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Post-traumatic growth

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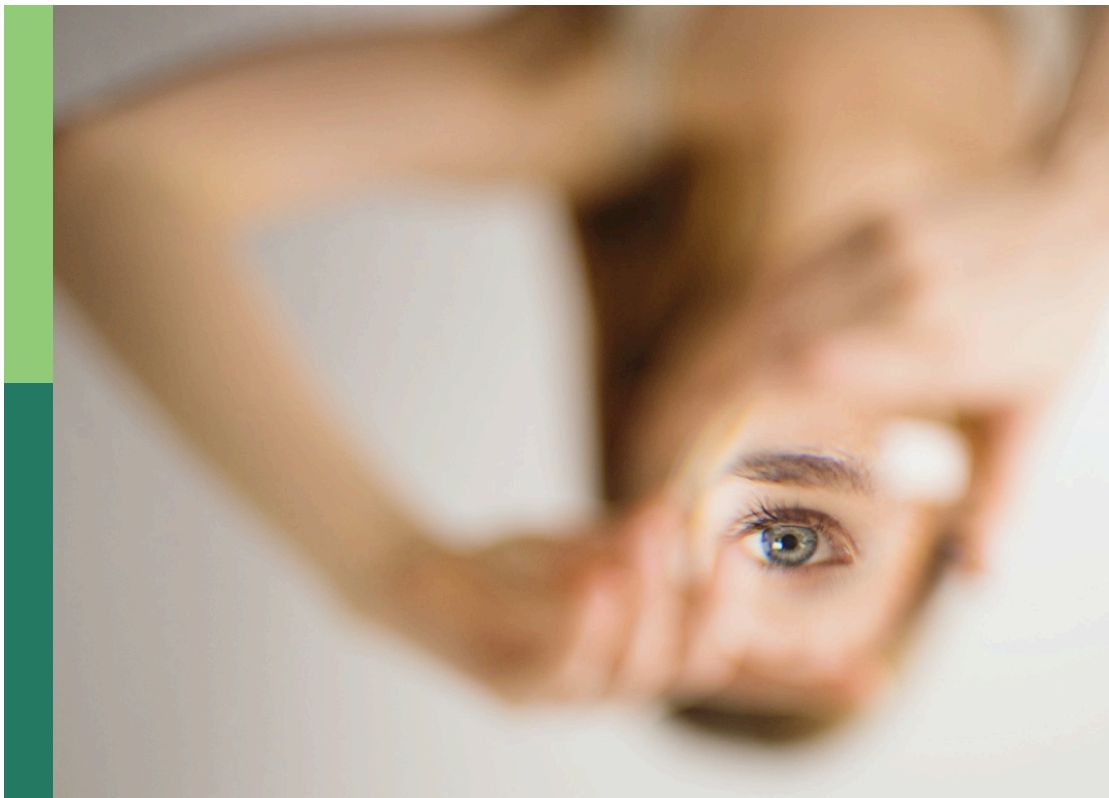
Published in
Frontiers in Psychology



ISSN 1664-8714
ISBN 978-2-8325-3200-3
DOI 10.3389/978-2-8325-3200-3

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Post-traumatic growth

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Citation

Senol-Durak, E., Di Tella, M., Romeo, A., eds. (2023). *Post-traumatic growth*. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-8325-3200-3

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frontiers | Frontiers in Psychology

TYPE Editorial
PUBLISHED 26 July 2023
DOI 10.3389/fpsyg.2023.1227892

OPEN ACCESS

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RECEIVED 23 May 2023
ACCEPTED 17 July 2023
PUBLISHED 26 July 2023

CITATION
Senol-Durak E, Di Tella M and Romeo A (2023) Editorial: Post-traumatic growth.
Front. Psychol. 14:1227892.
doi: 10.3389/fpsyg.2023.1227892

Editorial: Post-traumatic growth

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KEYWORDS

post-traumatic growth, stress-related growth, loss of loved one, chronic illnesses, post-traumatic depreciation, resilience, natural disasters, violence

Editorial on the Research Topic
Post-traumatic growth

Studies on traumatic events have mainly focused on their unfavorable effects, like post-traumatic stress disorder. On the other hand, traumatic encounters that shatter people's presumptions can result in positive experiences. Positive experiences following traumatic events are what Tedeschi and Calhoun (1996, 2004) refer to as "Post-Traumatic Growth" (PTG). Other researchers prefer to refer to the positive changes caused by long-term life experiences as "stress-related growth," this term is preferred for chronic life events (Park, 2010). PTG includes priorities adjustments, life's purpose, interpersonal connections, inner fortitude, and spirituality. It is important to note that PTG does not negate trauma's negative effects but acknowledges that growth can occur alongside pain and suffering. Following a significant but unpleasant life experience, it is a positive metamorphosis. Beyond simple personality shifts, post-traumatic growth reflects true change, which we may continually learn and benefit from Tedeschi and Blevins (2022). Studies on post-traumatic growth after major life events have shown that the factors contributing to PTG vary depending on the trauma and that there are important therapeutic ramifications for overcoming a difficult experience. In particular, it is not the trauma *per se* that is the catalyst for change but the abrupt disintegration of one's fundamental assumptions and the cognitive process implicated in reestablishing functional assumptions. Studies that investigate the disruption of core beliefs, rumination, coping, and depressive symptoms in relation to PTG are numerous (Senol-Durak and Ayvasik, 2010; Zhou et al., 2015; Senol-Durak and Durak, 2018; Durak and Durak, 2019; Romeo et al., 2020, 2022; David et al., 2022). Also, it is mentioned that individuals, families, and larger social groups may all experience the effects of PTG (Berger, 2015).

Furthermore, cultural influences have a significant impact on PTG. Recently, the "Post-traumatic growth inventory," a widely used assessment, was altered to take into account diverse cultures and religious affiliations. Furthermore, after PTG, a new notion known as "post-traumatic depreciation" was introduced, which has received little attention in the literature. In this collection of Research Topics, we encourage researchers to contribute to post-traumatic growth and post-traumatic depreciation studies in order to understand better the presence of different types of positive psychological transformations (e.g., natural disasters, accidents, violence, the death of a loved one, chronic illness) in people from other countries. It is important to note that PTG does not negate the pain and suffering experienced during the traumatic event but acknowledges the potential for growth and positive change resulting from it.

Over the past 20 years, PTG has been investigated among individuals suffering from various traumatic events. The term has served different perspectives for professionals working with trauma survivors (Tedeschi and Calhoun, 2004), and recovery from trauma

can lead to positive functioning that has been estimated in clinical settings. Besides, contributing factors affecting PTG have been mentioned in those studies, with the theoretical model explaining the rationale behind PTG (Tedeschi and Calhoun, 1996; Senol-Durak and Ayvasik, 2010; Hallam and Morris, 2014). Moreover, the literature discusses trauma survivors' cultural aspects (Calhoun et al., 2010; Tedeschi et al., 2017). Primarily, English-written self-measures assessing PTG, such as the Post-traumatic Growth Inventory, have been investigated in other countries to see cultural parameters in the phenomenon (Tedeschi et al., 2017). Also, a shorter form of PTGI has psychometrically significant results (Platte et al., 2023). Studies have also examined the connection between PTG and other psychological concepts like resilience and coping mechanisms (Tedeschi et al., 2017; Taku et al., 2021). Understanding these relationships can help people learn how to grow from traumatic experiences and cope with them in the best way possible.

We are interested in well-defined research that addresses the current PTG literature. Priority was given during the call for papers to research that (1) investigates post-traumatic growth and its sub-dimensions, such as changes in life priorities, the meaning of life, social relationships, personal strength, and spirituality; (2) tests the theoretical models identified for PTG; (3) focuses on factors contributing to post-traumatic growth based on trauma type; (4) contributes to PTG studies with qualitative, quantitative, and mixed methods; (5) discovers PTG through cultural and cross-cultural studies; (6) applies PTG in clinical settings, and (7) explores post-traumatic depreciation following a profoundly important event. Scholars are specifically asked to submit papers on the following PTG-related topics: (1) PTG with a cultural or cross-cultural focus; (2) PTG and PTD comparisons based on the types, nature, and meanings of specific traumatic events; (3) PTG-related hypotheses and theories, and (4) PTG in clinical/therapeutic settings.

Eleven papers have been published on the topic of post-traumatic growth; nine of them are "original research," while the other two are "brief research reports". Findings suggest that post-traumatic growth can take place in a variety of life areas, including interpersonal relationships, spirituality, and self-perception. It is a complicated and multifaceted phenomenon. The studies also emphasize the value of meaning-making, resilience, hope, optimism, post-traumatic stress, cognitive processing, and social support in promoting post-traumatic growth.

The first article, authored by Jaafar et al. and titled "*Post-traumatic growth, positive psychology, perceived spousal support, and psychological complications in head and neck cancer: evaluating their association in a longitudinal study*," was published as an original research article. Head and neck cancer (HNC) patients have generally been examined in response to negative psychological influences such as social isolation, depression, and anxiety; they have rarely been examined for positive outcomes. The study is a well-designed longitudinal study examining possible positive changes (PTG, hope, and optimism). Perceived spousal support and psychological complications (such as depression, anxiety, and post-traumatic stress symptoms) across time. It was observed that there was an increase in post-traumatic growth and perceived spousal support over time. In the time between the first and second data collection, HNC participants reported fewer psychological difficulties (depression, anxiety, and post-traumatic stress symptoms) and higher scores from positive psychology variables (PTG, hope, and optimism) and perceived spousal support. Over time, a higher level of PTG was attributed to greater hope and perceived spousal support. On the other hand, over time, a lower level of PTG was linked to a higher severity of anxiety symptoms. The female gender moderated the association between the severity of anxiety symptoms and PTG; however, this association was not moderated by hope or perceived spousal support. In order to increase the degree of hope and perceived spousal support and lessen the severity of anxiety symptoms, it is crucial to include psychosocial interventions in the treatment regimen, which will, in turn, help HNC patients develop PTG. In addition, the results demonstrated that cultivating positive psychological traits may result in greater resilience and development in the face of adversity.

The second article, authored by Collazo-Castiñeira et al. and titled "*Prediction of post-traumatic growth in the face of the COVID-19 crisis based on resilience, post-traumatic stress, and social participation: a longitudinal study*," was published as an original research article. The study aims to investigate PTG, resilience, and post-traumatic stress symptoms (PTSS) over three different periods (March, July, and November 2020). There were no significant temporal shifts in the roughly 20% of the sample with moderate-to-high PTG levels. The predictive model demonstrated that PTSS mediated the inverse relationship between resilience and PTG, and this model explained 19% of the variance in PTG. Moreover, engagement in extracurricular activities predicted PTG. Higher PTG was seen in women, younger people, people who had lost their jobs, and those who had experienced COVID-19 symptoms or the death of a loved one. It can be said that people have felt better, but that has not stopped them from experiencing negative symptoms. However, after 8 months, participants showed signs of PTG, suggesting that this shift was not fleeting. Since the COVID-19 crisis is ongoing and the situations at play are dynamic, a long-term analysis of the relationship between PTG and the experiences contributing to its development (e.g., loss of a loved one and participation in social activities) was examined. In this regard, the results revealed that the dynamic nature of traumatic events might contribute to PTG. Findings also highlight the significance of positive experiences like social activities in fostering PTG in the wake of trauma. Finally, how PTG and its underlying mechanisms can be predicted is one of the field's most important and debated issues. The study was aimed at explaining issues.

The third article, authored by Titlestad et al. and titled "*Paths to positive growth in parents bereaved by drug-related death: a mixed-method study*," was published as an original research article. Drug-related death (DRD) is one of the stressful events, and psychological effects on parents are less likely to be examined. Considering constructive shifts among parents after other tragic events like a child's death from sudden infant death syndrome (SIDS), parents' post-traumatic growth after a DRD was studied using a mixed-method approach to grasp its complexity better. Both a survey and in-depth interviews were conducted in the present study. In the quantitative study, the impact of everyday functioning (WSAS), self-efficacy (GSE-SF), social support (CSS), and extended mourning symptoms (PG-13) on post-traumatic

growth short form (PTGI-SF) was investigated using hierarchical multiple regression. Self-efficacy and social support, and growth after traumatic experiences were associated. Also, the "New possibilities" subscale of PTGI-SF had the lowest mean score; many interviewed parents placed a premium on exploring other career choices. Also, item analysis of the PTGI-SF was conducted, that the item "I discovered that I'm stronger than I thought I was" ranked highest on the post-traumatic growth scale. On the other hand, the item "I am able to do better things with my life" ranked lowest. Thoughtful thematic analysis of the qualitative data revealed two overarching themes: (I) novel outlooks on life and (II) novel ways forward. When the findings from the survey with those from the interviews were integrated, a statistically significant correlation was found between surveys and the interviews yielded. Even before their kid died, parents who had dealt with the hardship of caring for an addict noted how their lives had improved. On an individual level, the aftereffects of exposure to negative stereotypes, feelings of inadequacy, and obsessive, repetitive thinking may all work to stunt the healing process. It is noted that increased social support facilitates positive outcomes for growing from adversity. The study demonstrates that helping parents who have gone through a DRD build their social networks and sense of efficacy is considered to be important.

The fourth article, authored by Koutná et al. and titled "*Posttraumatic stress and growth in adolescent childhood cancer survivors: links to quality of life*," was published as an original research article. The manuscript focuses on the widely discussed and clinically relevant question of the association of post-traumatic stress (PTSS) and post-traumatic growth (PTG) with overall psychosocial adjustment (Quality of life QOL) in long-term childhood cancer survivors. Using a cohort of 172 survivors, it analyzes the associations of stress and growth with various dimensions of quality of life in two age groups (children and adolescents) suffering from pediatric cancer. After controlling age, gender, and time off treatment, the relationship of PTSS and PTG with QOL was significant by regression analyses in a sample of adolescent cancer survivors. However, negative relationships between PTSS and QOL were found, but the relationships between QOL and PTG were insignificant in children. The results illustrate that the relationship between post-traumatic growth and overall adaptation may take different forms at different developmental stages and offer a new perspective on the possible implications of the relationships found.

The fifth article, authored by Blom et al. and titled "*Sub-groups (profiles) of individuals experiencing post-traumatic growth during the COVID-19 pandemic*," examined PTG in the context of the negative consequences of the COVID-19 pandemic. The main aim was to assess whether distinct sub-groups of individuals experiencing PTG could be identified by how they appraised and coped with the pandemic. They selected a sample of 392 individuals from the general population who had experienced moderate degrees of pandemic-related PTG. Authors have identified two sub-groups that appraised and coped with the pandemic differently. The first resilient group was characterized by increased coping flexibility and greater use of positive reappraisal. Higher levels of stressfulness and greater use of rumination characterized the second stressed group.

The sixth article, authored by Chen et al. and titled "*Perceived posttraumatic growth after interpersonal trauma and subsequent well-being among young Colombian adults: a longitudinal analysis*," was published as a brief research report. The relationships between perceived PTG and wellbeing across time, especially across domains of functioning, have been the subject of few rigorous investigations. The study is a three-wave longitudinal study of 636 Colombian young adults to investigate the links between perceived PTG and seventeen outcomes measuring mental, social, and physical health. These outcomes included self-rated mental health, meaning in life, happiness, and satisfaction with one's own life. Perceived PTG assessed in Wave 2 was strongly associated with enhancements in one or more aspects of each wellbeing domain assessed in Wave 3 about 6 months later. This was found using an outcome-wide analytic design that included steps to control for potential confounding and reverse causation by adjusting for a range of covariates assessed in Wave 1. The results of this study provide longitudinal data that suggests an association between perceived PTG and improved wellbeing.

