

Future Directions: Posttraumatic Growth and Physical Activity in Female Trauma Survivors

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ABSTRACT

Traumatic event exposure is a widespread issue challenging peoples' ability to thrive. Exposure can result in Post-Traumatic Stress Disorder (PTSD) which can lead to dysfunction in cognitive, physical, and interpersonal areas of life. Despite public perception, PTSD disproportionately affects women at 2 times the rate as men (Lehavot et al., 2018). Despite this, promising research into trauma-informed care and posttraumatic growth (PTG) have been conducted. PTG can occur simultaneously with PTSD and promotes thriving across social-emotional life domains (Tedeschi & Calhoun, 2004). Moreover, group activity and physical activity have been shown separately to promote PTG and decrease PTSD symptoms (Love & Sabiston, 2011; Sheppard-Perkins et al., 2022). The following review discusses theoretical frameworks, contemporary trauma recovery research, and need to evaluate physical activity as low-cost adjunctive treatment option for clinical implementation.

Introduction

According to the National Institute of Mental Health about 50% of US adults will experience at least one traumatic event in their life that goes beyond a typical life stressor (*Post-Traumatic Stress Disorder (PTSD)* - *National Institute of Mental Health (NIMH)*, 2017). While what constitutes as a traumatic event to one person may be subjective, the American Psychiatric Association defines Criterion A trauma as "exposure to actual or threatened death, serious injury, or sexual violence in one or more of the following ways: 1. directly experiencing the traumatic event(s); 2. witnessing, in person, the event(s) as it occurred to others; 3. learning that the traumatic event(s) occurred to a close family member or close friend; 4. experiencing repeated or extreme exposure to aversive details of the traumatic event(s)" (American Psychiatric Association, 2013, p.271). Experiencing such events can lead to a spectrum of negative impacts on one's mental and physical health. The most identifiable stress related condition is Post Traumatic Stress Disorder (Webber et al., 2017). PTSD is characterized by prolonged psychological distress, avoidance behaviors, negative mood alterations, and hypervigilance causing dysfunction in daily life (American Psychiatric Association, 2013, p.271). While this condition is most commonly associated with male combat veterans, both female veterans (13.2%) and female civilians (7.9%) experience higher lifetime prevalence rates than male veterans (6.2%). Women disproportionately experience PTSD at 2 times the rate as men (Lehavot et al., 2018). There are multiple theories for this gender difference, but the mostly widely agreed upon theories attribute the rate difference to women's increased exposure to interpersonal violence and structural differences in the neural hypothalamic-pituitary-adrenal axis which is responsible for threat assessment. This is the brain system responsible for registering perceived stress and ordering the corresponding physiological response. Any structural differences in the system can result in stress response sensitivity effects (Lehavot et al., 2018).

With such widespread need, research has answered the call. The occurrence and negative effects of trauma have been well documented, even creating a subspeciality of psychology known as traumatology (Webber et al., 2017). Yet despite the challenges trauma presents, growing research demonstrates that people have the ability to not only overcome trauma's challenges but live a fuller, more robust life in the face of them.

Posttraumatic Growth

Beginning in the 1990's research duo, Dr. Richard Tedeschi and Dr. Lawrence Calhoun entered the psychotraumatology field and started interviewing criterion A trauma survivors (Tedeschi & Calhoun, 2004). To the researchers' surprise, people consistently reported experiencing positive life changes after extremely stressful events such as airplane crashes and cancer battles (Tedeschi & Calhoun, 1996). After researching more into survivors' accounts, Tedeschi and Calhoun named this phenomenon *posttraumatic growth* (PTG) and defined it as "positive psychological change experienced as a result of the struggle with highly challenging life circumstances" (Tedeschi & Calhoun, 2004, p.1). Upon further analysis, PTG was found to occur in five distinct subareas known as factors. The first factor is a greater appreciation for life which alters people's priorities and values. The second is improved relationships which involve interpersonal connections becoming warmer and more intimate. Factor three is a greater sense of personal strength which makes a person feel more empowered. The fourth factor is the improved ability to see new life possibilities. Finally, the fifth factor is spiritual development which leads to a richer sense of connectedness on a global level (Tedeschi & Calhoun, 2004). Of crucial importance, PTG was found to be independent of PTSD. People can experience PTG despite the co-occurrence of PTSD (Noushad et al., 2022). Moreover, the benefits of PTG were not diminished after the passage of time (Tedeschi & Calhoun, 1996).

