events lead an individual to being more emotionally expressive in order to talk through events or ask for help. This can lead to the utilization of new or more resources. The struggle to understand trauma can lead individuals to a new philosophy of life that may alter basic assumptions previously held. These views can change through finding meaning or even peace amid these traumatic events, allowing a new mindset to develop.

The prevalence of PTG is one of the main areas of focus that recent research has examined. A systematic review and meta-analysis conducted in 2019 examined twenty-six articles focused on specific types of traumas and the PTG that individuals displayed (Kaminga et al, 2019). Of those individuals who experienced traumatic events, the level of PTG found ranged from 10% to 77.3%. When the random effect model was used with the data, the prevalence level rose to 52.58% of all cases examined in the review. The review concludes that nearly half of those who experience traumatic events showed moderate to high levels of PTG. Prevalence in professions where trauma is a regular obstacle individuals face, such as emergency ambulance personnel, see a different range of PTG levels. These professionals may not have experienced trauma on the same level as their patients, but these events are still well within the definition of trauma. An impressive 98.6% of participants in one study reported experiencing at least one positive change after experiencing these traumas (Shakespeare-Finch et al, 2003). The area where these reports were highest was in the participants' perception of their own personal strength and in their renewed appreciation for life as well as their relationships.

In the case of Jane McGonigal, author of *Superbetter*, PTG developed in the aftermath of a brain injury, specifically a concussion that did not heal properly (Concussion, 2022). Studies have examined the relationship between PTG and various types of head injuries and found general support for patients who developed PTG going on to experience positive changes psychologically, physically, and socially. In a systematic review examining eight studies on participants with ABI (acquired brain injury), data revealed that many participants reported PTG across several areas of life (Grace et al, 2015). The review concluded that incorporating support for PTG to those with ABI in recovery may be a significant factor in these individuals attaining a new social identity, social network, and developing other kinds of PTG. Clinicians can integrate the relatively new concept of PTG into patients' recovery by offering adaptive cognitive processing strategies. These strategies focus on deliberate rumination, which will be addressed further in a later section of this paper, and the use of positive cognitive re-appraisal. Researchers claim that "Gaining a new perspective of a changed reality may facilitate the use of adaptive coping strategies and the instigation of PTG following ABI" (Rogan et al., 2013, as cited in Grace et al, 2015, p. 12).

Theories of positive change resulting from trauma or difficult experiences are not necessarily new ideas. Ancient Hebrews, Greeks, and early Christians wrote about this concept but the idea was not adopted by social science and medical research until the twentieth century (Tedeschi & Calhoun, 1995). Attempts to define PTG and what it may mean for those experiencing trauma and involved with trauma work did not begin until 1995 when researchers Richard Tedeschi and Lawrence Calhoun began studying the concept (Collier, 2016).

Tedeschi and Calhoun made several contributions to the foundational concept of PTG. One of the most significant being the creation of The Posttraumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996). This tool

allows researchers to measure the perceived benefits of PTG in a way that allows resulting data to be analyzed. The method includes 21 items that participants are asked to indicate placement of on a 6-point scale. These 6 responses ranged from "I did not experience this change as a result of my crisis" (scored 0) to "I experienced this change to a very great degree as a result of my crisis" (scored 6)" (p. 459). Using 21 items, or questions, the inventory allows researchers to divide responses into 5 different categories: Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and Appreciation of Life. Using these categories, Tedeschi and Calhoun measured them against the NEO Personality Inventory (Costa & McCrae, 1985). The NEO Personality Inventory consists of six scales being Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Also included in their measurements were the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960), a scale for Optimism, and for Religious Participation. Results show that the PTGI is a reliable tool with good internal consistency and test-retest reliability (Tedeschi & Calhoun, 1996). The PTGI's development provided a way for researchers to compare responses and further understand PTG in a variety of situations.

PTG can present itself in many ways. These positive impacts can be seen as "the perception of change towards better relations with others, new possibilities in life, enhanced personal growth, and an increased appreciation of life..." (Bartoskova, 2015). Part of this change requires modifying the way an individual's brain presently views things by redrawing their "mental maps" to include new perspectives and mindsets.

In a recent study examining the relation between PTG and social support in arthritis patients, data suggests that providing certain types of support can contribute to patients' experience of PTG (Sørensen et al, 2021). A total of 207 patients participated in the study, and PTG results were measured with the PTGI while social support results were measured by the Berlin Social Support Scales (BSSS). A hypothesis for the study was that data would result in a positive relationship between the level of PTG shown by participants based on the level of social support provided and received. Results supported the hypothesis, demonstrating the relationship between social support and the levels of PTG participants exhibited. This study reinforces that PTG can be attained more easily through certain types of aid such as social support. An interesting note in this study points to the difference in received support and provided support. Received support, referring to assistance that a patient may receive can potentially result in feelings of guilt or distress, which may not promote PTG as well as other types of support (Bolger et al. 1996; Scholz et al. 2012). Provided support refers to sources of support that are offered but not necessarily taken by patients. Provided support can increase feelings of independence and can even serve as a healthy distraction (Batson & Powell 2003).

Resilience is often associated with PTG, and rightly so. In a groundbreaking article from George Bonanno, a professor of clinical psychology at Columbia University, resilience is distinguished from recovery (Bonanno, 2004). Recovery suggests that normal functioning resumes at its pre-event levels at some point after a traumatic event, while resilience connotes the ability to "maintain a stable equilibrium" (p.20). Individuals who portray resilience tend to

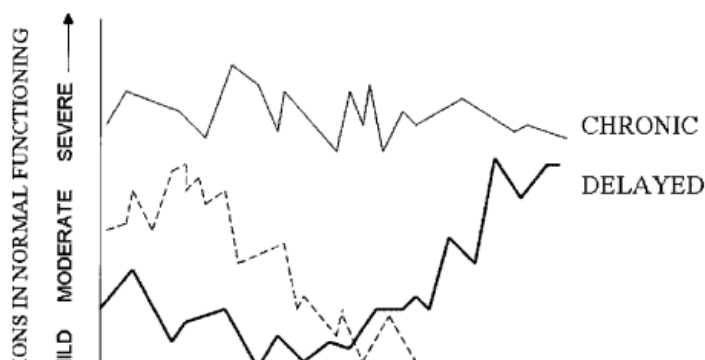


Figure 1. "Prototypical Patterns of Disruption in Normal Functioning Across Time Following Interpersonal Loss or Potentially Traumatic Events." (Bonanno, 2004)

maintain relatively stable levels of psychological and physical functioning as shown in Figure 1. Bonanno makes three crucial points in his article, the first being the distinction between resiliency and recovery. Bonanno's second point is that resilience is exhibited by more individuals exposed to trauma than is widely considered. His third and final point is that there are several ways in which to find resilience. These pathways include hardiness, self-enhancement, repressive coping, positive emotion, and laughter. Through these routes, individuals show resilience in many ways and Bonanno encourages future research to

examine these adaptations as individuals face impairing events. Although resilience and PTG are different concepts, they are deeply interconnected and generally both surface at some point during trauma recovery.