The seventh article, authored by Menger et al. and titled "*The nature and content of rumination for head and neck cancer survivors*," was published as an original research article. Head and Neck Cancer (HNC) can be scary to diagnose and treat. Constant difficulties with everyday activities like speaking and eating may persist after cancer therapy. Compared to survivors of other malignancies, those with an HNC often do worse emotionally. Post-traumatic growth (PTG) is associated with improved health-related quality of life, and it occurs in some people who have survived HNC. Few studies have examined the path toward PTG in cancer but doing so might help shape therapies for better health outcomes in HNC and the avoidance of post-traumatic stress disorder (PTSD). There is general agreement that it helps to be able to think about and process past trauma. Twenty cancer survivors from a variety of HNC subtypes participated in this qualitative research to better understand the impact of this disease and its treatment on rumination. The results provide light on the kind and subject matter of rumination that occurs when HNCs reflect on their experiences. Their findings imply that many thoughts that arise after HNC are fleeting. The anxious and invasive thoughts plaguing us as children often give way to more introspective ruminating as we age. Some HNC survivors are at a higher risk of PTSS because they dwell excessively on the most unpleasant or stressful parts of their treatment.

The eighth article, authored by Yasdiman et al. and titled "*Examining the protective influence of post-traumatic growth on interpersonal suicide risk factors in a 6-week longitudinal study*," was published as a brief research report. Although suicide is avoidable, it nonetheless claims the lives of about 703,000 individuals worldwide yearly, according to the World Health Organization. Accordingly, to develop evidence-based suicide prevention measures, it is essential to look at risk and protective variables. Post-traumatic growth (PTG) has recently gained attention as a protective factor against suicide. PTG is described as beneficial psychological changes from coping with stressful situations. For instance, prior studies linked PTG with reduced suicide ideation, showing that the ability to draw positive lessons from adversity (i.e., perceive PTG) might serve as a protective factor against the development

of suicidal musings. However, the research does not provide a clear explanation for the mechanism behind this association. Perceived burdensomeness (i.e., feeling like a burden to others) and thwarted belongingness (i.e., a sense of failed connectivity) are two interpersonal suicide risk variables that have recently been linked negatively to PTG in cross-sectional studies. In the present publication, we followed up on that study and looked into the connection between the two variables using a longitudinal methodology. The results demonstrated that PTG mediated the reductions in burdensomeness from recent negative experiences 6 weeks later. Our research has implications for suicide prevention and may be used in clinical settings to lessen the effect of negative judgments of burdensomeness and thereby minimize suicidal thoughts.

The ninth article, authored by Moore et al. and titled "*Growth and hope after loss: how TAPS facilitates post-traumatic growth in those grieving military deaths*," was published as an original research article. Suicide bereavement research has mostly focused on psychopathology. Investigating the potential for one's own development in the midst of an upsetting and traumatic experience is the focus of a new subfield within the field of positive psychology, which provides an additional avenue for better comprehending the implications of the event in question. This study also suggests that assisting others promotes personal development and recovery. When asked about one's mental health, peer mentors of the recently bereaved reported higher levels of PTG. Participation in Tragedy Assistance Program for Survivors (TAPS) and resilience were shown to be reliable and favorable predictors of all subtypes of PTG.

The tenth article, authored by Bakaitytè et al., examined the path from the centrality of an event to PTG, involving intrusive and deliberate rumination and self-blame, as a coping strategy in women survivors of intimate partner violence (IPV). In order to reach this aim, a sample of two hundred women with a history of IPV were recruited, and a series of self-report measures were administered. The path analysis results showed that the event's higher centrality was related to higher levels of intrusive rumination, which was positively related to self-blame and deliberate rumination, eventually leading to PTG. Indirect effects from the centrality of an event to PTG through intrusive and deliberate rumination and from intrusive to deliberate rumination through self-blame were also detected.

The last article, authored by Dominick and titled "*Changes in post-traumatic growth, core belief disruption, and social support over the first year of the COVID-19 pandemic*," was published as an original research article. This manuscript explores the relative impact of various sources of social support, including support from pets and various coping strategies on post-traumatic growth (PTG) over the first year of the COVID pandemic and a highly contentious political election. Data were collected at a four-time interval from April 2020 (T1) until April 2021 (T4). Although there was no statistically significant change in overall PTG between Time 1 and Time 4, there was a substantial rise in core belief disruption, a reduction in the use of coping techniques, and an increase in the feeling of personal strength and new possibilities. Pet owners, those who knew someone hospitalized with COVID-19, and people who knew someone who died from COVID-19 all had higher PTG. People who saw the incident as concluded had greater PTG than those who saw it as continuing, even though people's ratings of COVID-19 or politics as the most stressful event at Time 4 did not correlate with variations in PTG. Personal exposure to or immunization against COVID-19 did not correlate with different rates of post-traumatic growth. Core belief disruption and social support, as well as support from video conferencing, predicted PTG at Time 4 for both the complete sample and the pet owners alone group. Disrupting fundamental beliefs, focusing on problems, and avoiding triggers all predicted PTG at time four. The PTG theoretical model serves as the basis for discussing the results. Implications for therapies to promote psychological development are also discussed; they include both standard and non-traditional social support mechanisms, such as distant communication and perceived support from pets. Given the time constraints, learning about the benefits of alternative means of obtaining social support is important for informing intervention techniques targeted at enhancing mental health. The findings of this study provide validity to the PTG theoretical model and shed light on who is more likely to undergo psychological development and which variables impact this process.

The last article by Chin et al. aimed to propose a theoretical framework integrating three areas of research: race-based trauma, PTG, and racial identity narratives. Based on the work on Black and Asian American identity and integrating theory and research on historical trauma and PTG, the framework presented by the Authors posits that the transformation of externally imposed narratives into more authentic, internally generated ones can serve as an important influence that sparks PTG after racial trauma. Strategies and tools that enact the cognitive processes of PTG, including writing and storytelling, are finally suggested by the Authors as ways to promote PTG in response to racial trauma.

In conclusion, post-traumatic growth has been investigated with a variety of traumatic events. The results indicate that people may recover and even thrive despite experiencing traumatic events, including head and neck cancer, childhood cancer, suicide, drug overdose mortality, the COVID-19 Crisis, interpersonal trauma, relationship abuse, and racial trauma. Several papers have discussed the numerous personal and societal aspects that contribute to PTG and the ways in which PTG and its associated domains evolve through time. As a result, healthcare professionals and researchers must prioritize the prevention, assessment, and treatment of mental health concerns among people dealing with several traumatic incidents.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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ORIGINAL RESEARCH
published: 24 June 2022
doi: 10.3389/fpsyg.2022.920691

Posttraumatic Growth, Positive Psychology, Perceived Spousal Support, and Psychological Complications in Head and Neck Cancer: Evaluating Their Association in a Longitudinal Study

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Specialty section:
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

Received: 14 April 2022
Accepted: 03 June 2022
Published: 24 June 2022

Citation:
Nik Jaafar NR, Abd Hamid N, Hamdan NA, Rajandram RK, Mahadevan R, Mohamad Yunus MR, Zakaria H, Mohd Shariff N, Hami R, Isa S, Shari NI and Leong Bin Abdullah MFI (2022) Posttraumatic Growth, Positive Psychology, Perceived Spousal Support, and Psychological Complications in Head and Neck Cancer: Evaluating Their Association in a Longitudinal Study. Front. Psychol. 13:920691. doi: 10.3389/fpsyg.2022.920691

Despite head and neck cancer (HNC) association with various negative impacts, collective evidence is accumulating regarding the positive impacts of positive psychology on cancer survivors. However, data on how positive psychology is related to the psychological complications of HNC across time are lacking. This longitudinal study examined the trends of positive psychology (e.g., posttraumatic growth [PTG], hope, and optimism), perceived spousal support, and psychological complications (e.g., depression, anxiety, and posttraumatic stress symptoms) and determined the association between them, psychological complications, and PTG across two timelines among a cohort of HNC patients. A total of 175 HNC respondents exhibited an increasing trend of positive psychology and perceived spousal support while reporting a decreasing trend of psychological complications between baseline and follow-up assessments. A greater degree of hope and perceived spousal support contributed to a higher degree of PTG across time. Conversely, a higher severity of anxiety symptoms was associated with a lower degree of PTG over time. Female gender had a moderating effect on the association between severity of anxiety symptoms and PTG, but did not moderate the association between hope, perceived spousal support and PTG. This study indicates the pivotal role of incorporating psychosocial interventions into the treatment regimen to enhance the degree of hope and perceived spousal support and reduce the severity of anxiety symptoms, which, in turn, will facilitate the development of PTG in HNC patients.

Keywords: posttraumatic growth, head and neck cancer, positive psychology, perceived spousal support, depression, anxiety

INTRODUCTION

Head and neck cancer (HNC) refers to malignant tumors that develop around the head and neck area, such as the throat, mouth, nose, and ear (National Cancer Institute, 2021). The worldwide incidence of HNC is ∼900,000 cases, whereas its mortality rate is as high as 400,000 deaths annually (Global Cancer Observatory, 2021). HNC contributes to a wide range of psychosocial issues, such as depression, anxiety, substance use disorder, suicide, conflict in interpersonal relationships, damage to self-esteem, social isolation, and facial disfigurement (Smith et al., 2017). It must be properly managed to ensure positive outcomes in the physical and mental wellbeing of HNC patients.

Notwithstanding these negative impacts of HNC, positive psychology, such as posttraumatic growth (PTG), hope, and optimism, has been reported in HNC patients (Ho et al., 2011; Leong Abdullah et al., 2015). PTG is defined as a positive psychological change resulting from struggles with highly challenging life crises or traumatic events. A greater degree of PTG in cancer patients may result in a better appreciation of life, improved interpersonal relationships, greater spiritual development, more possibilities in life, and enhancement of the personal strengths of patients (Calhoun and Tedeschi, 2006). PTG develop when cognitive processing and reappraisal of the traumatic event of living with cancer occurred. When there is integration of the trauma-related information to facilitate the reconstruction of the new assumptive worldview on self, others and the surrounding environment, *via* the process of accommodation, search of meaning out of the trauma of living with cancer occurred. A successful search of meaning to solve unproductive ruminations such as cognitive posttraumatic stress symptoms and fear of cancer progression, and facilitate the reconstruction of the new assumptive worldview on self, others and the surrounding environment, will lead to development of PTG (Leong Abdullah et al., 2019; Ochoa Arnedo et al., 2019).

The relationship between hope, optimism, and PTG in cancer patients remains inconsistent; some studies have revealed a direct association, whereas others have reported no association between them (Shand et al., 2015; Casellas-Grau et al., 2017). In the context of HNC patients, Ho et al. (2011) conducted the only cross-sectional study that investigated the relationship between hope, optimism, and PTG. The study reported that only the pathway domain of hope was associated with PTG and not the agency domain of hope and optimism (Ho et al., 2011). Hope may promote cognitive reappraisal of living with cancer and positively rethink on the trauma of having cancer. Hope also facilitates the acceptance of the traumatic event and leads to reconstruction of the of the new assumptive worldview on self, others and the surrounding environment. Hence, it may contribute to higher PTG among cancer patients (Leong Abdullah et al., 2019). In the context of optimism, Tedeschi and Calhoun (2004) stated that people with higher degree of optimism tend to concentrate on the most important points in life and forego unachievable goals and worldviews that are no longer consistent with the trauma-related event of living with cancer, which in turn will facilitate threat appraisal and cognitive reprocessing enhancing the search for meaning out of the trauma-related event, hence this promotes the development of PTG among cancer patients. The theoretical framework of the possible association between hope, optimism, perceived spousal support, psychological complications related to cancer and PTG are illustrated in **Figure 1**. To date, no longitudinal study has focused on the assessment of the relationship between these forms of positive psychology in HNC patients.

Social support forms a bidirectional relationship with positive psychology in cancer patients. Specifically, spousal support helps promote the active disclosure of life events and crises of cancer patients to their partners; this encourages cognitive reappraisal of the traumatic event of cancer diagnosis, thus fostering meaning making out of the cancer experience and eventually leading to PTG (Tedeschi and Calhoun, 2004; Shand et al., 2015; **Figure 1**). In the context of Malaysian cancer patients, PTG was found to be positively associated with perceived spousal support, particularly instrumental support (Schroevers and Teo, 2008; Leong Abdullah et al., 2019). However, to date, no longitudinal study has investigated how perceived spousal support is related to PTG across time in HNC patients.

It is interesting to explore how common psychological complications related to cancer [such as depression, anxiety and posttraumatic stress symptoms (PTSSs)] are link to PTG among HNC patients. Overwhelming severity of depression, anxiety and PTSSs may disrupt the cognitive processing and search of meaning out of the trauma of living with cancer. Even if search for meaning out of the trauma of living with cancer occurred, if the search for meaning failed to solve unproductive ruminations such as cognitive posttraumatic stress symptoms, it may disrupt development of PTG (Ochoa Arnedo et al., 2019; **Figure 1**). Depression and anxiety are prevalent in patients with cancer because of the complications of facial disfigurement, which may increase the psychological vulnerability of patients because of society's emphasis on physical attractiveness (Long et al., 1996; Dropkin, 1999). The prevalence of depression and anxiety in HNC patients could be as high as 28 and 37%, respectively (Kugaya et al., 2000; Humphris et al., 2003; Massie, 2004). Therefore, evaluating whether depression and anxiety affect PTG in HNC patients would be interesting. Studies of PTG in other sites of cancer reported that there was only a weak negative association between depression and PTG, but there was an absence of association between anxiety and PTG (Shand et al., 2015). As for HNC patients, only a few studies have examined the relationship between depression, anxiety, and PTG. In a Malaysian study of HNC patients with a sample size of only 50 subjects, depression and anxiety were not found to be associated with PTG (Leong Abdullah et al., 2015). However, in a small-scale Dutch study of HNC survivors with psychological distress ($n = 74$), the absence of anxiety disorder was found to be associated with a higher degree of PTG (Holtmaat et al., 2017). To date, data are lacking on how depression and anxiety are related to PTG across time.

Besides depression and anxiety, PTSSs were reported in 33.4% of cancer survivors, and about 11.8% of survivors met the diagnostic criteria for posttraumatic stress disorder (PTSD) (Moschopoulou et al., 2018). Based on studies of PTG in patients diagnosed with cancer in other sites, PTSSs were

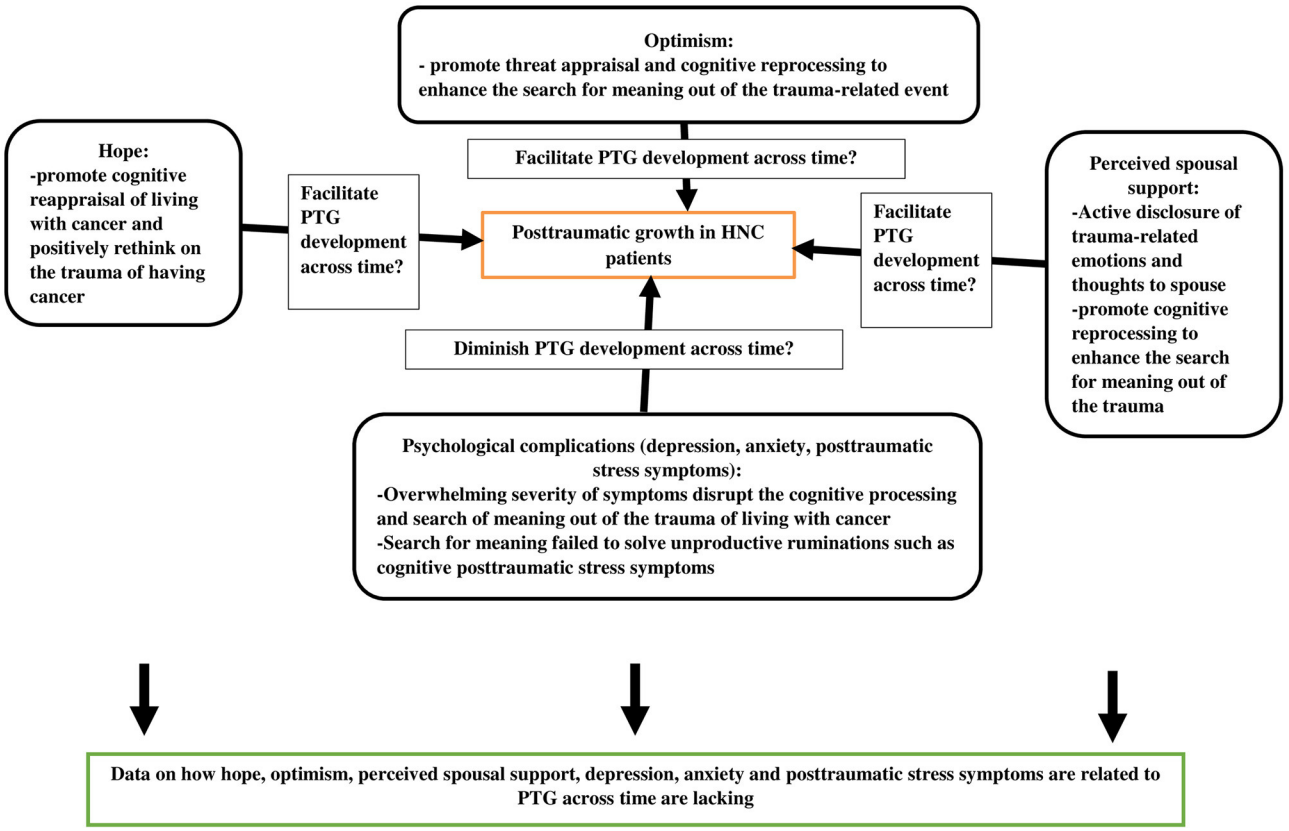

FIGURE 1 | The theoretical framework of the possible association between hope, optimism, perceived spousal support, psychological complications related to cancer and posttraumatic growth among cancer patients.

weakly positively associated with PTG (Shand et al., 2015). Again, to the best of the authors' knowledge, no study has been conducted to date regarding how PTSSs are related to PTG over time. Therefore, the present longitudinal study was conducted to fill this research gap by (1) examining the trends of positive psychology (e.g., PTG, hope, and optimism), perceived spousal support, and psychological complications (e.g., depression, anxiety, and PTSSs) across time and (2) determining the association between positive psychology (e.g., hope and optimism), perceived spousal support, psychological complications (e.g., depression, anxiety, and PTSSs), and PTG across time after controlling for socio-demographic and clinical characteristics among a cohort of HNC patients.