The research team then went on to diagram the process of PTG. In their model the process begins with a stressful experience that challenges an individual's sense of self (Tedeschi & Calhoun, 2004). In the aftermath of this event, people must manage their distress through constructive cognitive processing. This process opens an opportunity for one to modify their fundamental schemas. A successful process results in the development of beneficial new attitudes and behaviors that work effectively under the person's new life circumstances and a release of their old views. A person's beliefs, goals, life narrative, and emotional environment can be rewritten entirely in this new novel life scenario. The tension between creation and release is displayed via distress which the individual must continue to work through until it is resolved. If the distress is chronically unresolved, it can lead to negative health impacts and stress disorders. However, if the distress is positively managed the individual can experience positive growth. One's ability to undergo healthy constructive cognitive processing is mediated through social support and rumination (Tedeschi & Calhoun, 2004). In the beginning, a survivor's cognitions are usually automatic and full of stressful imagery. Yet as recall continues, the individual takes in more information from the external world and reconstructs the events into a more manageable narrative. During this time, the information the individual is taking in is highly impactful since the person is rewriting their fundamental beliefs about themselves and the world (Neimeyer, 2001). People tend to seek out their loved ones, who are deeply influential. If a person can openly discuss the trauma with a trusted companion and receive encouragement in return, they are more likely to incorporate positive views into their new schemas. Moreover, this material is deliberately reviewed repeatedly through the person's own rumination. Uplifting and self-soothing self-talk is imperative to construct positive schemas. The newly developed schemas are under constant revision due to rumination, so growth is theoretically able to be facilitated by external environmental influences. As a result of the processing, posttraumatic growth occurs in the five domains as a result of the individual behaving and thinking in alignment with the new schemas and trauma narrative created (Tedeschi & Calhoun, 2004).

In 1996, Tedeschi and Calhoun published the Posttraumatic Growth Inventory (PTGI) (Tedeschi & Calhoun, 1996). This inventory is a 21-item scale that objectively measures overall PTG by assessing the 5 factors of PTG. Each item lists a possible life change, and respondents are asked to rate the degree in which this change occurred in their life after the trauma on a 6-point Likert scale. During the psychometric testing of their inventory, the research team found a significant gender difference in relation to PTG. Women reported significantly more benefits of PTG than men across testing. Those who experienced more severe trauma also reported significantly more benefits, yet the gender x severity interaction was not significant. Further analysis found women tended to report significantly more benefits in the new possibilities, personal strength, improved relationships, and spiritual growth factors but not the appreciation for life factor. The greatest differences were found in spiritual growth and improved relationships. These perceived benefits are understood to be a result of coping with trauma and not from the trauma itself. With this in

mind and in alignment with other female-focused PTSD research, Tedeschi and Calhoun concluded that the gender difference on the PTGI suggests a gender difference in the trauma coping process (Tedeschi & Calhoun, 1996).

Activity Used as a Coping Mechanism

As discussed above, PTG can be a result of effective coping. Coping itself is the use of cognitive or behavioral strategies to manage situational demands and reduce distress (Algorani & Gupta, 2024). These coping strategies are often referred to as coping mechanisms in research. Since effective coping has been found to decrease negative health outcomes, extensive research has been conducted to assess the efficacy of different strategies (Hébert et al., 2022). Physical activity has been a strategy found to be particularly effective in mitigating negative effects of stress (Harvey et al., 2018).

One study followed aging women through a 10-week community exercise program (Hardcastle & Taylor, 2005). This demographic was chosen for their age. The aging process puts constant pressure on one's sense of self thus, the required coping is an ongoing continuous process. Researchers found that through the program participants adopted a new "active" identity. Increased feelings of achievement, control, and belonging through the program contributed to participants adopting the identity. Women who adopted the new identity reported significantly increased empowerment and well-being than those who did not (Hardcastle & Taylor, 2005). Another study looked to explore physical activity as a coping mechanism and its effect on depression. According to the diathesis-stress model, an abundance of unprocessed stress can trigger mental health conditions, such as depression, in people with a genetic predisposition (Colodro-Conde et al., 2018). The research hypothesis was that effective coping mechanisms would be correlated with fewer depressive episodes. This study followed 33,098 Norwegian adults without previously diagnosed mental health conditions for 11 years. A significant negative correlation between regular physical activity and depressive episodes was found. The findings suggest that physical activity is an effective coping mechanism to reduce stressors and subsequent depressive episodes. At the end of the study, the research team concluded that 12% of future depressive episodes could have been prevented if people participated in at least one hour of physical activity a week (Harvey et al., 2018).