Another study focused on the cues for PTG in recovery from a traumatic event showed supportive results. With 176 college students participating in the study, results supported the initial hypothesis that those reporting less reliance on experiential avoidance showed higher levels of PTG (Kashdan & Kane, 2011). Generally, individuals who experience trauma and show PTG exhibit some type of “psychological flexibility” (p.85). When an individual does not portray this feature, and they lack the desire to be in contact with their emotions, memories, etc. they exhibit what is referred to as experiential avoidance. The study concludes that participants showing more experiential avoidance scored lower on the PTGI while the reverse was true as well. As the researchers’ hypothesis stated, those who reported greater PTG and meaning in life relied far less on experiential avoidance. The study also noted that higher levels of distress coupled with a low reliance on experiential avoidance created the highest reporting of PTG. Results of this study imply that reliance on experiential avoidance can lower the probability of experiencing PTG after trauma.

A fascinating literature review conceptualizes the effect of PTG as a personality change. Researchers Eranda Jayawickreme and Laura Blackie (2020) claim that PTG should be understood as and assessed in terms of personality change. This view implies that PTG is a personal change of great depth and meaning. True personality change is hard to come by, and part of what makes it so difficult to attain is the quality of permanence (Karen Nikos-Rose, 2020). In order to examine intra-individual personality development, the literature review focuses on encouraging the exciting investigation of PTG as a personality change (Jayawickreme & Blackie, 2020). This is a new area of research that shows promising results for future studies.

With PTG having an inverted relation to PTSD, a study examining the levels of PTG among a group of PTSD participants shows valuable insight. Although not infallible, the results of the study have shown that PTG levels in those diagnosed with PTSD are higher than those who don’t develop true PTSD, with both groups being trauma survivors (Schubert et al, 2016). In this perceptive literature review over 140 studies were chosen with 14 studies being examined after meeting certain inclusion criteria. The review also indicated strategies like rumination could aid in the development of PTG. These studies show promising evidence that individuals who experience trauma and develop negative impacts such as PTSD have a higher likelihood of developing PTG and its positive adaptations. Future studies call for a deeper analysis of other factors such as personality traits, social support, and other biological aspects and their effect on the relationship between PTSD and PTG.

Developing PTG

Measuring PTG

Although not everyone who experiences trauma develops PTG, it is possible for anyone experiencing trauma to develop PTG in some way or another (THC, 2021). A variety of factors may influence the development of PTG, among them being one’s support system, coping style, and personality traits. Certain predispositions have been found to increase the likelihood of an individual experiencing this growth after trauma. Individuals who are more open to new experiences are more likely to develop PTG, partially because they are more likely to reevaluate their personal belief systems (Collier, 2016). Extroverts are also more likely to display PTG due to their active responses and tendency to seek out help and connection. These personality traits were originally measured by Richard Tedeschi and Lawrence Calhoun when they created *The Posttraumatic Growth Inventory* (Tedeschi & Calhoun, 1996). This inventory was an essential tool in the development of the concept of PTG and has been used in several studies since. Additionally, in their original study women reported slightly higher benefits ($M = 75.18$, $SD = 21.24$) than men ($M = 67.77$, $SD = 22.07$), scoring higher than men in every category except New Possibilities. This data proposes the idea that women and men respond to trauma in different ways. Age also plays a factor in the development of PTG, with studies indicating that children under the age of eight are less likely to be cognitively capable of PTG experience (Collier, 2016).

On the other hand, individuals in late adolescence or early adulthood seem to be more open to change, perhaps because their world views are still in development.

Gratitude & Rumination

Developing PTG can be done in a number of ways. In a systematic review focused on PTG shown in first responders, several promoting factors were noted including gratitude, rumination, sharing negative emotions or experiences, using healthy coping styles, and the utilization of growth actions (Henson et al, 2021). Together, these methods have been found to promote PTG after trauma.

To examine the method and value of gratitude, it is helpful to consider the definition first. Gratitude, according to the Oxford English Dictionary (n.d.) is “the quality or condition of being grateful; a warm sense of appreciation of kindness received, involving a feeling of goodwill towards the benefactor and a desire to do something in return; gratefulness.” Gratitude is an attribution-dependent characteristic (Kim & Bae, 2019; Weiner, 1985) and is known to promote PTG and indicate its potential. Researchers Eunseung Kim and Sungman Bae (2019) also note that gratitude actually moderates the effect of deliberate rumination on PTG. Deliberate rumination can be a helpful tool in developing PTG and is generally associated with higher levels of PTG after trauma (Henson et al, 2021). In fact, deliberate rumination soon after the occurrence of a traumatic event indicated the highest levels of PTG (Taku et al., 2009), and the presence of continuous cognitive processing through deliberate rumination signaled higher levels of growth over time.

Sharing Negative Emotions

Disclosing negative emotions or experiences in a safe and supportive setting can aid in the development of PTG (Henson et al, 2021). This not only promotes PTG but reduces the risk of depression (Henson et al, 2021; Nolen-Hoeksema & Larson, 1999; Saltzman et al., 2018). Sharing with a person or a group who have had similar experiences may also help an individual feel more “normal” about their feelings and experiences (Richardson, 2016).

Positive/Healthy Coping Styles

The coping style an individual chooses to apply after trauma influences the level of PTG they may develop as well (Henson et al, 2021). Strategies such as religious coping and positive reappraisal coping correlated with higher levels of PTG. The coping style of positive reappraisal involves the attempt to take negative events and construe them in a positive light. This “positive reframing” can bring about positive changes to the mindset of the individual. Another way to cope with trauma in a way that brings about PTG is to appraise the traumatic event as a challenge. Referring back to Jane McGonigal’s *Superbetter* (McGonigal, 2015), turning her own experience into a thoughtful “game” allowed her to overcome her traumatic concussion that did not heal properly. McGonigal created the *Superbetter* game for others who were working their way through trauma and has seen massive success with her audience. Allowing oneself to find some joys through making “allies”, experiencing “powerups”, or completing “quests” can give hope, confidence, and determination to those who play. Another key part of developing PTG is that of acceptance coping (Henson et al, 2021). On some level, to some extent, an individual trying to develop PTG must acknowledge the reality of the situation and address it within themselves. This coping style has a “small but significant” effect on collected levels of PTG (Prati & Pietrantonio, 2009).