METHODS

Study Design and Respondent Recruitment

This longitudinal study was conducted from January 2019 to December 2020. The study population was recruited from HNC patients who were registered for treatment in two major tertiary referral centers for oncology in Malaysia. G*Power 3.1.9.7 was used for the calculation of sample size to compute two dependent means (matched pairs); with reference to a prospective study of HNC patients in Malaysia (Leong Abdullah et al., 2015), the effect size was 0.25, the α error was 0.05, and the power of the study was 0.8. Therefore, the sample size needed for the study was 152 subjects (after the inclusion of an estimated dropout rate of 20%). A total of 175 participants were drawn from a longitudinal study of the relationship between PTG and coping strategies in HNC patients (Nik Jaafar et al., 2021).

Consecutive sampling was used, in which HNC patients who attended the oncology and otorhinolaryngology units of the two targeted referral centers were approached by the research team and screened for eligibility criteria. The inclusion criteria were (1) those diagnosed with HNC, completed treatment within no more than 1 year, and at any stage of cancer (confirmed by a histopathological report); (2) those who are fit to answer questionnaires; and (3) those who were married or in a stable relationship for at least 6 months. The exclusion criteria were (1) those with a history of pre-existing mental illnesses (e.g., psychotic disorders, depressive disorders, bipolar mood disorder, anxiety disorders, and obsessive compulsive disorder), (2) those with a history of illicit drug and alcohol use, (3) those with a history of medical illnesses that may induce depressive and anxiety symptoms (e.g., hyperthyroidism, hypothyroidism, cerebrovascular accident, ischemic heart diseases, chronic obstructive airways disease, chronic pain, multiple sclerosis, Parkinson's disease, Addison's disease, Cushing's disease, and

epilepsy), and (4) those with regular medications that may induce depressive and anxiety symptoms (e.g., clonidine, guanethidine, methyldopa, reserpine, beta blockers, isotretinoin, levetiracetam, triptans, corticosteroids, oral contraceptives, gonadotropin-releasing hormone agonists, tamoxifen, varenicline, interferons, and levodopa). Those who met all eligibility criteria were invited to participate in the study and signed informed consent forms before they were enrolled in the research. The purpose of the study, the study procedures, the participants' anonymity, and their right to withdraw from the study were explained to them. The research received approval from the Human Research Ethics Committee of the two targeted tertiary referral centers for oncology where the study subjects were recruited.

Measures

Data collection was performed by a research assistant who was not involved in the study to avoid observer bias. Social desirability bias was minimized through the assurance of anonymity and confidentiality of the information that the respondents disclosed in this study. They were also not required to disclose any personal identification information during the assessments. Respondent assessments in this study were performed across two timelines, which were the baseline assessment (when the respondents were first enrolled in the study) and the follow-up assessment (which were between 5 and 7 months after the baseline assessment). During the baseline assessment, the respondents were administered the socio-demographic and clinical characteristics questionnaire, the Malay versions of the Posttraumatic Growth Inventory-Short Form (PTGI-SF), the Dispositional Hope Scale, the Sources of Social Support Scale (SSSS), the Life Orientation Test-Revised (LOT-R), the Hospital Anxiety and Depression Scale (HADS), and the PTSD Checklist for DSM-V (PCL-5). During the follow-up assessment, the respondents were re-administered with the question on the mode of treatment received, the Malay versions of the PTGI-SF, the Disproportional Hope Scale, the SSSS, the LOT-R, the HADS, and the PCL-5.

Outcome Variable (Posttraumatic Growth)

In this study, the Malay version of the PTGI-SF was used to measure the degree of PTG among the respondents. The PTGI-SF is a shorter version of the Posttraumatic Growth Inventory (PTGI), which could substitute for the PTGI without any loss of information. The PTGI-SF is a self-reporting instrument made up of 10 items designating five domains (appreciation of life, relating to others, spiritual development, personal strength, and new possibilities in life). Each item is scored on a Likert scale ranging from 0 to 5. Therefore, the total score may range from 0 to 50, with a higher score indicating a higher degree of PTG. The PTGI-SF exhibited good internal consistency with a Cronbach's α of 0.86 (Cann et al., 2010). The Malay version of the PTGI-SF has been validated in the Malaysian cancer population and reported good internal consistency with a Cronbach's α of 0.89; confirmatory factor analysis revealed that it has five domains similar to the original English version of the PTGI-SF (Leong Bin Abdullah et al., 2017a). In this study, the Cronbach's α of the Malay version of the PTGI-SF was 0.94, whereby the internal consistency was excellent.

Explanatory Variables

Hope

The Malay version of the Dispositional Hope Scale was administered to the respondents to assess their level of hope. It is a self-rated 12-item scale and consists of two subscales that incorporate Snyder's cognitive model of hope: (a) agency (goal-directed energy) and (b) pathways (planning to accomplish goals). Four of the 12 items assess agency, whereas another four items assess pathways. The other four items are fillers. Each item is scored using a Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree) (Everson et al., 1996). Therefore, the total score ranges from 8 to 32. A higher score indicates a higher degree of hope. The Malay version of the Hope Scale was validated in Malaysian cancer patients and demonstrated acceptable internal consistency with a Cronbach's α of 0.716; confirmatory factor analysis revealed that it has two domains similar to the original English version of the Dispositional Hope Scale (Leong Bin Abdullah et al., 2018). In this study, the internal consistency of the Malay version of the Hope Scale registered a good Cronbach's α of 0.89.

Optimism

The Malay version of the LOT-R was administered to the respondents to assess their degree of optimism. The LOT-R is a self-rated tool derived from the Life Orientation Test, in which the LOT-R omitted or rewrote items that did not focus on explicit expectations. It consists of six items designated to two domains (optimism and pessimism). Three items are assigned to the optimism domain, and another three items are assigned to the pessimism domain. Each item is scored on a Likert scale ranging from 0 (strongly disagree) to 4 (strongly agree). A higher score indicates a higher degree of optimism. It has good internal consistency and is stable over time. The positive and negative subsets are more strongly related to each other than those in LOT (Scheier et al., 1994). The Malay version of the LOT-R was validated in the Malaysian cancer population and exhibited a Cronbach's α of 0.58. Confirmatory factor analysis revealed that it has two domains similar to the original English version of the LOT-R (Leong Bin Abdullah et al., 2017b). In this study, the internal consistency of the Malay version of the LOT-R exhibited a Cronbach's α of 0.57.

Perceived Spousal Support

The Malay version of the SSSS was used to assess the degree of perceived spousal support among the respondents in this study. The SSSS is a self-rated questionnaire consisting of 10 items scored on a Likert scale ranging from 1 = not at all to 5 = a lot. Therefore, the total score ranges from 10 to 50. A higher score denotes a greater degree of perceived spousal support (Kinsinger et al., 2011). The Malay version of the SSSS was validated in Malaysian cancer patients and exhibited acceptable internal consistency with a Cronbach's α of 0.72 (Leong Bin Abdullah et al., 2017c). In this study, the internal consistency of

the Malay version of the SSSS was acceptable with a Cronbach's α of 0.74.

Depression and Anxiety

The Malay version of HADS was used to measure the degree of depressive and anxiety symptoms experienced by the respondents. HADS is a self-rated questionnaire with seven items designated to the depression subscale and another seven items designated to the anxiety subscale. It is suitable for assessing the severity of depression and anxiety symptoms in patients with medical illnesses, such as cancer patients, as HADS focuses on psychological symptoms rather than physical symptoms; the latter, as well as depression and anxiety, may be present in cancer. Each item is scored from 0 to 3, and the range of total scores for both depressive and anxiety subscales is 0 to 21 per subscale (Zigmond and Snaith, 1983). The cut-off for caseness of depression is 8/21, and that for caseness of anxiety is also 8/21. The anxiety subscale has a sensitivity of 0.9 and a specificity of 0.78, and the depression subscale has a sensitivity of 0.83 and a specificity of 0.79 (Bjelland et al., 2002). The Malay version of HADS was validated in Malaysian breast cancer patients and exhibited acceptable to good internal consistency for its total score and subscales, with a Cronbach's α ranging from 0.73 to 0.87 (Yong et al., 2016). In this study, the Malay version of HADS reported an excellent internal consistency with a Cronbach's α of 0.90.

Posttraumatic Stress Disorder Symptoms

The Malay version of the PCL-5 was administered to the respondents to evaluate their degree of PTSSs. The PCL-5 is a self-rated tool that consists of 20 items derived from the Diagnostic and Statistical Manual for Mental Disorders diagnostic criteria for PTSD. Each item is scored in a Likert scale ranging from 0 = "Not at all" to 4 = "Extremely." Therefore, its total score may range from 0 to 80. The PCL-5 exhibits good psychometric properties (Blevins et al., 2015). The Malay version of the PCL-5 was validated in the Malaysian population that had traumatic experiences, and it showed good psychometric properties with strong internal consistency (Cronbach's $\alpha = 0.89$; Bahari et al., 2019). In this study, the internal consistency of the Malay version of the PCL-5 was excellent with a Cronbach's α of 0.96.

Sociodemographic and Clinical Characteristics

The data collected on the sociodemographic characteristics of the respondents included gender, age, monthly household income, and education. The responses to the question on gender were documented as either "male" or "female." The responses to the item on age were recorded as "18 to 40 years old," "41 to 60 years old," and "more than 60 years old." The responses to monthly household income were documented as "less than RM 3000," "RM 3000 to RM 6000," and "more than RM 6000." Finally, the responses to education were recorded as "up to primary education," "up to secondary education," and "up to tertiary education."

Regarding clinical characteristics, data were collected on the following: type of HNC, time since treatment completion, stage of cancer, and modalities of treatment received and completed. The responses to the item on type of HNC were documented as "nasopharyngeal carcinoma," "oral cancer," "thyroid cancer," and "other types of head and neck cancers." The responses to the time since treatment completion were reported as either "less than 6 months" or "6 to 12 months." The responses to the item on stage of cancer were documented as "stage 1," "stage 2," "stage 3," and "stage 4." Finally, the responses to the item on the modalities of treatment received and completed were recorded as "surgery only," "chemotherapy only," "surgery and chemotherapy," "surgery and radiotherapy," "chemotherapy and radiotherapy," and "surgery, chemotherapy and radiotherapy."

Statistical Analysis

Data analysis was performed with the Statistical Package for Social Sciences version 26 (SPSS 26). Descriptive statistics were reported for socio-demographic and clinical characteristics, the total PTGI-SF, total HS, total LOT-R, HADS depressive and anxiety subscale, total PCL-5, and total SSSS scores at baseline and follow-up assessments. The categorical variables were presented as frequencies and percentages. The continuous variables were described as means and standard deviations, as the Shapiro-Wilk test indicated that the continuous variables were normally distributed ($p > 0.05$). There were no missing data.

To achieve objective (1) of the study, a paired *t*-test was applied to compare the differences in the total PTGI-SF, total HS, total LOT-R, HADS depressive and anxiety subscale, total PCL-5, and total SSSS scores between baseline and follow-up assessments. To achieve objective (2) of the study, a random intercept model was applied, as the measures were not conducted on a predetermined fixed schedule (the time interval between baseline and follow-up assessments ranged from 5 to 7 months). Statistical significance was set at $p < 0.05$ for the paired *t*-test and repeated measures mixed effect model, and it was two sided.

As gender was a significant factor associated with PTG in cancer patients (Shand et al., 2015), a subgroup analysis was performed to evaluate the moderating effect of gender on the association between significant factors identified in the random intercept model and PTG by moderator analysis with a dichotomous moderator (gender). Statistical significance was set at $p < 0.05$ and it was two-sided.

RESULTS

Respondents' Characteristics

The sociodemographic and clinical characteristics of the respondents are summarized in **Table 1**. Males constituted slightly more than half of the total respondents, and seven-tenths of the respondents were in the middle age group. Half of the respondents were diagnosed with nasopharyngeal carcinoma and had completed treatment within <6 months. More than half of the respondents were at stage 2 and stage 3 of cancer. Majority of the respondents received and completed at least two modalities of cancer treatment.

TABLE 1 | Socio-demographic and clinical characteristics of respondents.

Variables	Frequency (*n*)	Percentage (%)
Gender		
Male	94	53.7
Female	81	46.3
Age		
18–40 years	10	5.7
41–60 years	125	71.4
>60 years	40	22.9
Monthly household income		
<RM 3,000	132	75.4
RM 3,000–6,000	28	16
>RM 6,000	15	8.6
Education		
Primary education	45	25.7
Secondary education	73	41.7
Tertiary education	57	32.6
Types of head and neck cancer		
Nasopharyngeal carcinoma	89	50.9
Oral cancer	40	22.9
Thyroid cancer	25	14.3
Others	21	12
Time since completion of treatment		
<6 months	89	50.9
6–12 months	86	49.1
Stage of cancer		
Stage 1	38	21.7
Stage 2	51	29.1
Stage 3	53	30.3
Stage 4	33	18.9
Treatment modalities received and completed		
Surgery only	7	5.7
Chemotherapy only	24	13.7
Surgery and chemotherapy	23	13.1
Surgery and radiotherapy	23	13.1
Chemotherapy and radiotherapy	54	30.9
Chemotherapy, radiotherapy, and surgery	44	25.1

Trend of Posttraumatic Growth, Positive Psychology, and Psychological Complications Across Time

The mean total PTGI-SF, SSSS, LOT-R, Dispositional Hope Scale, PCL-5, and HADS subscale scores during the baseline and follow-up assessments are shown in **Table 2**. The degree of positive psychology, such as PTG, hope, optimism, and perceived spousal support, exhibited a significantly increasing trend from baseline to follow-up. Conversely, the degree of psychological complications, such as depressive symptoms, anxiety symptoms, and PTSSs, showed a significantly decreasing trend from baseline to follow-up.