More recent coping mechanism research has been focused on the COVID-19 pandemic. Such a global event provided researchers with a large population pool from which to study how people managed stress differently. One study was a cohort study, which followed 768 participants from the ages of 20 to 22 during the pandemic (Shanahan et al., 2022). The research team documented increased amounts of perceived stress and anger across participants after the onset of the pandemic. Yet those who used physical activity to cope during the lockdowns experienced significantly reduced levels of stress, anger, and internalizing symptoms in follow up surveys (Shanahan et al., 2022). This finding is of particular importance as those three internal experiences were also reported to be some of the most distressing posttraumatic symptoms according to women with PTSD (Sheppard-Perkins et al., 2022). A larger study on coping during the pandemic was performed but this time it focused primarily on youth during the first wave. 4914 Canadian emerging adults ages 14-25 were surveyed using the Primary Care PTSD Screen for DSM-5 (PC-PTSD-5), the Posttraumatic Growth Inventory (PTGI), and a coping behaviors checklist. 20.3% of respondents displayed symptoms that aligned with probable PTSD. Of all the coping strategies, maintaining social support, engaging in leisure activities and physical exercise were the most commonly reported with 54.9% of respondents reporting they began exercising more since the pandemic started. The research group also assessed PTG and found that 71.1% of respondents showed signs of PTG and that PTG was significantly predicted by ethnicity, social support seeking behaviors, and receiving social support (Hébert et al., 2022).

Physical Activity as an Adjunctive Treatment

With data seeming to support the idea that physical activity is an effective coping mechanism, more intentional research has been conducted to examine its efficacy as an adjunctive treatment option. Much of the interest in physical activity as a supplemental treatment has come from neuropsychology studies. An imaging study that diagramed the neural structural changes cardiovascular activity had on the brain found that there was significant overlap in the areas of the brain positively impacted by physical activity and the areas negatively impacted by trauma. The researchers hypothesized that physical activity could be strategically employed to facilitate neuroplasticity in areas negatively impacted by trauma (Hayes et al., 2013).

A metanalysis of studies that assessed moderate to vigorous physical activity performed by women with PTSD in 2022. 83.3% of the reviewed studies found that moderate to vigorous physical activity led to significant improvement of PTSD. The review found that intrusive PTSD symptoms were related to unmanaged physical reactions to triggers and that bodily movement helped decrease avoidance behaviors of the triggers. MVPA causes increased heart rate, heart breathing, and sweating which are also experienced during hyperarousal. Controlled exposure to somatic triggers such as increased heart rate and heavy breathing in safe planned environments, led to the desensitization of physiological trauma responses associated with being stuck in “fight or flight” mode. Once participants realized they were safe having stress symptoms in like heavy breathing and noticeable heartbeat during exercise, they became less distressed having these somatic experiences in daily life. This mental and bodily stress alleviation led to great increases in perceived symptom improvement (Sheppard-Perkins et al., 2022).

Outside of cardiovascular activity, a 2023 research team assessed how low impact resistance weight training impacted women with PTSD (Pebole et al., 2023). A benefit of low impact training would be greater accessibility to women with mobility or cardiac limitations. This study had a treatment group of women perform three 30-minute weight training sessions a week with a personal trainer for three weeks while the control group met with a healthcare provider weekly but did not engage in any additional physical activity. All participants were given pre and post treatment surveys that consisted of the Posttraumatic Stress Diagnostic Scale for DSM5 (PDS-5), State- Trait Anxiety Inventory (STAI), Center for the Epidemiological Studies of Depression Short Form (CESD), and Pittsburgh Sleep Quality Index to assess symptoms and Category Patio Perceived Exertion Scale to assess the participants’ ratings of perceived exertion. Significant reductions in rates of anxiety, depression, and sleep disturbances were found in the weight training group. Yet, both groups displayed significantly reduced PTSD symptomatology at the conclusion of the study. The trial had high adherence and retention rates despite the participant pool’s recent traumatic experiences. With symptom reduction and high adherence in mind, the research team concluded that resistance training showed promises and an effective adjunctive treatment to traditional therapy for PTSD (Pebole et al., 2023).

Physical Activity and Posttraumatic Growth

According to Tedeschi and Calhoun’s model of PTG, growth occurs when new behaviors and attitudes align with the positive schemas, goals, and beliefs formed after a traumatic event calls a person’s identity into question. These new patterns of belief are the result of the coping process. With physical activity efficacy at coping clearly documented, some researchers began to study its relation to PTG.

One of the earliest studies linking PTG to physical activity was a 2007 examination of breast cancer survivors who participated in dragon boat races. The study recounted 20 breast cancer survivors’ experiences on a dragon boat team, a 20-person rowboat race, via 45-60 minute semi-structured interviews. Transcripts of the interviews underwent data analysis based on constructivist grounded theory. Significantly increased levels of enhanced meaning and purpose, confidence, self-esteem, sense of control, and social interactions were found among participants. 55% of the participants said the adoption of an athlete identity was a benefit since it gave them a sense of self beyond their disease. This finding corroborates Tedeschi and Calhoun’s theories that change in self-identity is needed for growth and that

novel experiences spark opportunity for that transformation. On that note across interview transcripts the women's responses corresponded with the 5 factor PTG model and all participants showed growth in one or more of the factors (Sabiston et al., 2007).