Growth Actions

The above coping styles are great tools to cognitively deal with trauma. When actions accompany these tools, they are referred to as “growth actions” (Henson et al, 2021). Hobfoll et al. (2007) claim that in order for actual growth to occur, both growth cognitions and growth actions must take place. In fact, the authors state, “Only when individuals were deeply involved in translating growth cognitions to growth actions in our research ... did we find positive benefit in posttraumatic growth.” The formula for PTG seems to be a two-part system requiring development in both cognition and action.

Resiliency & Thriving

Understanding the difference between resiliency and thriving or growth is beneficial for recognizing the value of PTG. One definition of resilience is, “an ability to recover from or adjust easily to misfortune or change,” (Merriam-Webster). Resilience is a step above surviving, but neither concept is equal to the benefits of *thriving*. Thriving has been found to mediate the relationship between the stressors (or trauma) in life, and satisfaction (Flinchbaugh et al., 2015). In the wise words of Maya Angelou, “My mission in life is not merely to survive, but to thrive; and to do so with some passion, some compassion, some humor, and some style. Surviving is important. Thriving is elegant.” Thriving in life may look different for individuals but involves not only coping with life’s stressors but pursuing some kind of opportunities for growth and development (Feeney & Collins 2015). Thriving involves both personal and relation growth. Feeney and Collins (2015) conceptualize five components of thriving:

- (a) hedonic well-being (happiness and life satisfaction—the perceived quality of one’s life), (b) eudaimonic well-being (having purpose and meaning in life, having and pursuing passions and meaningful goals, personal growth, self-discovery, autonomy/self-determination, mastery/efficacy, development of skills/talents, accumulation of life wisdom, movement toward one’s full potential), (c) psychological well-being (positive self-regard, self-acceptance, resilience/ hardiness, a positive belief system, the absence of mental health symptoms or disorders), (d) social well-being (deep and meaningful human connections, positive interpersonal expectations, a prosocial orientation toward others, faith in others/humanity), and (e) physical well-being (physical fitness, the absence of illness or disease, health status above expected baselines, longevity).

Thriving cannot be defined in absolute terms because an individual’s specific circumstances must be taken into consideration as well (Feeney & Collins 2015). Individuals do not have to thrive in all areas of life, and there is no scale to measure how much one might be thriving. Thriving is multi-dimensional and must be understood and determined in relative terms.

Prevalence

The surfacing of PTG in trauma survivors is estimated to be between one-half and two-thirds (Collier, 2016; Tedeschi & Calhoun, 1996). PTG has also been reported at higher rates among individuals below the age of 60 (Kaminga et al, 2019). An important question to consider is how one might know or recognize that they are experiencing or showing signs of PTG. Researchers have identified certain indicators that may answer that question. Through the use of carefully selected surveys and tools, such as the PTGI, reports of a greater appreciation of life and improved relationships with others have been collected from individuals who have experienced PTG (Lebow, 2021; Tedeschi & Calhoun, 1996). Appreciating day-to-day activities in life and valuing the closeness of relationships are valuable parts of a happy life. Other ways PTG can be recognized is through the exploration of new possibilities, perhaps avenues that were not considered as options pre-trauma and growth. This can include possibilities such as new-found interests, hobbies, or a willingness to try new things or change an aspect of an individual’s lifestyle. With the development of

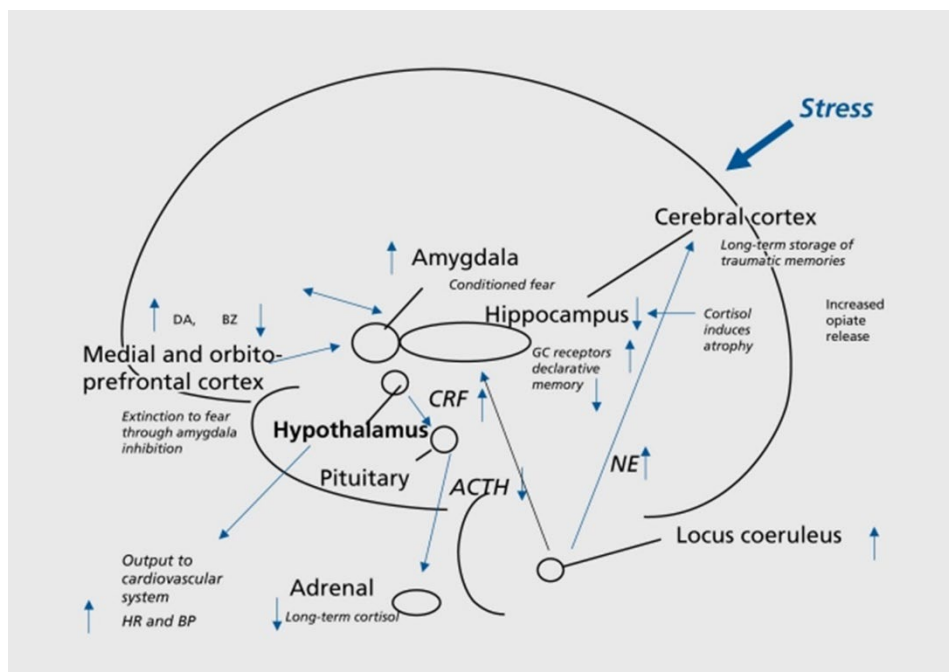
PTG comes the knowledge of personal strength gained from overcoming a difficult experience, sometimes referred to as self-resilience.

The benefits of PTG appear quite promising and give hope to those who experience trauma. Will these benefits last? Some studies show results that indicate not only long-lasting PTG benefits, but an increase in those benefits over time (Ochoa et al., 2016; Látos et al., 2021). Participants were followed-up with after twelve months and showed both a steady presence of PTG and a slight increase over time in mental functioning and general well-being. This draws encouraging results that PTG may not only last long-term but is likely to actually increase over time as well.