Association Between Positive Psychology, Psychological Complications, Sociodemographic and Clinical Characteristics, and PTG Across Time

The associations between the total SSSS, LOT-R, Dispositional Hope Scale, PCL-5, and HADS subscale scores, sociodemographic and clinical characteristics, and the total PTGI-SF score across the timeline between baseline and follow-up assessments are presented in **Table 3**. The random intercept model revealed that the only positive psychology significantly associated with PTG across time was hope. A greater degree of hope significantly contributed to a higher degree of PTG among the respondents [estimate = 0.098, 95% confidence interval (CI) = 0.003–0.193, standard error (SE) = 0.048, $t = 2.020$, $p = 0.044$]. In addition, a greater degree of perceived spousal support was significantly associated with a higher degree of PTG across time (estimate = 0.515, 95% CI = 0.349–0.681, SE = 0.084, $t = 6.098$, $p < 0.001$). Contrastingly, anxiety symptoms were the only psychological complications significantly associated with PTG across time, in which a higher degree of anxiety symptoms contributed to a lower level of PTG among the respondents (estimate = −0.529, 95% CI = −0.922 to −0.136, SE = 0.200, $t = -2.650$, $p = 0.008$).

As for sociodemographic and clinical characteristics, the random intercept model indicated that gender was the only factor significantly associated with PTG across time. Males exhibited a significantly lower level of PTG than females across time (estimate = −2.882, 95% CI = −5.179 to −0.583, SE = 1.164, $t = -2.474$, $p = 0.014$).

Moderating Effect of Gender in the Association Between Hope, Perceived Spousal Support, Severity of Anxiety Symptoms, and PTG

The moderating effect of gender on the association between hope and PTG among the HNC respondents are summarized in **Table 4**. In model 1, gender ($p = 0.029$) and hope ($p = 0.015$) were significantly associated with PTG. The linear regression model contributed to a significant regression equation of $F_{(2,172)} = 3.721$ with $R^2 = 0.041$ and $p = 0.026$. In model 2, when the interaction between female and hope was added to the model, the R^2 change (0.004) was non-significant ($p = 0.591$), indicating that the female gender did not moderate the association between hope and PTG.

The moderating effect of gender on the association between perceived spousal support and PTG among the HNC respondents are presented in **Table 5**. In model 1, gender ($p = 0.043$) and perceived spousal support ($p < 0.001$) were significantly associated with PTG. The linear regression model contributed to a significant regression equation of $F_{(2,172)} = 16.417$ with $R^2 = 0.160$ and $p < 0.001$. In model 2, when the interaction between female and perceived spousal support was added to the model, the R^2 change (0.025) was non-significant ($p = 0.150$), depicting

TABLE 2 | Mean total PTGI-SF, SSSS, LOT-R, Dispositional Hope Scale, PCL-5, and HADS subscale scores during baseline and follow up assessments.

Variables	Baseline assessment		Follow up assessment		*p*-value
	Mean	Standard deviation	Mean	Standard deviation	
Total PTGI-SF score	34.05	11.20	39.43	9.40	<0.001*
Total SSSS score	40.62	6.78	42.11	6.47	0.023*
Total LOT-R score	13.83	2.44	14.86	3.37	0.002*
Total Hope Scale score	24.87	3.84	26.97	2.21	<0.001*
HADS anxiety subscale	6.95	4.23	5.41	4.54	<0.001*
HADS depression subscale	6.63	4.37	5.25	4.30	0.002*
Total PCL-5 score	15.5	14.57	12.87	14.28	0.047*

**Statistical significance at $p < 0.05$; PTGI-SF, Posttraumatic Growth Inventory-Short Form; SSSS, Source of Social Support Scale; LOT-R, Life Orientation Test-Revised; HADS, Hospital Anxiety and Depression Scale; PCL-5, PTSD checklist for DSM-V.*

that the female gender did not moderate the association between perceived spousal support and PTG.

Finally, the moderating effect of gender on the association between severity of anxiety symptoms and PTG among the HNC respondents are illustrated in **Table 6**. In model 1, gender ($p = 0.048$) and severity of anxiety symptoms ($p = 0.001$) were significantly associated with PTG. The linear regression model contributed to a significant regression equation of $F_{(2,172)} = 7.143$ with $R^2 = 0.077$ and $p = 0.001$. In model 2, when the interaction between female and severity of anxiety symptoms was added to the model, the R^2 change (0.065) was significant ($p = 0.022$), denoting that the female gender moderated the association between severity of anxiety symptoms and PTG. Higher interaction between female gender and severity of anxiety symptoms contributed to significantly higher degree of PTG (B = 0.625, 95% CI = 0.091–1.160, SE = 0.269, $t = 2.328$, $p = 0.022$).

DISCUSSION

This longitudinal study assessed the trend of positive psychology (e.g., PTG, hope, and optimism), perceived spousal support, and psychological complications (e.g., depressive, anxiety, and PTSSs) and determined the association between positive psychology, perceived spousal support, psychological complications, and PTG across two timeframes in a cohort of HNC patients who had completed their cancer treatment within no more than 1 year. Our findings revealed that the degree of positive psychology (e.g., PTG, hope, and optimism) and perceived spousal support increased across time, whereas psychological complications (e.g., depressive, anxiety, and PTSSs) decreased across time. A higher degree of hope and perceived spousal support contributed to a higher level of PTG, whereas a greater severity of anxiety symptoms lowered the level of PTG across time among the HNC respondents. Nevertheless, optimism, depression, and PTSSs were not associated with PTG over time.

Studies have reported that positive psychology exhibits an increasing trend across time in cancer patients who are recently diagnosed. PTG demonstrated an increasing trend during the first 18 months after HNC treatment completion before it plateaued off after 18 months (Harding, 2018). The findings in this study confirmed the trend of PTG across time, as the HNC respondents were within the first 18 months after the completion of their cancer treatment. Regarding the trend of other forms of positive psychology across time, the degree of hope among cancer patients treated with curative intent increased over time compared with those who were treated with palliative intent (Sanatani et al., 2008). Similarly, the degree of optimism among newly diagnosed HNC patients also showed an increasing trend over time and was reported to predict 1-year survival (Allison et al., 2003). Our study sample, which consisted of individuals all treated with curative intent and completed cancer treatment within no more than 1 year, also exhibited similar increasing trends of hope and optimism across time, shedding new light on how the degree of hope and optimism varies over time.

As for perceived spousal support, a study by Song et al. (2012) among 134 couples (prostate cancer patients and their spouses) reported a significant increase in perceived spousal support and a significant decrease in uncertainty among cancer patients between baseline assessment and follow-up assessment after 12 months. The increasing trend of perceived spousal support over time was contributed by increased perceived communication between cancer patients and their spouses (Song et al., 2012). Therefore, the increasing trend of perceived spousal support among the HNC respondents in this study may be attributed to the increased communication between the respondents and their spouses after the diagnosis of cancer.

The prevalence of depression increased 3 weeks after the completion of cancer treatment, but it decreased 18 months after treatment completion in newly diagnosed HNC patients (Neilson et al., 2013). Our study findings supported the trend of depression in HNC patients, as depression decreased ∼18 months after the completion of cancer treatment (during the follow-up assessment). Regarding anxiety in HNC patients, its prevalence was high during pre-treatment, but it decreased over time after treatment completion (Wu et al., 2016). Our findings further confirmed the trend of anxiety over time in HNC patients, as reported in other studies in the HNC population. As for the trend of PTSSs in patients diagnosed with cancer in various sites, the prevalence of PTSSs was high at 3–6 months after diagnosis

TABLE 3 | The random intercept model between the socio-demographic and clinical characteristics, total SSSS, total Hope Scale, total LOT-R, total PCL-5 scores, HADS subscale scores (independent variables), and total PTGI-SF scores (dependent variable).

Variables	Estimate (95% CI)	Standard error	*t*	*p*-value
Gender				
Female	Reference			
Male	−2.882 (−5.179 to −0.583)	1.164	−2.474	0.014*
Age				
18–40 years	Reference			
41–60 years	2.926 (−3.971 to 7.823)	2.989	0.645	0.52
>60 years	0.663 (−4.669 to 6.000)	2.702	0.246	0.806
Monthly household income:				
<RM 3,000	Reference			
RM 3,000–6,000	−2.347 (−6.852 to 2.159)	2.283	−1.028	0.305
>RM 6,000	−0.767 (−5.517 to 3.983)	2.407	−0.319	0.75
Education				
Primary education	Reference			
Secondary education	2.391 (−1.097 to 5.879)	1.767	1.353	0.178
Tertiary education	−0.681 (−3.643 to 2.282)	1.501	−0.454	0.651
Types of head and neck cancer				
Others	Reference			
Nasopharyngeal carcinoma	−0.492 (−3.576 to 2.591)	1.563	−0.35	0.753
Oral cancer	−1.027 (−4.751 to 2.697)	1.887	−0.544	0.587
Thyroid cancer	−0.060 (−4.585 to 4.464)	2.293	−0.026	0.979
Time since completion of treatment				
<6 months	Reference			
6–12 months	−0.361 (−2.619 to 1.898)	1.145	−0.315	0.753
Stage of cancer				
Stage 1	Reference			
Stage 2	0.941 (−2.287 to 4.170)	1.636	0.576	0.566
Stage 3	0.948 (−2.452 to 4.349)	1.723	0.551	0.583
Stage 4	2.308 (−1.417 to 6.032)	1.887	1.223	0.223
Treatment modalities received and completed				
Surgery only	Reference			
Chemotherapy only	3.208 (−2.535 to 8.951)	2.91	1.103	0.272
Surgery and chemotherapy	0.144 (−5.615 to 5.903)	2.918	0.049	0.961
Surgery and radiotherapy	0.421 (−5.403 to 6.244)	2.951	0.143	0.887
Chemotherapy and radiotherapy	0.992 (−4.512 to 6.495)	2.788	0.356	0.723
Chemotherapy, radiotherapy, and surgery	−0.850 (−6.233 to 4.533)	2.727	−0.312	0.756
Total SSSS score	0.515 (0.349 to 0.681)	0.084	6.098	<0.001*
Total LOT-R score	0.215 (−0.166 to 0.595)	0.194	1.108	0.269
Total Hope Scale score	0.098 (0.003 to 0.193)	0.048	2.02	0.044*
HADS anxiety subscale	−0.529 (−0.922 to −0.136)	0.2	−2.650	0.008*
HADS depression subscale	0.086 (−0.296 to 0.468)	0.194	0.442	0.659
Total PCL-5 score	0.125 (-0.030 to 0.280)	0.079	1.584	0.114

*****Statistical significance at $p < 0.05$.*

and completion of treatment, but it followed a decreasing trend thereafter (O'Connor et al., 2011; Chan et al., 2018). This finding is in line with those reported in studies of patients with different sites of cancer, highlighting that the trend of PTSSs over time may be universal across patients with different sites of cancer.

Our study findings indicated that a higher degree of hope contributed to a higher degree of PTG among HNC patients over time, whereas optimism was not associated with PTG. In addition, a meta-analysis of studies of PTG in cancer patients revealed that optimism is only weakly correlated with PTG (Shand et al., 2015). Similar findings were also reported by Ho et al. (2011) in a study of oral cancer patients. It has been suggested that hope is a component of meaning making. Therefore, a higher degree of hope would allow cognitive

TABLE 4 | The moderating effect of gender on the association between the total Hope Scale score and total PTGI-SF score.

Variables	B (95% CI)	Standard error	*t*	*p*-value
(Model 1)[a]				
Gender				
Male	Reference			
Female	2.020 (1.281–5.321)	1.672	1.208	0.029*
Total Hope Scale	0.536 (0.106–0.965)	0.218	2.463	0.015*
(Model 2)[b]				
Gender				
Male	Reference			
Female	1.986 (−0.085 to 3.657)	1.587	1.190	0.177
Total Hope Scale	0.565 (−0.114 to 1.243)	0.641	1.656	0.102
Female x Hope Scale	0.301 (−0.810 to 1.411)	0.558	0.539	0.591

*****Statistical significance at $p < 0.05$.
[a]$F_{(2, 172)} = 3.721$, $R^2 = 0.041$, $p = 0.026$.
[b]R^2 change $= 0.004$, $p = 0.591$.

TABLE 5 | The moderating effect of gender on the association between the total SSSS score and total PTGI-SF score.

Variables	B (95% CI)	Standard error	*t*	*p*-value
(Model 1)[a]				
Gender				
Male	Reference			
Female	2.670 (0.079–5.261)	1.313	2.034	0.043*
Total SSSS	0.543 (0.343–0.744)	0.102	5.352	<0.001*
(Model 2)[b]				
Gender				
Male	Reference			
Female	1.967 (−0.090 to 3.234)	1.456	1.090	0.145
Total SSSS	0.320 (−0.007 to 0.647)	0.164	1.951	0.055
Female x SSSS	0.250 (−0.093 to 0.593)	0.172	1.454	0.150

*****Statistical significance at $p < 0.05$.
[a]$F_{(2, 172)} = 16.417$, $R^2 = 0.160$, $p < 0.001$.
[b]R^2 change $= 0.025$, $p = 0.150$.

TABLE 6 | The moderating effect of gender on the association between the HADS anxiety subscale score and total PTGI-SF score.

Variables	B (95% CI)	Standard error	*t*	*p*-value
(Model 1)[a]				
Gender				
Male	Reference			
Female	2.743 (0.026–5.460)	1.377	1.993	0.048*
HADS anxiety subscale	−0.490 (−0.790 to −0.191)	0.152	−3.237	0.001*
(Model 2)[b]				
Gender				
Male	Reference			
Female	2.867 (0.054–5.670)	1.567	2.345	0.034*
HADS anxiety subscale	−0.045 (−0.674 to 0.583)	0.316	−0.144	0.886
Female x HADS anxiety subscale	0.625 (0.091–1.160)	0.269	2.328	0.022*

*****Statistical significance at $p < 0.05$.
[a]$F_{(2, 172)} = 7.143$, $R^2 = 0.077$, $p = 0.001$.
[b]R^2 change $= 0.065$, $p = 0.022$.

reprocessing of trauma-related information of living with cancer and the adverse effects of its treatment, which may facilitate the search for meaning out of the trauma and facilitate the development of PTG (Hullmann et al., 2014). A higher degree of hope is also positively related to greater perceived social support, in which cancer patients with more hope may tend to utilize their social networks in order to cope with their highly stressful experience of living with cancer, thus enhancing the interpersonal relationship between the patients and their social network. This facilitates the development of PTG. A higher degree of hope is also associated with cognitive flexibility, in which cancer patients successfully readjust their goals in relation to the new circumstances of living with cancer, which may increase new possibilities in life. Moreover, a greater degree of hope is associated with higher self-efficacy. This may enhance patients' personal strengths and, in turn, increase their degree of PTG. Cancer patients with a higher level of hope may have a higher probability of finding meaning and benefitting out of the highly stressful experience of living with cancer, which may allow greater appreciation of life and facilitate the development of PTG (Leong Abdullah et al., 2019). Unlike hope, optimism is related only to PTG in certain circumstances, such as in cancer survivors who perceive that they have better control over their stress (Leong Abdullah et al., 2019).

In a cross-sectional study, a higher degree of social support was well-documented to predict a higher degree of PTG among HNC patients (Sharp et al., 2018). A meta-analysis of studies on PTG in cancer survivors also highlighted that increasing social support has a moderate effect on enhancing PTG in cancer survivors (Prati and Pietrantoni, 2009; Shand et al., 2015). The present study confirmed that social support, especially spousal support, could indeed contribute to facilitating the development of PTG in HNC survivors. Research has shown that just talking and venting any emotional turmoil that cancer patients experience to close family members could enhance emotional support from family members. This self-disclosure of thoughts and emotions could enhance personal strength in cancer patients, which, in turn, facilitates the development of PTG (Leong Abdullah et al., 2019). A higher degree of spousal support could also facilitate cognitive reprocessing of the trauma-related event of living with cancer, which, in turn, initiates meaning making and eventually facilitates the development of PTG (Schroevers et al., 2010).

On the contrary, a greater severity of anxiety symptoms was the only psychological complication associated with lower PTG across time. Our study confirmed the finding of a cross-study of PTG in Dutch HNC survivors, which reported that the presence of anxiety disorder, but not depression, lowers PTG among the survivors (Holtmaat et al., 2017). Similarly, a negative association between anxiety and PTG was also reported in breast cancer patients in the first year after the completion of cancer treatment (Wang et al., 2014; Canavarro et al., 2015). The HNC survivors in our study may be heavily burdened by anxiety symptoms that they failed to experience cognitive processing and search for meaning out of the traumatic event of living with cancer (Holtmaat et al., 2017). Hence, this may disrupt the development of PTG resulting in lowering of PTG.