After the initial dragon boat study, the head researcher Dr. Catherine Sabiston teamed up with Dr. Caitlin Love (2011) to explore the link between physical activity and PTG in youth cancer survivors. 64 cancer survivors, of which 74% were female, were assessed with the PTGI and Godin Leisure-Time Exercise Questionnaire (GLTEQ). Upon analyzing the results, it was found that the physical activity by social support interaction accounted for 12.8% of the variance in the amount of PTG. This finding suggests that those who were more physically active needed less social support than those who were less active to experience PTG. Sabiston and Love hypothesized that physical activity interacts with correlates of PTG to increase the amount of growth possible. The relationship between social support and PTG was weaker from more active survivors, suggesting that physical activity provides people benefits that facilitate PTG regardless of their amount of social support. The team believed these benefits from physical activity include enhanced self-perception, improved goal adjustment and self-regulation abilities, and schema changes that are necessary for PTG (Love & Sabiston, 2011).

That same year another PTG and physical activity study was conducted on women who participated in challenge-based peer support programs. 27 semi-structured interviews were performed with breast cancer survivors who participated in Amazon Hear Thunder which is a 10-day 1,000-mile motorcycle/ camping journey across the country. It was found that overcoming physical challenge resulted in increased active coping, emotional expression, and acceptance which led to improved self-perception. The challenge served as a safe environment to undergo self-learning and test limits. The shift of identity experience during the challenge inspired PTG in multiple aspects of the participants' lives. Similarly to other studies, interviewees reported adopting a new identity which brought increased perception of personal strength, pride, and willingness to self-nurture. Each participant reported growth in at least one factor of PTG that resulted from completing the challenge. The most common factors were new life possibilities and appreciation for life. The research team concluded that the challenge was able to promote PTG by offering participants a new social environment that allowed them to shift their cancer identity into one of an active survivor. The team placed specific importance on the event being a unique challenge as it allowed the women to step outside of their daily routines and test their preconceived notions. It was reported that the sense of achievement gained from completing the challenge and new identity inspired the women to make positive lifestyle changes in their lives that continued long after the ride concluded (Morris et al., 2011).

The interest in PTG continued exponentially growing throughout the late 2000s and into the 2010s. By 2019, enough studies were performed for a large-scale integrative review to be performed. This review focused specifically on female breast cancer survivors. After examining 31 peer-reviewed journal articles published after the 1996 defining of PTG, it was found that four major manifestations of PTG were found in new perceptions of self, connectedness to others, new life philosophy, and spiritual growth. Physical activity and social support were identified as factors that significantly impacted PTG in women. A significant positive correlation was found between positive psychological growth and participation in challenging activities. Many of the activities studied were physical in nature. The review highlighted the challenge of climbing Mount Kilimanjaro which was found to facilitate growth through providing changed priorities, feelings of self-accomplishment and self-belief, and stronger connections between climbers (Zhai et al., 2019).

A more recent study was performed to see if PTG could be facilitated in healthcare providers with PTSD through nature based physical activity. This study sample was specifically chosen due to their repeated extreme exposure to traumatic events as outlined by Criterion A.4 (American Psychiatric Association, 2013 p.217). Three months of CBT was given to 241 healthcare providers with PTSD. The sample was split into two groups where one walked in nature while the other sat in nature multiple times a week. Both groups were assessed with Trauma Symptom Checklist 40, Traumatic Stress Scale, Post-Traumatic Growth Inventory (PTGI), Cortisol, C-Reactive Protein (CRP), Interleukin-6 (IL-6), Brain Derived Neurotrophic Factor (BDNF), and heart rate variability testing. The walk in nature group showed significantly more PTG than the sit in nature group. That said, both groups showed a significant

reduction in stress hormones. These findings suggest that physical activity and therapy are independently effective at reducing trauma related stress symptoms and building factors of PTG (Noushad et al., 2022).

Directions for Future Study

Future study should aim to synthesize much of the current literature finding and evaluate the efficacy for physical activity as a supplemental treatment to traditional psychotherapy for female trauma survivors. A recent review of PTSD literature found that although women are two times as likely to have PTSD, they are significantly underrepresented in trauma research. Research on physical activity in the trauma recovery process is being conducted, but 62% of studies looking at aerobic fitness used all male samples. Only 20% of the studies used female veterans, the most at-risk group. It was also found that half the studies used non-control design. As a result, causation could not be evaluated (Pebble & Hall, 2019). On the other side of the research there are claims that physical activity is needed for PTG, but the claim lacks empirical backing (Post et al., 2023). Most of the current physical activity and PTG facilitation studies are limited to the experience of cancer survivors. Further research is needed to expand the generalization ability to the multiple aspects of Criterion A trauma. This research following the clinical trauma definition should be conducted in hopes that the results can be functionally applied to clinical environments.

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