Neurological Impacts of PTG

Impacts of Trauma

Trauma can affect the mind and body in many ways. A study in 2006 indicated that three main areas of the brain were observed to experience changes due to stress from traumatic events (Bremner, 2006). These areas are the amygdala, hippocampus, and prefrontal cortex. These brain structures are a part of the brain's "circuits" that are involved with the stress response. Two neurochemicals that play an important part in this response in the brain are cortisol and norepinephrine, as shown in Figure 2. These chemicals produced by the adrenal glands allow the body to react to stressors. As traumatic stress impacts the brain, these neurochemical stress response systems are affected. When the amygdala becomes over-activated, the difference between a current or past threat can be hard to identify. This may lead to chronic stress, insomnia, an increase in irritation, or an inability to calm down once upset. Since the amygdala is partly responsible for emotions, memories, and our survival instincts, damage to this structure can have large impacts on an individual's day-to-day life. When the amygdala is over-activated, it is as if the brain is going through the traumatic event again in the present. The influence of trauma-related stress on the prefrontal cortex distorts the ability



to control fear, and thus traps an individual in a reactive state. Regulating the fear-based reaction of the amygdala may become more difficult for the prefrontal cortex after trauma. The hippocampus, when affected by traumatic stress, can shrink or decrease in volume. Since the hippocampus is associated with storing and retrieving memories, this can result in an individual struggling to keep traumatic memories in the background or create and store new memories from the present.

Figure 2. “Lasting effects of trauma on the brain, showing long-term dysregulation of norepinephrine and cortisol systems, and vulnerable areas of hippocampus, amygdala, and medial prefrontal cortex that are affected by trauma” (Bremner, 2006).

Impacts of PTG

One of the first studies hypothesizing the relationship between resilience and the neural impacts of PTG tested the volume of gray matter in participants' prefrontal cortexes (PFC) (Nakagawa et al., 2016). This crucial study resulted in data that shows some of the neurological effects of PTG. Twenty-six participants underwent MRI scanning after showing signs of PTG following the natural disaster of the East Japan Great Earthquake, an earthquake with a 9.0+ magnitude on the Richter scale. The data indicated a positive association between higher scores on the PTGI and the volume of gray matter in the PFC. More specifically, the gray matter increases were found in the right dorsolateral PFC (DLPFC). Interestingly enough, the DLPFC is thought to be responsible for the ability to relate to others and manage both empathy and emotional intelligence. Participants who scored lower on the PTGI showed reduced volume in the same area. These results imply the response to stress and trauma can be either adaptive or maladaptive but effect the same area of the brain. A more recent study analyzed the previously mentioned study as well as several other studies on the neurological impacts of PTG and found greater cortical thickness within the DLPFC, and that this level of thickness was linked to better executive functioning on performance tests (Ord et al., 2020; Lyoo et al., 2011). These promising results show a few of the many impacts of PTG.

PTG in Adolescent Development

So far, the studies mentioned have applied to adults, both with traumatic stress and PTG. In a systematic review analyzing 25 studies on levels and factors of PTG in children and adolescents, data show a few differing patterns (Meyerson et al., 2011). First, results suggested that PTG may “decay” over time faster in children and adolescents than it might in adults, indicating that opportunity for growth may be optimal during late adolescence. Gender differences played less of a role than in studies on adults with differences in reported PTG between genders not occurring until early adulthood. Other data indicates that PTG in children and adolescents can be accessed reliably through the PTGI (Vloet et al., 2017) although a revised version called the “Post-Traumatic Growth-Inventory for Children” was created in 2009 (Kilmer et al., 2009). This revised inventory consists of ten items to assess PTG and has been seen to be a reliable assessment tool of PTG in children and adolescents.

Some research has indicated that there may be certain “trajectories” that children and adolescents may develop (Zhou et al., 2019). Four main trajectories have been found: high, increasing, decreasing, and low-stable. In Figure 3, the four trajectories can be seen over the course of two and a half years after a traumatic event. These trajectories are influenced by several factors including sex, age, trauma exposure, and PTSD. This study demonstrates that the development of PTG can be heterogeneous.

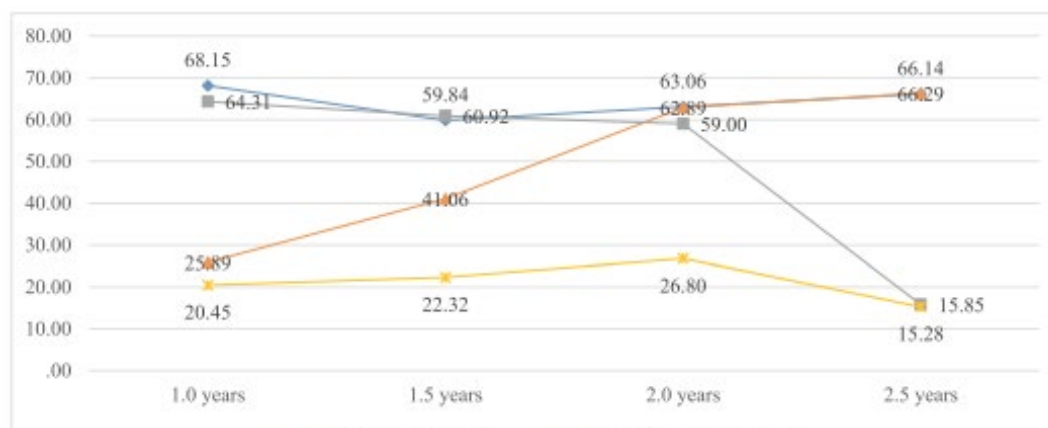


Figure 3. “The four latent trajectories of posttraumatic growth” (Zhou et al., 2019)

Most of the adolescents involved in the study (76%) were categorized in the “high PTG” group. Approximately 14% of the participants showed an increasing level of PTG throughout the four waves of measurement. The decreasing and low-stable groups made up 3.4% and 5.7% respectively.

Several factors were noted as influential to these trajectories. Older youth, for example, seemed to be more capable of developing higher levels of PTG than the younger participants (Zhou et al., 2019). Participants who showed more effort in avoiding thoughts, memories, feelings, and conversations regarding the traumatic event indicated lower levels of PTG. In contrast, those who showed “hyperarousal” symptoms indicated higher levels of PTG. These individuals seemed more interested in participating in the world around them, which means building more interpersonal relationships and finding more social support. A factor that did not influence the levels of PTG shown was that of gender. Gender did not have much effect on this study, reinforcing the concept that gender does not have an impact on PTG levels until early adulthood. Exposure to trauma previous to the earthquake had no significance to the results as well. This study shows valuable insight into which groups of adolescents may need more clinical help, such as social support and encouragement for positive rumination, through traumatic events.