Similarly, our findings indicated that PTSSs was not associated with PTG across time in HNC survivors. PTSSs exhibited a curvilinear relationship with PTG in cancer patients, in which PTSSs at milder severity increased PTG but as its severity increase further, PTG reduces (Shand et al., 2015). Again, overwhelming psychological distress may dissipate the cognitive processing and search for meaning out of the trauma of living with cancer and lead to failure to develop PTG (Zhang et al., 2022), as depicted in our finding.

In the context of the moderating effect of gender on the association between hope, perceived spousal support, severity of anxiety symptoms, and PTG; the only significant moderating effect of female gender was on the association between severity of anxiety symptoms and PTG. Surprisingly, the interaction between female gender and severity of anxiety symptoms contributed to higher degree of PTG. Female cancer patients tend to cope with emotional coping and may have a higher tendency to perceive living with cancer as traumatic (Tanyi et al., 2017; Sharp et al., 2018). Hence, this increases the possibility of developing PTG even in the presence of anxiety symptoms related to living with cancer. In essence, despite having anxiety symptoms, female may still be having higher probability of developing PTG compared to male HNC patients as denoted by our study findings.

Our findings should be interpreted in consideration of a few limitations. First, the socio-demographic and clinical characteristics of the respondents in this study may not be fully representative of the HNC patient population in Malaysia. This may affect the generalizability of our findings. Second, there were only two time points of assessments in this study, which may not be sufficient to evaluate how the relationship between the associated factors and PTG varies with time. Finally, this study did not assess the physical symptoms of HNC and adverse effects of its treatment which could affect the health-related quality of life of patients and the development of PTG (such as problem with chewing, swallowing, tasting of food, thick saliva, restriction of physical and recreational activities) during the time interval between baseline and follow up assessments (Harding, 2018). This may be an important confounding factor that may affect the findings of the study.

Despite these limitations, to date, this was the first longitudinal study to evaluate the association between positive psychology (e.g., hope and optimism) and PTG across time in HNC patients while controlling for psychological complications (e.g., depression, anxiety, and PTSSs). The relationship between another important associated factor, perceived spousal support, and PTG across time was also measured in this longitudinal study. Data on how these factors were related to PTG across time in HNC patients were lacking. Our study provided valuable data on psychosocial factors associated with increase or decrease in PTG across time, so that psychosocial interventions which facilitate associated factors that increase PTG and mitigate associated factors that decrease PTG could be formulated to safeguard the mental wellbeing of HNC patients and incorporated as part of the treatment regimen for HNC.

In essence, it should be noted that not all HNC patients living with cancer will develop PTG. If the traumatic experience of

living with cancer is too intense, it may disrupt the cognitive reprocessing of the traumatic event to search for meaning, hence reducing the likelihood of PTG occurrence (Zhang et al., 2022). Hence, psychosocial interventions which enhance the development of PTG are needed as part of the treatment regime for HNC patients. Based on our study findings, we recommend that treating clinicians include psychosocial interventions that may enhance spousal support and caretaker support for cancer patients, such as social skills training, psychoeducation, and therapeutic counseling (Northouse et al., 2010). Enhancing spousal support will increase the probability of developing PTG and improve the wellbeing of HNC patients. In addition, hope enhancement strategies may promote the development of PTG among HNC patients and should be incorporated into the treatment regime by treating clinicians. It is also advisable to screen for the severity of anxiety symptoms among HNC patients and ensure that anxiety is thoroughly managed with psychosocial interventions (e.g., cognitive behavioral therapy, mindfulness-based interventions, or acceptance and commitment therapy) to facilitate the development of PTG and improvement in the mental wellbeing of patients.

CONCLUSION

This longitudinal study showed that the degree of positive psychology (e.g., PTG, optimism, and hope) exhibited an increasing trend, whereas psychological complications (e.g., depression, anxiety, and PTSSs) showed a decreasing trend across a timeline of between 5 and 7 months after treatment completion among HNC patients. A higher degree of spousal support and hope contributed to a higher degree of PTG across time, but a higher severity of anxiety symptoms decreased the degree of PTG over time. Conversely, optimism, depression, and PTSSs did not contribute to changes in PTG across time. This study provided useful data for treating clinicians on the pivotal roles of screening for the degree of hope, perceived spousal support, and severity of anxiety symptoms among HNC patients and of incorporating psychosocial interventions to manage these variables in order to facilitate development of PTG and improvements in the mental wellbeing of patients.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Human Research Ethics Committee of Universiti Sains Malaysia; the Human Research Ethics of Faculty of Medicine, Universiti Kebangsaan Malaysia. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

ML and NS conceptualized and design the study. ML, NS, NN, NA, NM, RH, SI, NH, RR, RM, MM, and HZ involved in data collection. ML, NS, and NN involved in data and statistical analysis. ML wrote the first draft of the manuscript. All authors involved in the revision of the manuscript and approved the submitted version.

FUNDING

This work was supported by the Short Term Grant of Universiti Sains Malaysia (Grant Number: 304/CIPPT/6315236) (ML). The funder has no role in the conceptualization of the review, literature review, writing of the manuscript, and decision on submission of the manuscript for publication. There was no fund received for open access publication fees.

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Conflict of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 11 August 2022
DOI 10.3389/fpsyg.2022.985879

OPEN ACCESS

EDITED BY
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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 04 July 2022
ACCEPTED 21 July 2022
PUBLISHED 11 August 2022

CITATION
Collazo-Castiñeira P, Rodríguez-Rey R, Garrido-Hernansaiz H and Collado S (2022) Prediction of post-traumatic growth in the face of the COVID-19 crisis based on resilience, post-traumatic stress and social participation: A longitudinal study. *Front. Psychol.* 13:985879. doi: 10.3389/fpsyg.2022.985879

Prediction of post-traumatic growth in the face of the COVID-19 crisis based on resilience, post-traumatic stress and social participation: A longitudinal study

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The COVID-19 crisis has generated a severe and negative psychological impact worldwide. Despite this, it is also possible to experience post-traumatic growth (PTG). This study aimed to longitudinally explore the prevalence of PTG in the Spanish population and test a predictive model for PTG from resilience, post-traumatic stress symptoms (PTSS), and participation in social activities. Data were collected longitudinally in March, July, and November 2020 *via* an online survey. About 20% of the sample showed moderate-high levels of PTG, with no significant differences over time. The predictive model explained 19% of the variance in PTG, showing that the inverse relation between resilience and PTG was mediated by PTSS. Additionally, participation in social activities acted as a predictor of PTG. Women, young people, those who had lost their job and people who had experienced COVID-19 symptoms or the loss of a loved one presented higher PTG. Thus, people have experienced positive changes (PTG), but these did not protect them from adverse symptomatology (PTSS).

KEYWORDS

COVID 19 pandemic, lockdown 2020, post-traumatic growth, post-traumatic stress, resilience, social participation

Introduction

The pandemic situation generated by COVID-19 has had a serious impact on the population's mental health worldwide (Da Silva Neto et al., 2021; Prati and Mancini, 2021; Mahmud et al., 2022). In Spain, in March 2020, between 15 and 41% of the population presented moderate-severe post-traumatic stress symptoms (PTSS;

González-Sanguino et al., 2020; Rodríguez-Rey et al., 2020). Despite the adverse impact generated by this crisis, the experience of post-traumatic growth (PTG) was also reported (e.g., Yeung et al., 2022; Zhang et al., 2022), understood as the perception of positive psychological changes after going through a potentially traumatic situation (Tedeschi and Calhoun, 2004). Thus, Tedeschi and Calhoun (2004) proposed that people have a series of beliefs that can be challenged by a traumatic experience, allowing their subsequent reconstruction and leading to the development of PTG. This construct has gained presence in the literature on traumatic experiences in recent years (Helgeson et al., 2006).

PTG has been studied as a result of different types of traumatic experiences, for example, individual adverse situations like living with HIV or suffering a traffic accident (Nishi et al., 2010; Garrido-Hernansaiz et al., 2017), but also collective traumatic experiences like natural disasters such as earthquakes or nuclear accidents (Pérez-Sales et al., 2005; Kaye-Kauderer et al., 2019). Furthermore, PTG has also been reported following past health crises, such as the SARS epidemic in 2003 (Cheng et al., 2006). All of the mentioned adverse situations generate feelings of anxiety, fear, and worry in the population (Cheng, 2004; Esterwood and Saeed, 2020) due to their unpredictability uncertainty, and the risks involved. However, in the case of the COVID-19 health crisis, its impact goes beyond health implications, as the measures put in place to prevent its propagation have significant repercussions on the population's everyday life (e.g., lockdowns, quarantines, curfews, social distancing, etc.). Even though these measures have affected everyone, people show different trajectories following these adversities, from the resilient ones who neither presented significant levels of perceived stress nor PTG, to the "resurgent" ones who experienced both perceived stress and PTG (Baños et al., 2022). Given that the COVID-19 health crisis has affected the population globally and differently, it becomes a relevant context for exploring in which cases PTG flourishes, how it evolves, and which variables (both personal and contextual) are important in its development.

The construct of PTG has received some criticism, such as, for example, that it is not a real experience of positive changes, but a passing and illusory response that perhaps acts as a coping strategy (Kaur et al., 2017). However, the presence of PTG over time (i.e., longitudinally) has not been systematically studied (see, as an exception, Cheng et al., 2020; Zhao et al., 2021). This makes it difficult to clarify whether PTG is temporary or, on the contrary, persists over time.

The development of PTG has been studied in the context of the COVID-19 health crisis. These studies, mostly from a cross-sectional approach, reported a significant prevalence of PTG in populations of different nationalities (Ikizer et al., 2021; Kalaitzaki, 2021; Matos et al., 2021), including Spain (Prieto-Ursúa and Jódar, 2020; Vázquez et al., 2021). The sociodemographic profile associated with higher levels of PTG as a result of the COVID-19 health crisis was consistent with that found in previous crises (Helgeson et al., 2006; Vishnevsky et al., 2010), with women and younger people experiencing PTG to a greater extent. Additionally, in these studies on PTG during COVID-19, different contextual variables were found to be related to the levels of PTG reported. In particular, it seemed that experiencing harsher and more adverse conditions was related to higher levels of PTG, which was also consistent with previous studies (Laufer and Solomon, 2010). For example, having experienced changes in the workplace as a result of the pandemic (e.g., having lost their employment, suffered a salary reduction; Ikizer et al., 2021; Na et al., 2021) and having had greater contact with the disease (i.e., having suffered the disease or having presented symptoms) showed a positive relationship with PTG (Prieto-Ursúa and Jódar, 2020; Zhang et al., 2022), as well as having suffered the loss of a loved one due to COVID-19 (Prieto-Ursúa and Jódar, 2020; Chen and Tang, 2021).

Presenting a higher level of perceived concerns or risks derived from the COVID-19 crisis also had a positive relationship with PTG (Hyun et al., 2021; Ikizer et al., 2021; Na et al., 2021; Yeung et al., 2022). For example, perceived risk of unfavorable economic changes (Ikizer et al., 2021) or concern for physical and mental health in the wake of this crisis (Na et al., 2021) was associated with higher PTG. In this sense, the most frequent concerns in the early stages of the pandemic, which in turn were related to more PTSS, were in reference to the economic situation, a loved one contracting COVID-19, and not knowing when this crisis would end (Rodríguez-Rey et al., 2020). Despite these findings, in the context of COVID-19, there are limited longitudinal studies that evaluate the importance of sociodemographic and contextual variables on PTG in the long term. Therefore, the first objective of this study was to evaluate the temporal stability of PTG in the context of the COVID-19 health crisis and explore the possible influence that sociodemographic and contextual variables had on the development of PTG over time.

In addition, there are other, less-studied variables in this context that could be relevant to the development of PTG, such as participating in leisure activities after an adverse experience (Chun and Lee, 2010). Thus, Chen et al. (2020), in their meta-analysis, found that sport acts as a facilitator in the development of PTG. Another factor that could be related to the development of PTG is participation in collective activities and rituals, which in past crises were related to a reconstruction of positive beliefs based on support and social cohesion (Páez et al., 2013). However, in the context of COVID-19, this has been frustrated by the limited physical contact due to preventive measures such as home confinement (Ammar et al., 2020). Even so, an increase in the sense of belonging and social and family cohesion was reported after this confinement (Saiz et al., 2021; Waters et al., 2021), similarly to other previous community catastrophes (Somasundaram, 2004; Pérez-Sales et al., 2005). This, at least in Spain, could be due to the collective activities carried out remotely: collective applause for health workers at 8 p.m., events *via* social networks, or community cooperation

activities (e.g., doing the shopping for those who could not). To our knowledge, the possible influence of having participated in these activities during the earliest phases of the pandemic has not been previously studied. Given the key role that social connection and support play in the development of PTG (Prati and Pietrantoni, 2009; Rzeszutek and Gruszczyńska, 2018), it is relevant to examine the effect of participation in these activities during the earliest phases of the pandemic in the development of PTG. In fact, in the context of COVID-19, social support has been a significant predictor of PTG. For example, Matos et al. (2021) found that social connection predicted higher PTG consistently across all countries assessed. In turn, Mo et al. (2021) reported that, in frontline nurses, social support was one of the main predictors of PTG. Taking into account the positive effect that this connection seems to have on the development of PTG, the second objective of this study was to evaluate the effect of social participation as a possible facilitator of PTG in the context of COVID-19.

There are two variables, so far unmentioned, that are key in the study of traumatic experiences. First, PTSS are a relevant indicator of the degree of affectation that an event has generated in an individual. Second, resilience, understood as the ability to adapt and recover more easily after experiencing adverse circumstances (Smith et al., 2008), is the main protective factor against experiencing PTSS (Levine et al., 2009; Bonanno et al., 2011). The relationship between these two variables and PTG is complex and controversial in the literature (Sawyer et al., 2010; Shakespeare-Finch and Lurie-Beck, 2014; Garrido-Hernansaiz et al., 2017; Rzeszutek and Gruszczyńska, 2018). Beginning with PTSS, and according to the theoretical paradigm of PTG, PTG is the result of reconstructing basic personal beliefs that had been previously challenged by an adverse event (Tedeschi and Calhoun, 2004). For such a challenge to personal beliefs to occur, the event must be sufficiently striking (Helgeson et al., 2006). Therefore, it is normal that when a person suffers more intense PTSS, there may also be a higher PTG (Rodríguez-Rey et al., 2020). However, the literature reports direct, inverse, and non-existent relationships between PTSS and PTG (Shakespeare-Finch and Lurie-Beck, 2014). Given this, various meta-analyses have found that these two variables coexist, supporting both: a linear relationship between the two and a curvilinear one. However, they have particularly supported the latter, where moderate PTSS levels are those related to higher PTG levels (Shakespeare-Finch and Lurie-Beck, 2014; Tsai et al., 2015). Therefore, higher growth does not necessarily imply a lesser experience of PTSS (Tedeschi and Calhoun, 2004), as apparently derived from some studies that found an inverse relationship. In addition, studies have shown that the predictive value of PTSS for PTG is maintained longitudinally (Zhou et al., 2015). Considering the above, it is necessary to use PTSS as a predictor of the development of PTG and, in fact, it has been used in the latest predictive models of PTG in the context of COVID-19 (e.g., Lau et al., 2021; Northfield and Johnston, 2021).

Continuing with resilience, and considering the premise that to develop PTG it is necessary to experience PTSS at least to some extent, resilience (as a protective factor that predicts lower levels of PTSS) would then have to be inversely related to PTG. In addition, such a relationship would have to be mediated by PTSS. Actually, this is what the theoretical model proposes: those with greater resilience will be less affected by the traumatic event, challenging their beliefs to a lesser extent and, consequently, limiting the potential reconstruction of these (Westphal and Bonanno, 2007; Tedeschi and McNally, 2011). Nevertheless, the results of previous studies mostly indicated a positive relationship between resilience and PTG (Dong et al., 2017; Rzeszutek and Gruszczyńska, 2018), with limited studies to support the opposite (Garrido-Hernansaiz et al., 2017; Rodríguez-Rey and Alonso-Tapia, 2019). Thus, the third and final objective pursued by this study was to test a predictive model based on the theoretical paradigm of PTG (considering the mediating role of PTSS in the relationship between resilience and PTG) and contribute to the resolution of the controversies in the literature in this regard. Additionally, this predictive model will also verify the facilitating role that participating in collective activities might play in the development of PTG, not just considering the necessary condition of an adverse situation, but also the positive aspects that could facilitate the development of PTG in the aftermath of trauma.

To synthesize, there is evidence of the emergence of PTG in the face of the COVID-19 crisis, however, the existence and etiology of PTG are unclear. Thus, this study has three aims: (1) to longitudinally explore the evolution of PTG generated as a result of the COVID-19 crisis and evaluate its temporal stability, as well as identify contextual and sociodemographic variables associated with its development; (2) to evaluate the effect of social participation as a possible facilitator of PTG in the COVID-19 crisis; and (3) to delve deeper into the study of PTG development by testing the predictive model of PTG development based on the theoretical postulates previously laid out (see **Figure 1**). Specifically, we expect to find (a) an inverse relationship between resilience and PTG, (b) a mediation effect

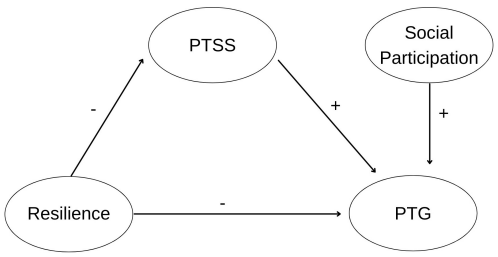

FIGURE 1
Hypothetical relations between variables in the PTG predictive model.

of that relationship *via* PTSS, and (c) a significant positive effect of social participation on PTG.

Materials and methods

Participants

The participants were adults living in Spain during the COVID-19 pandemic. In March 2020 (T1), 3055 people completed the questionnaire (75.1% women, M = 32.15 years). In July 2020 (T2), 855 people participated again, and in November 2020 (T3), 592 people filled out the questionnaires for a third time. The sociodemographic characteristics of the T3 sample are reflected in **Table 1**.

Instruments

Instruments used at T1 (March 2020)

Sociodemographic data

Participants provided their age, gender, country of birth, region, marital status, number of children, level of education, and monthly income per family unit.

Impact of event scale-revised

The Impact of Event Scale-Revised (IES-R; Weiss and Marmar, 1996; Weiss, 2007), validated in Spain (Báguena et al., 2001), is a self-report questionnaire of 22 items that measure the PTSS of the last 7 days before the experience of a traumatic event. It has three subscales: Avoidance (eight items), Intrusion (seven items), and Hyperactivation (seven items). The answer format consisted of a scale ranging from 0 (*not at all*) to 4 (*extremely*). In the present study, the tool was adapted such that this event referred to the COVID-19 crisis (e.g., "*Any reminders brought back feelings about COVID-19 health crisis*"). In this study, an adequate internal consistency (α = 0.94) was obtained for the scores of the total scale.

Brief resilience scale

The brief resilience scale (BRS; Smith et al., 2008) is a six-item self-report questionnaire that measures resilience as the capacity to recover from an adverse event (e.g., "*I tend to bounce back quickly after hard times*"). The answer format consisted of a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). It is unifactorial and a higher score indicates greater resilience. We used the Spanish version validated by Rodríguez-Rey et al. (2016), whose scores had good internal consistency in the present study (α = 0.81).

Situation in the workplace

Participants provided information on their employment status at the time, whether they had undergone significant changes in employment status due to the pandemic, whether they perceived a risk of losing their job for this reason and whether their income had decreased.

Contact with COVID-19

Participants indicated whether they had had symptoms characteristic of this disease or if they had been tested for COVID-19.

Concerns

Participants reported the degree of concern regarding various situations arising from the health crisis (e.g., I am concerned about my psychological state during this crisis). The response format was from 1 (*no or hardly*) to 4 (*very*).

Leisure activities during confinement

Participants indicated what leisure activities they carried out during this period (e.g., practicing sports, watching series, etc.).

Instruments used at T2 (July 2020)

Post-traumatic growth inventory-short form

The Post-traumatic growth inventory-short form (PTGI-SF; Tedeschi and Calhoun, 1996; Cann et al., 2010) is a 10-item self-report derived from Tedeschi and Calhoun's original 21-item version (1996) that evaluates PTG (e.g., "*I have a greater appreciation for the value of my own life*"). Garrido-Hernansaiz et al. (2022) carried out the validation of the instrument in a Spanish sample in the context of the COVID-19 pandemic, obtaining a final 8-item instrument with four subscales and two items per subscale: Appreciation for life and new opportunities, Relationship with others, Personal strength, and Spiritual change. It has a Likert response format ranging from 0 (*I did not experience this change as a result of my crisis*) to 5 (*I experienced this change to a very great degree as a result of my crisis*). The PTG score was computed as the mean of the item scores. A score of three or more is indicative of a PTG of at least mid-grade (Tedeschi and Calhoun, 1996; Rodríguez-Rey and Alonso-Tapia, 2017). The internal consistency of the scores was adequate in the two evaluations (T2 and T3) of this study, for both the total scale (α = 0.87 – 0.88) and the subscales (Appreciation for life: α = 0.80 – 0.83; Relationship with others: α = 0.70 – 0.69; Personal strength: α = 0.83 – 0.84; Spiritual change: α = 0.68 – 0.70).

Personal losses

Participants indicated whether they knew anyone who died from COVID-19.

Social participation during the general confinement

Participants indicated their participation in collective activities during home confinement, including three categories: (1) activities of recognition and gratitude toward health workers (e.g., applause at 8 p.m.); (2) community aid and collaboration

TABLE 1 Association between demographic variables and PTG in T3 (N = 592).

Variables	N (%)	PTG			
		M (SD)	t/F	p	g/η^2
Gender[2]			5.00[1]	<0.001	0.46
Female	468 (79.32)	15.13 (9.76)			
Male	122 (20.68)	10.72 (8.38)			
Other	2 (0.30)	9.5 (13.44)			
Country of origin			−1.41	0.17	−0.31
Spain	560 (94.59)	14.04 (9.52)			
Other	32 (5.41)	17 (11.63)			
Region			1.69	0.09	0.14
Madrid	325 (54.9)	14.81 (9.70)			
Other	267 (45.1)	13.46 (9.56)			
Marital status			3.26	0.01	0.02
Married/ cohabiting with a partner	266 (44266 (44.93)	12.7 (9.54)[a]			
In a relationship but not cohabiting	137 (23.14)	15.64 (9.74)[b]			
Widow(er)	3 (.51)	9.67 (6.11)[ab]			
Separated/ divorced	19 (3.21)	15.05 (10.41)[ab]			
Single	167 (28.21)	15.4 (9.46)[b]			
N° of children			1.44	0.23	0.01
None	410 (69.26)	14.63 (9.48)			
One	66 (11.15)	14.48 (9.91)			
Two	91 (15.37)	12.46 (10.13)			
Three or more	25 (4.22)	12.84 (9.80)			
Education level			0.82	0.56	0.01
Primary education	3 (0.51)	19.33 (13.2)			
Compulsory secondary education	8 (1.35)	12.88 (11.99)			
Post-compulsory secondary education	44 (7.43)	12.16 (9.38)			
Professional training	69 (11.66)	14.09 (9.50)			
University degree	282 (47.64)	14.43 (9.55)			
Master's degree	137 (23.14)	14.91 (9.77)			
Ph.D.	49 (8.28)	12.8 (9.95)			
Monthly income			1.28	0.26	0.01
<1000 €	48 (8.11)	15.42 (10.19)			
1000 – 1500 €	90 (15.20)	14.41 (10.36)			
1500 – 2000 €	94 (15.88)	15.99 (9.05)			
2000 – 2500 €	102 (17.23)	13.66 (9.79)			
2500 – 3000 €	73 (12.33)	14.3 (10.19)			
3000 – 3500 €	66 (11.15)	12.88 (8.49)			
>3500 €	114 (19.26)	12.91 (9.19)			
Age groups[3]			3.34	0.006	0.03
18 – 24	160 (27.03)	15.57 (9.30)[a]			
25 – 34	172 (29.05)	15.11 (9.81)[a]			
35 – 44	106 (17.91)	11.25 (8.94) [b]			
45 – 54	100 (16.89)	13.64 (10.18)[ab]			
55 – 64	41 (6.93)	14.98 (9.11)[ab]			
65-77	13 (2.20)	11.38 (10.69) [ab]			

Categories with a different superscript letter show statistically significant differences between them for the PTG variable.

[1]Homoscedasticity could not be assumed for these variables, thus t-test results adjusted for non-homogeneous variances were used; in the case of ANOVA, *post hoc* Games–Howell tests were used.

[2]Given the low number that responded "other," only men and women were included.

[3]M = 35.02, SD = 12.9.

activities (e.g., doing the shopping for someone in need); and (3) activities *via* social networks (e.g., concerts).

Instruments used at T3 (November 2020)

Participants filled out the PTGI-SF again and reported their employment status, contact with the disease, concerns, and personal losses.

Leisure hours

Participants indicated how many hours a day, on average during the previous week, they spent on leisure activities away from home or meeting with non-cohabitants (0 = *Less than 1 h*; 4 = *More than 5 h*).

Procedure

The study protocol was approved by the ethics committee of the University that led the study and was not pre-registered elsewhere. Between March 17th and 24th 2020 (T1), participants were contacted by social networks (Facebook, Twitter, Instagram, WhatsApp, and LinkedIn) requesting both their participation and the dissemination of the questionnaire, following the snowball method. After providing their informed consent, the participants went on to complete the questionnaire. At the end of the questionnaire, they were asked for permission to contact them at a later time, providing an email address or a telephone number. In July 2020 (T2), the 1598 participants who gave their contact details in T1 were contacted again, and in November 2020 (T3), the 855 who filled out the questionnaire in T2 were contacted. The data from T1 and T2 was used in previous reports (Rodríguez-Rey et al., 2020; Garrido-Hernansaiz et al., 2022). The present study reports data from T3 participants, using some variables measured at T1 and T2 to study their associations with T3 variables (i.e., the long-term effects of the COVID-19 crisis).

Statistical analysis

First, we verified whether the sample loss between T1 and T2 and between T2 and T3 was due to random factors or, conversely, the participants who continued to participate differed significantly from those who only completed the questionnaire in T1 or T2. To this end, Student's *t*-tests were performed for continuous variables (e.g., PTSS) and Chi-square tests for categorical variables, such as sex.

Next, to assess potential method bias in the scales used for this study, Harman's one-factor test was performed. If one factor accounts for most of the measures' covariance (usually interpreted as more than 50%), it would indicate that method bias is present (Podsakoff et al., 2003). In this study, a variance of 29.25% was obtained, indicating that the relations among these variables are not due to method bias.

We then calculated the percentage of participants who presented PTG of at least mid- or high-degree. To study the evolution of PTG, measured in T2 and T3, a paired-samples *t*-test was used. To study to what extent the variables evaluated in T1 and T2 related to the levels of PTG in T3, different statistical tests were performed. Thus, to explore the relationship between PTG and dichotomous variables (e.g., sex), Student's independent samples *t*-tests were performed. For variables with multiple categories, one-factor ANOVAs were performed, using the *post hoc* Tukey analysis when the variances were homogeneous and the Games–Howell one when they were not. Additionally, the size effect was evaluated with Hedges' *g* for Student's *t*-tests (interpretation: negligible $<$ 0.20 $<$ small $<$ 0.50 $<$ medium $<$ 0.80 $<$ large) and η^2 for ANOVA (interpretation: negligible $<$ 0.01 $<$ small $<$ 0.06 $<$ medium $<$ 0.14 $<$ large). An ancillary analysis was carried out, introducing relevant sociodemographic variables (*via* dummy variables) related to PTG in a multiple linear regression analysis. Also, bivariate correlation analyses were performed to explore the relationship between PTG and continuous (Pearson's *r*) or ordinal (Spearman's ρ) variables and quadratic and linear models were calculated to check whether the relationship between PTSS (T1) and PTG (T3) followed an inverted U shape.

To test the proposed theoretical predictive model, structural equation modeling (SEM) was employed using maximum likelihood as the estimation method. To assess the model fit, a mixed approach was used as recommended by Hu and Bentler (1999), including the absolute fit index χ^2/df, two baseline close-fit indices (SRMR and RMSEA), and two incremental close-fit indices (CFI and TLI). The values indicative of good fit were ratio χ^2/df $<$ 3 (Hair, 2014), SRMR $\leq$ 0.08, RMSEA $\leq$ 0.06; CFI and TLI $\geq$ 0.95 (Hu and Bentler, 1999). To test the mediation effects, indirect effects were calculated using 10,000 samples from the bootstrap method, stipulating a 95% confidence interval. Statistical analyses were performed using AMOS Graphics 24.0 for SEM and SPSS 25.0. for the rest. All analyses were two-tailed and used a 95% confidence interval.

Results

Sample homogeneity (T1-T2-T3)

Statistically significant differences were found between those who continued participating in T2 and T3 and those who ended their participation in T1 or T2. On the one hand, those who

TABLE 2 Descriptive statistics for the study variables.

		N	*M* (*SD*)	Min	Max	Skewness (*SE*)	Kurtosis (*SE*)
PTSS (T1)	Total	592	27.16 (17.62)	0	84	0.62 (0.1)	−0.30 (0.2)
	Males	122	20.97 (16.45)	0	72	0.88 (0.22)	0.22 (0.44)
	Females	468	28.78 (17.60)	0	84	0.57 (0.11)	−0.36 (0.23)
Resilience (T1)	Total	592	19.87 (4.93)	6	30	−0.46 (0.1)	−0.14 (0.2)
	Males	122	20.98 (5.15)	6	30	−0.64 (0.22)	0.22 (0.44)
	Females	468	19.60 (4.81)	6	30	−0.42 (0.11)	−0.24 (0.23)
PTG (T3)	Total	592	14.20 (9.65)	0	40	0.36 (0.1)	−0.78 (0.2)
	Males	122	10.72 (8.38)	0	32	0.59 (0.22)	0.40 (0.44)
	Females	468	15.13 (9.75)	0	40	0.28 (0.11)	−0.86 (0.23)

TABLE 3 Spearman correlation between different concerns (scored from 1 to 4) throughout the three collection times and PTG (*N* = 592).

	M (*SD*)	Spearman's Rho	*p*
Concerns in T1			
Lack of capacity of the health system	2.94 (1.01)	0.03	0.44
COVID-19 infection of a loved one	3.3 (0.78)	0.07	0.07
Lack of food supply and medical devices (e.g., masks or gloves)	2.46 (0.99)	0.01	0.88
Insufficient measures by the government	2.83 (0.89)	0.08*	0.04
The economic impact of the pandemic	3.31 (0.74)	0.01	0.76
The situation of collective nervousness	2.92 (0.85)	0.04	0.35
Not knowing when this crisis will end	2.95 (0.89)	0.13**	0.001
My psychological state during this crisis	2.33 (0.99)	0.19***	<0.001
Mean level of concern	2.88 (0.54)	0.12**	0.006
Concerns in T2			
Getting infected by COVID-19	2.51 (0.84)	0.16***	<0.001
COVID-19 infection of a loved one	3.48 (0.69)	0.15***	<0.001
The economic impact of the pandemic	3.34 (0.70)	0.06	0.11
Not knowing when this crisis will end	3.13 (0.79)	0.13**	0.001
My psychological state during this crisis	2.27 (1.01)	0.24***	<0.001
The appearance of new outbreaks	3.25 (0.70)	0.16***	<0.001
Continue to use security measures	2.06 (0.92)	0.07	0.06
Others not maintaining security measures	3.36 (0.75)	0.09*	0.02
The impact COVID-19 is having on my life	2.52 (0.87)	0.20***	<0.001
Mean level of concern	2.88 (0.48)	0.24***	<0.001
Concerns in T3			
Getting infected by COVID-19	2.45 (0.88)	0.17***	<0.001
COVID-19 infection of a loved one	3.46 (0.74)	0.20***	<0.001
The economic impact of the COVID-19 pandemic	3.34 (0.74)	0.06	0.14
Not knowing when this crisis will end	3.15 (0.85)	0.17***	<0.001
My psychological state during this crisis	2.24 (1.02)	0.29***	<0.001
Continue to use COVID-19 safety measures	2.03 (0.96)	0.09*	0.02
Others not maintaining COVID-19 safety measures	3.21 (0.84)	0.09*	0.02
The impact COVID-19 is having on my life	2.46 (0.96)	0.20***	<0.001
COVID-19 vaccine availability	2.66 (1.13)	0.14***	<0.001
Whether the COVID-19 vaccine is safe or not	2.59 (0.89)	0.12**	0.003
Mean level of concern	2.76 (0.51)	0.27***	< 0.001

*$p < 0.05$, **$p < 0.01$, and ***$p < 0.001$.

participated in T2 were more likely to be women and older than those who abandoned the study after T1, with no other significant differences for the remaining variables. On the other hand, those who participated in T3 were older and with lower PTG and PTSS at T2 than those who dropped out after T2 (for more information see **Supplementary Table 1**).