Categories: Individual, Social, Psychological, Spiritual

The four main categories of development that PTG has the biggest impact on are individual, social, psychological, and spiritual (Asgari & Naghavi, 2019). At the individual level, personal development includes modifying one’s self-schema after a traumatic event in a more positive light. This may look like the development of one’s capabilities and potential, or even the perception of existing capabilities and potential. Self-schemas are a mixture of impressions, memories, and even mindsets, all wrapped into a cognitive structure that guides an individual’s thoughts and behaviors. Social development can include new or better social skills, participation in more social events, and even an increase in feelings of altruism. This gradual acquisition of social skills can lead to more confidence and comfort in social situations. Altruistic behavior benefits another individual in an unselfish matter, even at the cost to oneself. PTG can develop these feelings in individuals and lead to an increase in altruistic behavior. The third category of psychological development includes emotional maturity, a greater appreciation of life, an increase of goal setting, and both reappraisal and prioritization of values. Managing one’s emotions with emotional maturity is important to living a fulfilling life. Setting healthy boundaries, taking responsibility for what is within an individual’s control, and not fearing being vulnerable are all signs of emotional maturity. For those who developed spiritually, a newfound discovery for the meaning of life was found. Spiritual development can take the form of being more aware of things and events in the world, instead of perhaps being on autopilot. A sense of calm might be developed, and fear may be handled in a better way. Spiritual growth can also lead to more authenticity in lifestyle and self-dependence. These categories name the top aspects of life that PTG is seen in after the experience of a traumatic event and are vital to living life with fewer regrets.

Specific Traumatic Events and PTG

Countless traumatic events are experienced by individuals all over the world. The following section reviews a small number of specific traumatic events that have been researched to some extent and where data has been provided about PTG specifically concerning the situation. Many specific situations were not mentioned or were lacking formal research but are of no less significance.

Covid-19

An increasing number of studies on PTG rates throughout the Covid-19 pandemic have provided substantial data on this concept. For example, as many as 88.6% of participants in a recent study reported PTG through the initial

lockdown and early stages of the pandemic (Stallard et al., 2021). Noted in the study were positives such as an improvement in relationships, a greater appreciation for life, and the embracing of new possibilities. A study on PTG in frontline health care workers shows somewhat similar data through a different lens. Significant negative mental health impacts have been found for these health care workers, but the study takes a look at what, if any, PTG may have come from the situation (Feingold et al., 2022). The results present an encouraging statistic; 76.8% of participants showed moderate to significant PTG, almost four out of five of the health care workers who participated. These significant numbers give hope that even through an event like the devastating Covid-19 pandemic individuals are not only capable of but likely to embrace and develop PTG.

Other studies are beginning to research PTG in children who have lost one or both parents to Covid-19, although further longitudinal studies are needed to truly analyze the data. “In the United States alone, more than 140,000 children had lost a parent or guardian at the time of the study, and that number has continued to ascend in the wake of the Omicron variant,” (Collins, 2022). Since losing a parent, especially unexpectedly, can be one of the most life-altering events for a child or adolescent, these numbers are quite significant (Gray et al., 2022). PTG was found in 39.79% of children in one study examining the exhibition of both post-traumatic stress and PTG in children in the aftermath of Covid-19 (Bhushan et al., 2022).

PTG throughout the Covid-19 pandemic was predicted through a few factors (Ikizer et al., 2021). First, deliberate rumination correlated with PTG directly. In addition, younger and single participants also showed higher levels of PTG in one short-term study. The more participants followed news related to Covid-19, the more stress they encountered in their lives. The pandemic has brought much stress to many individuals and their mental health. Certain character strengths have been associated with higher levels of PTG throughout the pandemic as well, such as transcendence, the ability to make meaning of the situation and create new connections (Casali et al., 2021). The virtue of humanity also revealed a connection to PTG and was analyzed as valuing interpersonal connections. These two qualities seem to indicate higher levels of PTG.

A study specifically among American medical students during the Covid-19 pandemic resulted in interesting data about PTG (Luo et al., 2022). These future physicians often cared for patients with Covid-19 directly. Certain “resilience behaviors” were identified, which predicted levels of PTG during the pandemic among the students. Students who had experienced stressful experiences prior to Covid-19 showed more PTG and even further resilience behaviors. Symptoms of Covid-19 related stress included boredom, irritability, loneliness, and intrusive thoughts. As

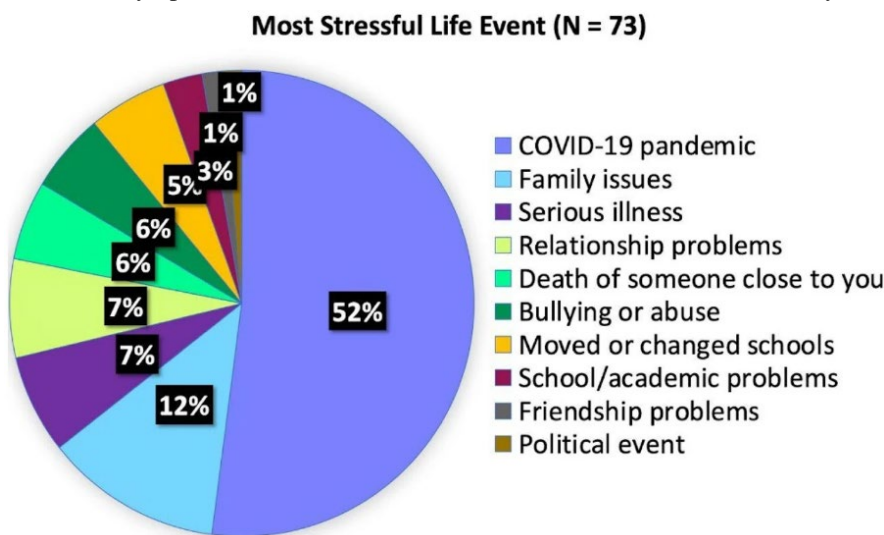


Figure 4. “Most Stressful Life Event” (Luo et al., 2022)

shown in Figure 4, researchers also gathered data on whether or not Covid-19 had been the most stressful event the students had faced in their lives. A large portion, 52.1% of students indicated the pandemic as their most stressful life event thus far.

Resilience behaviors observed in medical students included establishing a supportive social network, using cognitive flexibility, and relying on a personal moral compass. Others found creative outlets or ways to volunteer and serve others. These behaviors indicated higher levels of PTG in the students through-

out the Covid-19 pandemic. Students who indicated that Covid-19 was the most stressful event in their lives up to that

time showed higher levels of PTG, thus supporting the idea that stress caused by traumatic events must meet a certain threshold in order for significant PTG to occur.

Sexual Assault/Abuse

An extremely traumatic event that is experienced far too regularly by individuals is that of sexual violence. An exhaustive literature review performed by researchers at San Diego State University concludes that PTG is indicated across various studies of participants who have suffered sexual violence (Ulloa et al., 2016). These results do not mean that enduring or experiencing any type of sexual abuse should be tolerated, but it may mean that survivors might find some hope in the data indicating personal growth. Some domains measured in the analyzed studies showed that participants became more involved with social and political action or found more quality in relationships. Some participants found they had a stronger sense of self and personal strength.