Descriptive statistics for resilience, post-traumatic stress symptoms and post-traumatic growth

The descriptive statistics for the study variables – Resilience, PTSS, and PTG – can be found in **Table 2**, reporting mean, standard deviation, minimum and maximum values obtained, as well as skewness and kurtosis. These values are reported for the entire sample and for males and females separately.

Post-traumatic growth levels and evolution

There were no significant differences in PTG levels between July (T2) and November (T3) 2020, $t(591) = 1.39$, $p = 0.17$. In T2, 22.2% of participants showed medium-elevated PTG levels – i.e., a score of 3 or higher (Tedeschi and Calhoun, 1996; Rodríguez-Rey and Alonso-Tapia, 2017) – ($M = 15.15$, $SD = 9.51$), while in T3, this proportion was 19.3% ($M = 14.20$, $SD = 9.65$).

Relation between post-traumatic growth level and sociodemographic and contextual variables of COVID-19

Sociodemographic variables

Table 1 shows the descriptive data of the sociodemographic variables, as well as the relation of these with PTG in T3. We observed that women, younger participants, singles, and couples who were not cohabiting presented higher levels of PTG (i.e., those married showed significant lower levels of PTG than those single and those in a relationship but not cohabiting; regarding age, those aged 35–44 showed significantly lower levels of PTG than those aged 18–24 and 25–34). Effect sizes were small in all cases.

A multiple linear regression analysis was conducted, with PTG as criterion and the sociodemographic variables associated with PTG (i.e., gender, marital status, and age groups) as predictors. The results are included in **Supplementary Table 2**. Seven percent of the variance was explained [$R^2 = 0.07$; $F(9,582) = 4.71$; $p < 0.001$]. The following variables emerged as relevant in the prediction of higher levels of PTG: female gender (as opposed to male gender), having a relationship but not living with the partner and being single (as opposed to being married or cohabiting with a partner), and an age of 25–34 or 55–64 (as opposed to an age of 35–44).

Regarding the participants' employment situation, in March 2020 (T1), 90.6% of the sample reported undergoing changes in their work or studies. Between March and November (T2 and T3), 18.75% had to stop working or lost their job, while 65.2% had a salary reduction. Greater PTG was presented by the participants who lost their jobs between March (T1) and November 2020 (T3; $M = 16.1$, $SD = 9.77$), $t(364) = -2.40$, $p = 0.02$, $g = -0.27$, compared with those who did not ($M = 13.44$, $SD = 9.74$), and those who received a salary reduction ($M = 15.11$, $SD = 9.73$), $t(590) = -3.17$, $p = 0.002$, $g = -0.27$, compared with those who did not ($M = 12.5$, $SD = 9.3$).

Contact with COVID-19

Regarding the level of COVID-19 contact and its relationship with PTG, those participants who had greater contact with COVID-19 had higher levels of PTG. This occurred in those who suffered symptoms compatible with the disease ($M = 15.77$, $SD = 9.64$) compared with those who did not ($M = 13.66$, $SD = 9.61$), $t(590) = -2.33$, $p = 0.02$, $g = -0.22$; those who underwent diagnostic tests ($M = 15.26$, $SD = 9.84$) compared with those who did not ($M = 13.01$, $SD = 9.33$), $t(590) = -2.81$, $p = 0.01$, $g = -0.23$; and those who suffered the loss of a loved one ($M = 15.06$, $SD = 9.86$) compared with those who did not ($M = 12.88$, $SD = 9.19$), $t(590) = -2.70$, $p = 0.01$, $g = -0.23$.

Concerns

The level of concern of the participants regarding different issues throughout the three evaluations is shown in **Table 3**. Higher levels of concern were associated with higher PTG scores. Specifically, concern for one's psychological state was the one, throughout all the evaluations, most related to PTG.

Participation in social activities

Participation in social activities during the home confinement was positively related to PTG (see **Table 4**). Specifically, those who participated in the applause for the health workers at 8 p.m. and attended events on social media presented a higher PTG.

Leisure activities

As regards carrying out leisure activities, in March (T1), most participants (48% of participants from T3; $n = 291$) reported devoting less than an hour a day to leisure activities during the general home confinement. Carrying out various leisure activities was not related to PTG, except for physical exercise. In this sense, those who exercised ($M = 15.31$, $SD = 9.48$), $t(590) = -2.95$, $p = 0.003$, $g = -0.24$, showed higher PTG than those who did not ($M = 12.99$, $SD = 9.72$). In addition, a statistically significant and positive correlation was found between the number of leisure hours in July (T2) and the level of PTG in November (T3; $\rho = 0.14$, $p = 0.001$).

TABLE 4 Association between social participation during confinement (T2) and PTG in T3 (N = 592).

Variables	N (%)	PTG			
		M (SD)	t	p	g
Applause at 8 p. m.			−3.89	<0.001	−0.35
No	182 (30.74)	11.91 (8.94)			
Yes	410 (69.26)	15.22 (9.8)			
Community cooperation			−1.30	0.20	−0.11
No	297 (50.17)	13.69 (9.24)			
Yes	295 (49.83)	14.72 (10.04)			
Social media events			−2.80	0.005	-0.23
No	313 (52.87)	13.16 (9.39)			
Yes	279 (47.13)	15.37 (9.83)			
	M (SD)	Spearman's ρ	p		
Total participation	1.66 (0.96)	0.15	<0.001		

Post-traumatic growth prediction: The role of resilience, post-traumatic stress symptoms, and social participation

Correlation analyses were performed to study the association between PTG at T3 and resilience and PTSS. A statistically significant and direct correlation was found between PTSS (T1) and PTG (T3; r = 0.30, p < 0.001), while resilience (T1) was inversely related to PTSS (T1; r = −0.34, p < 0.001) and PTG (T3; r = −0.08, p = 0.047). As regards a possible curvilinear relationship between PTG (T3) and PTSS (T1), the linear model had the same adjustment as the quadratic model (R^2 = 0.09, p < 0.001 in both cases), being unable to establish the predominance of either.

Delving into how these variables are related, Figure 2 shows the predictive model tested and the results obtained, and Table 5 shows the different estimates and effects with their confidence interval. Adjustment indices were optimal [χ^2 = 83.10, df = 40, χ^2/df = 2.08, CFI = 0.98, TLI = 0.98, RMSEA = 0.04 (90% CI = 0.03, 0.06), SRMR = 0.04]. A total of 19.37% (95% CI = 0.11, 0.34; p < 0.001) of the variance of PTG at T3 could be predicted by the levels of resilience, PTSS, and social participation during the general home confinement (measured in T2). The relationship between resilience and PTG was mediated by PTSS, with a statistically significant indirect effect (−0.14 [95% CI = −0.20, −0.90], SE = 0.03, p < 0.001. This mediation effect was total, suggesting that resilience influences PTG levels only *via* its effect on PTSS.

Discussion

The health crisis derived from COVID-19 has generated a substantial psychological impact, reflected in a significant prevalence of moderate levels of PTSS (Rodríguez-Rey et al., 2020) and, without detracting from the severity of these harmful consequences, positive psychological changes such as PTG have also been observed (e.g., Yeung et al., 2022). However, studies evaluating this consequence, although increasingly prevalent, continue to be scarce and mostly cross-sectional, being unable

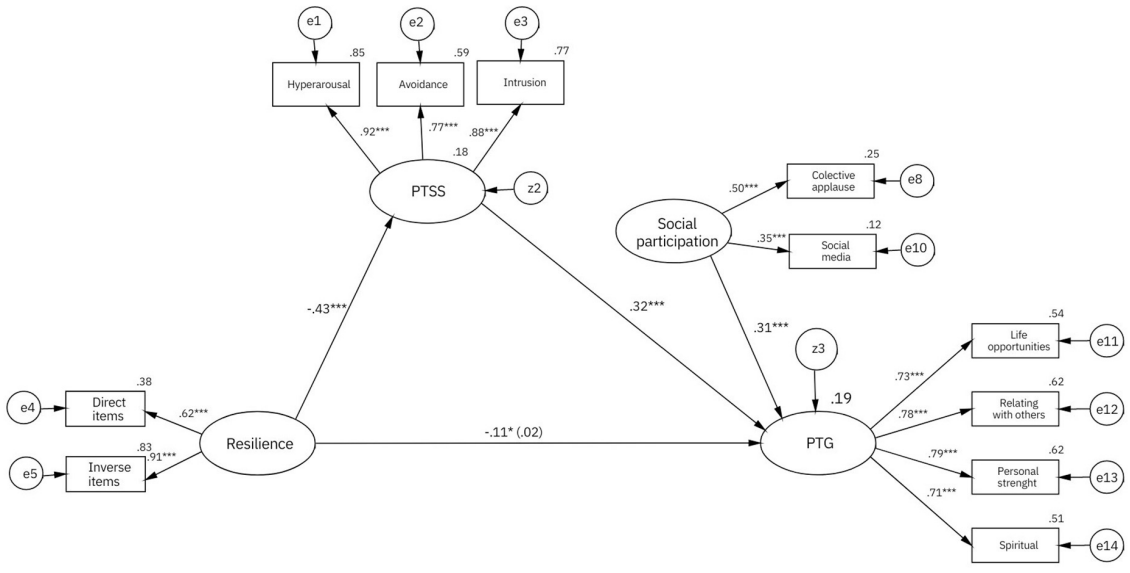

FIGURE 2
Predictive model, with standardized regression coefficients. The direct effect can be found between brackets (controlling for the effect of PTSS). *p < 0.05, **p < 0.01, and ***p < 0.001.

TABLE 5 Standardized estimates of the different paths and effects of the model.

Direct Paths			Estimate	*SE*	95% CI Lower	95% CI Upper	*p*
Resilience	→	PTSS	−0.43	0.05	−0.51	−0.33	<0.001
Resilience	→	PTG	0.02	0.05	−0.08	0.13	0.07
PTSS	→	PTG	0.32	0.05	0.22	0.43	<0.001
Social Participation	→	PTG	0.31	0.09	0.12	0.49	<0.001

Model effects	Estimate	*SE*	Lower	Upper	*P*
Direct effect	0.02	0.05	−0.08	0.13	0.65
Indirect effect	−0.14	0.03	−0.20	−0.09	<0.001
Total effect	−0.11	0.05	−0.21	−0.02	0.02

to study whether this change is maintained longitudinally, and which COVID-19-related variables are relevant long-term predictors of PTG development. In this sense, there are relevant contextual variables, such as carrying out collective activities and rituals, that had not been previously studied in the context of COVID-19. Additionally, there is notable controversy in the literature regarding how some key variables relate to PTG in the context of trauma, such as PTSS and resilience (Shakespeare-Finch and Lurie-Beck, 2014; Rzeszutek and Gruszczyńska, 2018). Thus, the objective of this work was to longitudinally explore the level of PTG generated by the COVID-19 crisis, its temporal stability, and the variables related to PTG, and to test a predictive model of the theoretical paradigm of the construct.

Our results found that a significant number of participants (around 20%) showed moderate or higher PTG as a result of the COVID-19 crisis, with no significant changes in their evolutionary trend between July and November 2020. This supported the hypothesis that the change persisted over time and, therefore, had a lower probability of it being a sporadic illusory phenomenon, as some critics have suggested (Kaur et al., 2017). However, we did not evaluate the possible existence of different trajectories in its evolution, as referred in previous studies (Cheng et al., 2020; Zhao et al., 2021) so this result should be taken with caution.

Regarding the sociodemographic profile with greater PTG, it was that of the women and younger age groups, similar to that reported in previous studies (Helgeson et al., 2006; Vishnevsky et al., 2010; Wu et al., 2019; Kalaitzaki, 2021). Furthermore, the variables significantly related to PTG were mostly consistent with previous studies. In this sense, those who experienced a more adverse situation presented greater PTG (Helgeson et al., 2006). Specifically, the variables associated with higher PTSS in T1 (Rodríguez-Rey et al., 2020) were related to higher PTG in T3: losing a job or stopping work due to COVID-19, perceived risk of, or having, a salary reduction, higher levels of concern, having a non-cohabiting partner, and being single. This was consistent with previous research (Hyun et al., 2021; Ikizer et al., 2021; Na et al., 2021; Yeung et al., 2022). Likewise, those participants who suffered the loss of a loved one or had symptoms compatible with COVID-19 presented higher levels of PTG, also in accordance with the literature (Prieto-Ursúa and Jódar, 2020; Zhou et al., 2020; Yeung et al., 2022; Zhang et al., 2022).

In addition, we were able to identify some factors related to higher PTG that did not necessarily imply greater PTSS: a greater number of hours dedicated to leisure in T2, having exercised physically during the general home confinement of T1, and greater participation in social activities in T2. These results were consistent with the literature. On the one hand, this supports previous results on the facilitating role of leisure activities, especially physical exercise, in PTG (Chun and Lee, 2010; Chen et al., 2020; Zhang et al., 2020). On the other hand, it demonstrates the positive relationship of social support and PTG (Prati and Pietrantoni, 2009; Mo et al., 2021; Wu et al., 2021). However, not all forms of social participation had the expected effect, which may be because the measurement method employed did not necessarily reflect community cohesion or perceived social support. For example, community cooperation activities were not related to PTG, maybe some participants felt obliged to cooperate without being intrinsically motivated to do so, consistently with the stages crossed after a traumatic event as a community, where initially there is a boom in participation in altruistic and solidarity activities that eventually declines (Páez et al., 2013). Future studies could specifically assess the role of the levels of experienced cohesion or perceived social support, in addition to assessing the possible component of social desirability.

Regarding the relationship between resilience and PTG, a full mediation effect by PTSS was found. According to our results, resilience was a protective factor against PTSS, and as such was related to a lower PTG. Although these findings contradict those of some previous works (Gouzman et al., 2015; Dong et al., 2017; Rzeszutek and Gruszczyńska, 2018) they support the theoretical model that maintains that those individuals with greater resilience will experience lower PTSS and, therefore, lower PTG (Westphal and Bonanno, 2007; Tedeschi and McNally, 2011). Thus, the relation between PTG and resilience appears to be complex. A possible explanation for the existence of both a direct relation between PTG and resilience in previous studies and an inverse one in ours could be that people who experienced higher PTSS and PTG in the face of adversity develop greater resilience to future crises (Tedeschi and McNally, 2011) and, therefore, future life adversities could cause them less PTSS and PTG. It would be useful to evaluate this hypothesis longitudinally in future research.

Our findings also showed that social participation had a significant effect on the development of PTG, although weak, which could be due to the aforementioned reasons. In any case, the model supports that social participation can be understood

as a positive experience that, after a traumatic event, allows the reconstruction of positive beliefs, generating greater PTG (Prati and Pietrantoni, 2009; Mo et al., 2021). These results are in line with those of Northfield and Johnston (2021), showing that the effect of PTSS on PTG within the context of COVID-19 is enhanced by social support.