Miscarriage

Another notable traumatic event that many individuals experience is bereavement via pregnancy loss. A literature review analyzing 15 studies on bereavement and PTG offers some insight (Michael & Cooper, 2013). Results indicated that active coping styles and social support are two factors that nurture PTG impacts after the loss of a family member or other loved one. It is again important to not imply that the loss or trauma itself has any positive implications but rather, "Personal growth after loss, therefore, should be viewed as originating not from the event but from within the person themselves," (p. 30). For bereaved parents specifically, data shows that PTG was found in areas proposed by the PTG model and also indicated that mothers were more likely to experience PTG than fathers (Waugh et al., 2018). The study also noted that PTG could only occur after some time had passed from the traumatic event, and this implies that a certain degree of patience with oneself or those who have suffered trauma is necessary.

Cancer/Health Issues

Cancer is another devastating experience that many individuals experience. One literature review found that between 70-90% of cancer patients experience PTG in three ways (Tanyi et al., 2020). Patients gain a greater appreciation for life and their priorities, they feel an increase in personal strength, and they see a new closeness develop in relationships with loved ones. In a study directly aimed at patients with breast cancer, approximately 83% of women noted at least one benefit from the overall experience, while many benefits were acknowledged by several patients (Sears et al., 2003). The study noted that higher education was associated with an increased number of benefits, and cited optimism as a "significant unique predictor". Long-term PTG in breast cancer survivors, found 5-15 years after diagnosis, reveals that rates of PTG are very similar to those found in the short term after diagnosis (Lelorain et al., 2010). Resources for patients are recorded as one of the determining factors in crucial long-term PTG.

Mental Illness

Reports of highly traumatic events also come from people with psychosis, generally taking the form of a psychotic episode. Data from 37 studies were analyzed and reported PTG in people with psychosis (Ng et al., 2021). Clinical interventions can assist to facilitate PTG by supporting identity changes in a positive way. Developing a positive identity can and should be supported by a variety of mental health services and other support systems. Other serious mental illnesses have been evaluated as well, and results continue to imply the presence of PTG in many study participants. As seen in Figure 5, through "...self-acceptance, self-exploration, self-worth, and self-fulfillment..." a new sense of self was achieved (Wang et al., 2019). Data indicated one crucial element to the development of PTG: awareness of the importance of self while recovering.

First Responders

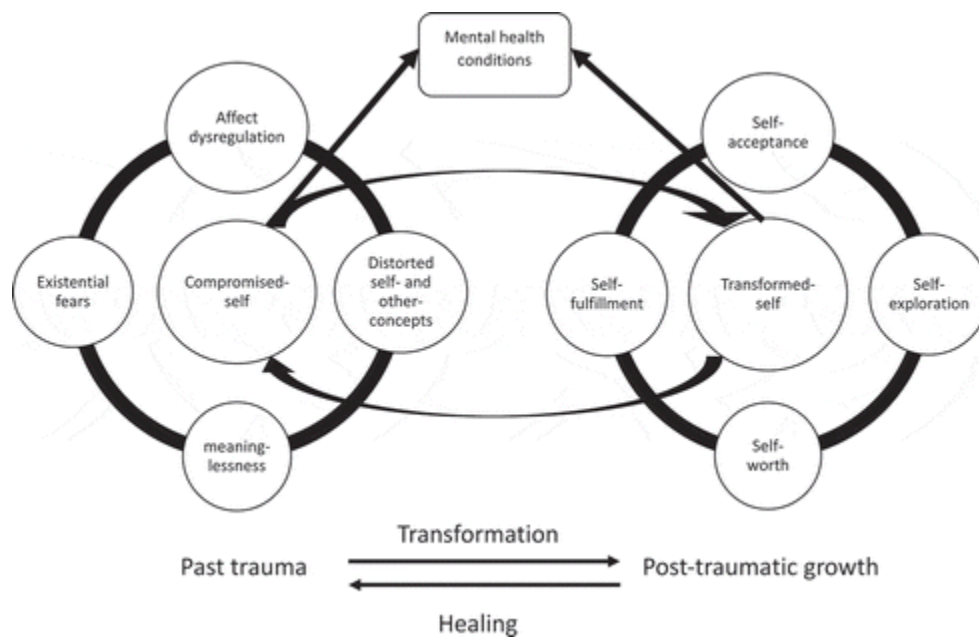


Figure 5. “From past trauma to post-traumatic growth” (Wang et al., 2019)

Many first responders experience high levels of trauma-related stress on a regular basis. PTG has been associated with attendance to debriefing sessions, coping strategies, and occupational support (Sattler et al., 2014). Resources for first responders can offset posttraumatic stress symptoms and facilitate PTG when maintained and acquired by first responders facing traumatic events. Certain mindfulness strategies or mindsets, such as approach-coping, have been found to correlate with higher levels of PTG after trauma (Chopko & Schwartz, 2009). Judging experiences for what they are, rather than avoiding them, is one approach-coping method. Mindfulness practices that promote new schemas, goals, or meanings may allow an individual to face a new reality presented by the traumatic event(s). A change in perspective can give way to PTG, but generally requires the acceptance that the traumatic event occurred, something easier said than done.

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Refugees

To further stress the importance of approach-coping strategies in relation to PTG, the traumatic experience many refugees face should also be considered. While post-traumatic stress has been found in refugees who have witnessed the death of family members or friends, sexual assault, and or torture, among many other terrible events, and who

have been forced to flee their home country facing various dangers and overwhelming experiences along the way, PTG has been reported as well (Acar et al., 2021). Noted associations between these traumas and PTG included specific types of coping strategies. Syrian refugees, for example, who implemented coping strategies such as problem-focused or emotion-focused coping resources held a “determinative role” in the development of PTG. Also key to the level of PTG experienced by many refugees are factors such as past-traumatic experiences and post-migration stressors. Effects from long-term trauma can roughly be determined by the timeframe in which it occurs in an individual’s life (Powell et al., 2003). As imagined, long-term traumatic events such as war can have various negative impacts on a person’s mental and physical state. Refugees exposed to traumata throughout the course of several years, 1991 to 1995, continue to live their lives in Sarajevo. Individuals who experienced these war-time years in their adolescence seemed to be able to cope with these events in a way that related to higher levels of PTG. Older individuals did not seem to perceive as much PTG, which may be explained by certain adaptive changes they faced. Adaptive changes such as starting a new family or learning a new profession were factors that were more difficult for refugees who were further along in life.

Veterans

Another often traumatized group of individuals in the aftermath of war is veterans. An estimated 30% of U.S. veterans who fought in the Vietnam War are estimated to have PTSD (2018). In a study on PTG among veterans, 50.1% were found to have moderate or higher levels of PTG, while 72% of veterans who had been diagnosed with PTSD showed similar levels of PTG (Tsai et al., 2015). Developing social connections and a sense of purpose were ranked among the most significant factors in PTG among veterans. These statistics show great hope for veterans who suffered trauma while serving their country.

Domestic Abuse

Trauma closer to home, or rather *in* the home, affects many individuals as well. Domestic abuse is a common issue many people face in their intimate relationships. Often severe experiences of physical, emotional, and sexual assault, sometimes lasting years on end, can result in PTSD, depression, substance abuse, and other mental or physical health issues (Anderson et al., 2012). Up to 84% of domestic violence survivors show symptoms of PTSD. Support systems and resources are absolutely crucial to individuals, who are mainly women, in these abusive situations. If a person is able to somehow leave or escape an abusive relationship from an often intimate partner, this brings with it a host of new challenges. Life-altering events can cause major disruption in a person’s life, and leaving a situation where every action was controlled, transitioning to a space where the control is taken back, can result in high levels of trauma-related distress. PTG occurs in the event of leaving an abusive or violent relationship through the change itself in the relationship, the survivor’s self-perception, cognitive appraisal of the violent relationship (often ignored or purposefully unrecognized previously), and life goals (Young, 2007). One factor of resilience that influences many survivors’ choice to leave is to, “renew ‘lost’ aspects of one’s identity.”

Divorce

Domestic abuse can lead to results such as divorce. Divorce itself can be another traumatic experience, where life can feel like it is turned upside down, bringing additional emotional, financial, and social implications (Graff-Reed, 2004). “Divorce may involve multiple crises of identity, self-worth, finances, lifestyle, child rearing, and life-goals,” (p.2). PTG from divorce may look slightly different for women and men. Reissman (1990) reports that men find greater interpersonal skills and a new willingness to self-disclose. She finds that in women, self-confidence levels rise along with a sense of control over their lives.

While this was not an exhaustive review of events that cause trauma and PTG, it does provide an overview of many specific traumatic events. Other traumatic events such as leaving a predominant religion, experiences of school-age bullying or shootings, car accidents, or serious injuries such as burns or dog attacks, were not addressed but are still extremely prevalent to the topic of PTG.

Post-Ecstatic Growth

The focus of this paper thus far has been on PTG from traumatic events. It is important to recognize growth from non-trauma events as well. Growth possible from positive events is known as *post-ecstatic growth* (PEG) (Roepke, 2013). While many people will face trauma in their lives, growth can be found through many other trauma-less challenges in life. Growth catalyzed by positive events appears in the same main categories as PTG. Major events need not have the component of trauma to push individuals to question their beliefs or to inspire sincere reflection. Finding new meaning in life, appreciating relationships, and valuing personal strength are all possible through post-ecstatic growth. Ann Marie Roepke, a clinical psychologist, has coined the phrase “gains without pains”, a largely fitting description of post-ecstatic growth.

Very little research has been done on this concept, as it is even more novel than the concept of PTG. Roepke created a way to measure PEG called the Inventory of Growth after Positive Events (IGPE) (Roepke, 2013). This self-reporting tool allows perceived benefits after positive events to be measured. Jane McGonigal, the author of *Superbetter* (McGonigal, 2015), writes about PEG as well (Pg. 7):

“It works the same way post-traumatic growth does, except you get to choose your own challenge. Instead of waiting for life to throw a trauma at you, you can cultivate post-ecstatic growth at any time by intentionally undertaking a meaningful project or mission that creates significant stress and challenge for you. This stressful adventure you’ve chosen for yourself creates the necessary conditions for you to struggle and grow as much as someone who is battling a trauma.”

Opportunities for post-ecstatic growth may look like facing and ending an addiction, starting a new business, participating in a marathon, or moving to a new city for a fresh start. These challenges can provide the type of thought-provoking processes that true growth requires, and can lead to a deeper understanding of an individual’s capabilities and views on relationships, goals, or life in general, just like PTG.

While PTG develops from trauma-related stress, PEG is thought to derive from thriving after positive events (Mangelsdorf & Eid, 2015). Thriving may take the form of moral growth or a deepening of close relationships. This “inspire-and-rewire” concept implies psychological growth from events that bring inspiration and even awe to an individual’s mindset (Keltner & Haidt, 2003). Positive events can become so central to an individual’s life that they outweigh the negative events, exerting a higher influence on one’s identity (Bernsten et al., 2011). The concept that positive events are more central to an individual’s identity holds that the importance of negative events diminishes as time passes, while the importance of positive events increases.

The benefits of PTG and PEG overlap considerably (Mangelsdorf & Eid, 2015). Though the difference in negative and positive events is quite stark, individuals show growth in similar areas of development such as improved relationships, meaning in life, spirituality, and higher self-esteem or personal strength.

Thrivers Model

One model based on PEG is known as the Thrivers Model (Mangelsdorf & Eid, 2015). This model is comprised of the idea that growth is based on personal factors, and that an individual exhibiting “thrivers” qualities would develop growth from both positive or negative life events. These qualities, or factors, in the Thrivers Model are positive emotions, supportive relationships, and meaning-making. Figure 6 depicts the Thrivers Model and can be applied to both negative and positive experiences. Critical life experiences can lead to core belief disruption (Cann et al., 2010) and

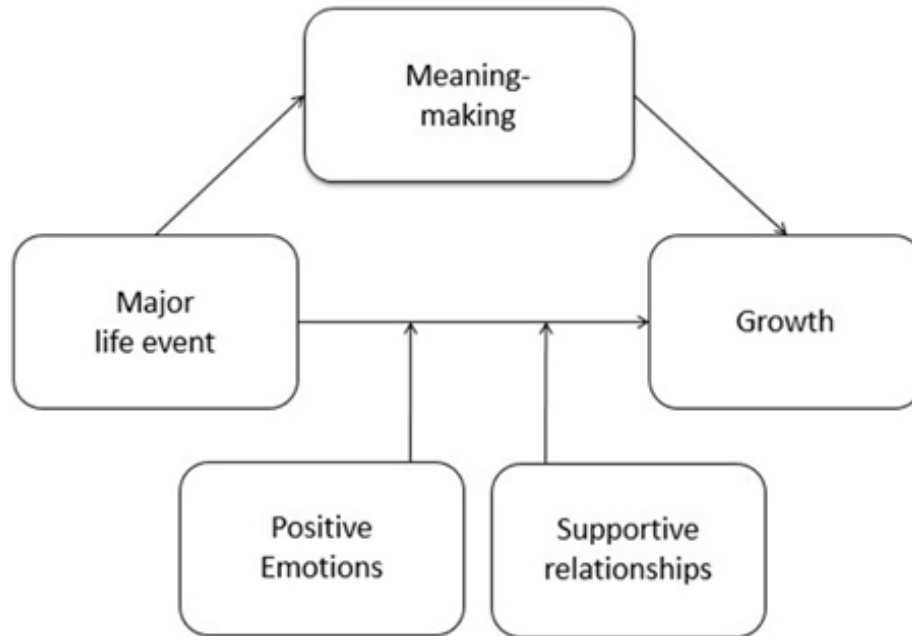


Figure 6. “Thriver model of contributing factors to positive development after major life events” (Mangelsdorf & Eid, 2015)

Ultimately, positive emotions and supportive relationships will produce growth and factor into the Thriver Model after a major life event (Mangelsdorf & Eid, 2015). How an individual copes with the major event will determine how positive or negative emotions may present, while support systems can either be in place before the occurrence of the event or can be found in the aftermath. The high emotional valence that major life events generally carry tends to enhance an individual’s neurological ability to develop memories and new learning processes (Hu et al., 2007). Positive emotions produce neurological changes in the brain that lead to a “broadening of thought-action repertoires” (Fredrickson, 2004). An individual’s attention is broadened, and their thinking and behavioral skills are improved when positive emotions are highly prevalent supporting the way an individual copes with these experiences. Supportive relationships are also key to growth in the Thriver Model (Mangelsdorf & Eid, 2015). Friends and family members who show support may play an important role in the integration of a new experience that an individual may experience, as well as the development of growth (Schroevvers et al., 2010).

Meaning-making is a cognitive process that allows an individual to integrate new life events into existing mental structures (Mangelsdorf & Eid, 2015; Park and Ai, 2006). “A consistent theme throughout meaning making research is that the people who achieve the greatest benefits are those who use meaning to transform the perception of their circumstances from unfortunate to fortunate” (Seligman et al. 2006, p. 777). This doesn’t just apply to PTG though. Meaning-making is also a major facilitator of PEG, according to Roepke’s (2013) initial research on the topic. Evoking a sense of meaning from positive life events more likely leads to growth.

Importance of Growth

Why be concerned with personal growth? Individuals encounter growth throughout their life, without knowledge of PTG or PEG. Seeking growth may be extremely beneficial and can be accomplished in a variety of ways. Many people may want to pursue growth in order to live a more purposeful life. Trying to improve attitude, gain education, or develop maturity are all examples of pursuing PEG. PTG is something individuals tend to have less control over and generally find themselves facing without choosing to do so. One strategy for developing personal growth, whether

thus cause a reevaluation of assumptions that affect several existing mental structures. Life events that bring this much upheaval to an individual’s life will likely lead to some new meaning-making, producing growth in one or more areas of life (Mangelsdorf & Eid, 2015).

PTG or PEG, is mindfulness. Meditation and mindfulness practices can influence personal growth as individuals face life's challenges. Davidson et al. (2003) suggest that even over a short period of time, these practices can actually change brain and immune function. Increases in antibodies were noted, and activation in parts of the brain that have positive effects on our emotions. These powerful effects can be achieved with simple meditation or mindfulness practices over a short time.

Personal development and growth lead individuals to be more happy, successful, and content in life. It is not always easy or comfortable, in fact, it may take a lot of effort, hard work, and patience, but may lead to elements McGonigal (2015) claims will counter life's biggest regrets, a worthwhile endeavor.

Conclusion

Seismic events, whether negative or positive, provide an opportunity for an individual to experience growth. As many as 90% of adults in the U.S. will or already have experienced a life event of this magnitude at least once in their life (Kilpatrick et al., 2013). Trauma can have many negative effects on an individual and can lead to the development of PTSD, depression, substance abuse, and more. In order to thrive, not just survive, after a negative or traumatic life event, certain elements or coping styles are more effective than others. Gratitude and deliberate rumination more often lead to growth. Adaptive coping styles, such as positive reappraisal or acceptance coping, have significant effects on levels of PTG an individual may obtain. Expression of one's emotions (positive or negative) in a safe and supportive setting can not only aid the development of PTG but can lower the risk of developing depression after a traumatic event.

PTG has been noted to last long-term, and even increase over time (Ochoa et al., 2016; Látos et al., 2021). Some of these changes are found in the brain as shown in gray matter volume in the DLPFC that increased in participants who showed PTG, an area associated with both empathy and emotional intelligence (Nakagawa et al., 2016). Greater cortical thickness in the DLPFC can be seen and has been linked to better executive functioning (Ord et al., 2020; Lyoo et al, 2011). These neurological effects of PTG result in the same areas that trauma and stress do in the brain, but in opposite ways.

There are several areas in an individual's life where PTG or PEG effects can be seen, but the main four categories that researchers have noted are at individual, social, psychological, and spiritual levels (Asgari & Naghavi, 2019). These levels seem to show some positive effects in a variety of situations where trauma is common, including the Covid-19 pandemic, sexual and domestic abuse, bereavement, and a variety of health issues. First responders, refugees, and veterans see PTG at these levels, as well as many other groups of individuals.

Breakthrough research on PEG offers a path to growth without the potential turmoil that trauma can bring. PEG can be acquired by facing a difficult task or challenge. This type of growth can emerge in the form of improved relationships, more meaning in life, greater spirituality, and higher self-esteem or personal strength (Mangelsdorf & Eid, 2015). Thriving after major life events, either negative or positive, requires factors such as positive emotions through emotion regulation, supportive relationships, and meaning-making.

Developing PTG or PEG may not be comfortable, but the benefits of doing so are paramount to living a life without major regrets. To avoid some of the top regrets in life such as not staying in touch with friends and family, expressing oneself, or living life true to one's dreams, developing PTG and PEG are crucial (McGonigal, 2015). Growth allows individuals to evaluate and reassess priorities, maintain and deepen interpersonal relationships, and focus on goals and dreams. Survivors of trauma or individuals facing difficult challenges in life may find some hope in the variety of benefits one may obtain from PTG/PEG. Many of the most important aspects of life—personal strength, true priorities, strong social connections, and a sense of meaning—are the greatest benefits of psychological change developed through PTG & PEG.

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