Limitations of the study and future directions

Our study evaluated the development of PTG in a specific context, that of the health crisis caused by COVID-19. It is one of the few studies, to date, that addressed this issue longitudinally, which is relevant at a theoretical and practical level. However, the study is not without limitations that must be mentioned. On the one hand, despite the large number of participants, the sample did not equally represent the characteristics of the Spanish population; there was low participation of individuals over 65 years of age, which could be due to the online format of the evaluations. In addition, the participation of women was significantly higher than that of men, which has been recurrently found in previous works (Korkeila et al., 2001), as women seem to be more willing to collaborate with research. Nor can we rule out the possibility that the sample loss throughout the various evaluations was due to specific and non-random factors, limiting the generalization of the results found. Also, the measure of social participation may not adequately reflect the subjective social support perceived by the participants as it was a behavioral measure, so it would be advisable to complement it with a standardized instrument in future work.

Regarding the temporal stability of PTG, we found no differences over time in PTG, supporting that this change is not temporary and illusory as had been suggested (Kaur et al., 2017), but in future research, this measure could be complemented with actions and behaviors that could evidence such change to a greater extent. For example, in COVID-19 patients, rethinking their life priorities resulted in wanting to spend more time with their families, exercise more, lead a healthier life, etc. (Zhang et al., 2022). However, specific studies need to be carried out to identify which behaviors would be an appropriate reflection of experiencing PTG, since the manifestations could be different for each person; some people show significant growth in the religious field (Prieto-Ursúa and Jódar, 2020), while for others, this area does not seem to be relevant (Garrido-Hernansaiz et al., 2022). Additionally, it is possible that the value of growth on a personal level is intangible behaviorally, but valuable in itself.

Practical implications

Our results have practical implications that can be considered to prevent and treat psychological distress due to the COVID-19 health crisis. In the first place, they reflect the need to adopt measures that meet the current needs of the population, since, although part of the sample reports PTG, this does not seem to cushion the negative consequences that the health crisis has had on mental health. Regarding future crises, the promotion of collective activities that could encourage community cohesion would be a measure that could facilitate the development of PTG and prevent psychopathology (Rodríguez-Rey et al., 2020). For its part, resilience acts as a protective factor against experiencing PTSS, thus adopting measures that encourage its development could be a possible preventive measure for future crises. To this end, the meta-analysis of Liu et al. (2020) found that interventions based on social support (e.g., promoting a support network) and evidence-based interventions (e.g., Cognitive Behavioral Therapy) fostered resilience building, such that, without downplaying the need for individualized attention, a community and social approach could favor the development of both PTG and resilience.

Conclusion

This study is one of the few that longitudinally contemplated the development of PTG in the context of COVID-19, being key to understanding its development in this context. This made it possible to assess the temporal stability of PTG, supporting that it is not a temporary and illusory change. In addition, it was possible to identify contextual variables of COVID-19 related to higher levels of PTG. These variables were not only adverse (e.g., losing a loved one), but also protective (e.g., physical exercise, social participation). In addition, this study sheds some light in relation to one of the most controversial questions in this field, which refers to the mechanisms and variables related to the development of PTG (Schubert et al., 2016; Rzeszutek and Gruszczyńska, 2018). In this regard, we proposed a theory-based predictive model which supports that resilient people – those who are less likely to be severely affected by adverse events – would experience less PTG than those who suffer more due to adversity. This finding, however, is contrary to what has been found in most previous studies. Our findings should be considered in the design and stipulation of measures for future crises. It is pertinent to develop preventive psychosocial and intervention measures that can foster resilience (as a protective factor against PTSS) and the development of PTG.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Ethics Committee at Universidad Pontificia Comillas. The patients/participants provided their written informed consent to participate in this study.

Author contributions

PC-C: conceptualization, methodology, formal analysis, investigation, data curation, writing – original draft preparation and review and editing, visualization, and supervision. RR-R: conceptualization, methodology, formal analysis, investigation, resources, writing – original draft preparation and review and editing, visualization, supervision, project administration, and funding acquisition. HG-H: conceptualization, methodology, investigation, writing – review and editing, visualization, and supervision. SC: conceptualization, investigation, writing – review and editing, visualization, and supervision. All authors read and agreed to the final version of the manuscript.

Funding

This research was funded by Universidad Pontificia Comillas (Grant No. 392201912P).

Acknowledgments

We thank the participants for their time and effort in filling out the questionnaires during these difficult times.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.985879/full#supplementary-material

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 25 August 2022
DOI 10.3389/fpsyg.2022.982667

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 30 June 2022
ACCEPTED 26 July 2022
PUBLISHED 25 August 2022

CITATION
Titlestad KB, Kristensen P, O'Connor M, Hystad S and Dyregrov K (2022) Paths to positive growth in parents bereaved by drug-related death: A mixed-method study. *Front. Psychol.* 13:982667. doi: 10.3389/fpsyg.2022.982667

Paths to positive growth in parents bereaved by drug-related death: A mixed-method study

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Introduction: Drug-related deaths (DRDs) are a major public health challenge. Losing a child to a DRD can be a very stressful life event, which places parents at risk of mental and physical health problems. However, traumatic experiences like losing a child to DRD can paradoxically also lead to positive psychological changes. A mixed-method approach was used to understand the complexity of the phenomenon of post-traumatic growth experienced by parents following a DRD.

Method: By combining data from a survey (n=89) and interviews (n=14), we explored positive growth experiences among Norwegian parents. We conducted descriptive analyses of the sample's demographic characteristics and mean scores for Post-traumatic Growth Inventory (PTGI-SF) items. Hierarchical multiple regression was used to examine the influence of the ability to perform daily activities (WSAS), self-efficacy (GSE-SF), social support (CSS), and symptoms of prolonged grief (PG-13) on the outcome variable of post-traumatic growth (PTGI-SF). Reflexive thematic analysis was applied to analyze the qualitative data. Finally, we integrated the results of the survey and the interviews.

Results: For items measuring post-traumatic growth, parents scored highest on the item "I discovered that I'm stronger than I thought I was" and lowest on the item "I am able to do better things with my life." Self-efficacy and social support had a statistically significant relation with post-traumatic growth. Two themes were generated from the interviews: (I) new perspectives on life and (II) new paths in life. Even though the "New Possibilities" subscale had the lowest mean score for the PTGI-SF, new paths in life were important for many of the interviewed parents.

Discussion: Parents described traumatic stressors associated with having a child who uses narcotics and hence experienced positive changes even before losing their child. We argue that on an individual level, the consequences of spillover stigma, low self-efficacy, and intrusive rumination can hinder potential post-traumatic growth. On a group level, enhancing network support

may increase post-traumatic growth experiences. Hence, parents who have experienced a DRD can benefit from help to activate their social networks and strengthen their self-efficacy.

KEYWORDS

drug-related death, parents, bereavement, post-traumatic growth, positive experiences

Introduction

Traumatic experiences can paradoxically lead to positive psychological changes. Various terms are used for this phenomenon (Calhoun et al., 2010), and we use the term post-traumatic growth (PTG) in this article. PTG is "the experience of positive change that occurs as a result of the struggle with highly challenging life crises" (Tedeschi and Calhoun, 2004b, p. 1). Such changes are not a direct reaction to the traumatic event itself but rather emerge from struggling with the consequences of the event. Hence, PTG results from revaluation processes, when a person reconstructs their beliefs and goals, and how they make sense of their life following a traumatic experience (Tedeschi and Calhoun, 2004a). People who experience traumatic stressors do not necessarily experience growth (Calhoun et al., 2010), but those who do often describe "five factors that define the major domains of PTG: greater appreciation of life and changed sense of priorities; warmer, more intimate relationships with others; a greater sense of personal strength; recognition of new possibilities or paths for one's life; and spiritual development" (Tedeschi and Calhoun, 2004a).

Considering the Norwegian Directorate of Health (2014, p. 14), drug-related deaths (DRDs) are defined as deaths caused by the intake of substances (intentional and unintentional overdoses), classed as narcotics, and deaths of people linked to drug use in various ways (e.g., violence, suicide, infectious disease, or other health disorders). There is a continuing need to scale up treatment and harm-reduction provisions to prevent DRDs, as the 2022 European Drug Report showed that in 2020 17.4 deaths per million among the adult population in Europe were due to an overdose (European Monitoring Centre for Drugs and Drug Addiction, 2022, p. 16). Sadly, reducing DRDs remains a major public health challenge in all parts of the world. In the US, the number of deaths has reached epidemic proportions reaching a high of over 100,000 deaths in 2021, a yearly increase of 28.5% compared to 2020, during which 78,056 overdose deaths were recorded (National Center for Health Statistics, November 17, 2021). Clearly then, there is a need for attention to drug-related bereavement (i.e., the situation of bereaved left behind after DRDs) as their unique difficulties have been identified in the scientific literature (see later).

Highly stressful events such as bereavement are known to produce high levels of psychological distress (Stroebe et al., 2007; Calhoun et al., 2010; Komischke-Konnerup et al., 2021). Parents who have experienced a drug-related bereavement have a higher mortality rate than non-bereaved parents and parents bereaved by other causes of death (Christiansen et al., 2020). Bottomley et al. (2021) studied the mental health burden associated with overdose-related deaths and found that the overall mental health burden of those bereaved by overdose is substantial compared to those bereaved by sudden natural loss. People bereaved by overdose were almost three times more likely to meet the symptom severity level for prolonged grief disorder (PGD), post-traumatic stress disorder, and major depressive disorder. They also appeared to be at risk of generalized anxiety disorder and suicide (Bottomley et al., 2021). Titlestad and Dyregrov (2022) have also found a strong association between suicidal thoughts and high levels of PGD among bereaved family members, with the highest level of prolonged grief symptoms found among participants in the group who had lost a family member one to 2 years previously. Grief responses that have persisted for more than 6 months are defined as an atypically long period in the ICD-11 (World Health Organization, 2022). After 2 years, high levels of prolonged grief symptoms indicate that those bereaved by DRD have experienced severe grief symptoms lasting much longer than their network and society would expect (Titlestad and Dyregrov, 2022).

Several articles about the parents included in this study have already been published (Titlestad et al., 2020a,b; Titlestad and Dyregrov, 2022), showing that bereaved parents continuously process an overload of stressors (from the time before the loss) as well as the perceived stigma and grief-related emotions and reactions. Parents of a child with a drug dependency described themselves as being in a state of constant preparedness, ready to step in at any time if their child needed help. Their parenting role was extended, and many described themselves as full-time helpers, which was complicated since they did not have an official carer's license (Titlestad et al., 2020a). Many parents bereaved by a DRD describe the loss of a child as a shock and experience negative changes in the aftermath, such as an overload of grief and emotions, self-stigmatization for failing as a parent, and high levels of prolonged grief symptoms (Titlestad et al., 2020a; Titlestad and Dyregrov, 2022). In sum, the parents described that being bereaved by a DRD was related to significant distress and suffering. Even though losing a child is profoundly disturbing, focusing on the psychological processes that can lead to positive growth is important as this can give service providers an insight

into how they can help people cope with major life disruptions (Tedeschi and Calhoun, 2004b).

Tedeschi and Calhoun (2004b) assert that social support may enhance PTG. For those bereaved as a result of an unnatural death, low perceived social support is a major risk factor for mental distress (Scott et al., 2020). Research about the effect of social support on PTG is inconsistent, though some studies show that social support may moderate the relationship between intrusive rumination and PTG (Xu et al., 2019). Dyregrov and Dyregrov (2008, p 123–133) argue that individuals bereaved as a result of an unnatural death and the people in their social networks lack shared understanding of a framework for communication. They explored this phenomenon in light of Berger and Luckmann's (1991) theories relating to the dynamic influence of individuals and groups on the social context, as well as Briggs's (1986) communication and interaction model. According to Dyregrov and Dyregrov (2008, p. 125), such theories are essential to understanding the challenges faced by the bereaved and their supporters. Tedeschi and Calhoun (2004b) have described a model illustrating that specific individual characteristics may increase the likelihood of experiencing positive growth. As with Dyregrov and Dyregrov (2008), they highlight characteristics that include openness about the experience, the ability to talk about personal topics, and managing distressing emotions through constructive cognitive processes (Tedeschi and Calhoun, 2004b).

In their "model of growth in grief," rumination (i.e., repetitive thoughts about the incident) is also underlined as playing an important part for the bereaved (Calhoun et al., 2010). Though rumination is often a burden, it can be helpful for dealing with emotional reactions, distracting the bereaved from the most painful aspects of the loss (Eisma and Stroebe, 2017) and, in the long run, can be part of a growth process (Tedeschi and Calhoun, 2004b). Calhoun et al. (2010) distinguished between intrusive rumination and rumination that is more deliberate and argued that deliberate rumination can predict a greater degree of PTG. In Stroebe and Schut's (1999) dual process model of coping with bereavement, the authors argue that both types of rumination probably coexist, and the bereaved might oscillate between these two types of rumination.

We have identified only one study investigating PTG in people bereaved by DRD (Sperandio et al., 2021). Sperandio et al. (2021) study included 292 participants from 17 countries, with various relationships to the deceased. Their study, which focused on whether self-compassion (i.e., having an emotionally positive self-attitude) serves as a predictor for PTG, confirmed their initial hypothesis, and they found that hope was a powerful mediator (i.e., with higher scores indicating high levels of PTG). Hence, self-efficacy can be considered a personality resource, affecting how a person copes with loss (Bandura, 1982), and self-efficacy is positively associated with problem-focused coping (Konaszewski et al., 2019). The search for meaning appears to be an important cognitive process on the path to PTG (Tedeschi and Calhoun, 2004b). Meaning-making is the process by which people "make sense of the loss or find some compensatory "benefits" or life lessons in it… [and] commonly integrate the event, adapt, and perhaps even grow through the experience" (Neimeyer, 2019). Feigelman et al. (2018) argue that helping others by facilitating support is an important meaning-making strategy for parents bereaved by a DRD. In Titlestad et al. (2020b), parents reported that being needed by their other children and grandchildren is crucial in the meaning-making process.

PTG is a complex term, and DRD bereavement is an understudied topic (Titlestad et al., 2021). To understand the complexity of the phenomenon of PTG following a DRD, we used various methods. Mixed-method research can be defined as "research studies in which a researcher mixes or combines quantitative and qualitative research ideas, approaches, and techniques in a single research study" (Johnson and Christensen, 2016, p. 468). By combining data from a survey and data from interviews, we sought to elaborate, illustrate, and clarify the quantitative results using the qualitative results. We looked to PTG literature describing the consequences for individuals bereaved by a DRD or other unnatural losses, in order to formulate the hypotheses. We also identified sociodemographic characteristics that are related to higher levels of grief symptoms (e.g., female gender, a low level of education, and unemployment (Heeke et al., 2017)). The following research questions guided our exploration:

Quantitative research questions: Do parents bereaved by DRDs report PTG post loss, and if so, which factors can explain high levels of PTG?

We hypothesized that high levels of self-efficacy and support are associated with high levels of PTG and that high scores on the WSAS and high levels of prolonged grief symptoms will be associated with low levels of PTG.

Qualitative research question: What positive changes do parents bereaved by DRD describe?

Mixed-method question: Can integrating quantitative and qualitative data provide a deeper understanding of PTG experienced by parents bereaved by DRD?

Materials and methods

Study design and procedures

The END project was launched in 2017 at the Western Norway University of Applied Sciences. The END project's primary purpose was to understand better the consequences and care needs of individuals bereaved by a DRD. The project applied a mixed-method approach by collecting quantitative data, using a survey, and collecting qualitative data from semi-structured interviews (ResearchGate, 2022).

The purpose of our study was to explore and investigate PTG *post hoc* from the above data using a mixed methodology. We applied a parallel convergent mixed-method research design, with a deductive approach. Data collection and analysis of data from a survey and interviews took place concurrently, and both components

of the research design had the same relevance. The quantitative and qualitative data were analyzed independently. Analysis of the interviews was theory-driven as we were looking for elements of PTG as described in the theories. As described by Johnson and Christensen (2016, p. 595), results from the survey interviews were merged in a joint display at the analysis stage. The reporting standards for mixed methods by Levitt et al. (2018) guided this study.

Recruitment process and participant selection

From March 2018 until December 2018, we invited family members and friends bereaved as a result of a DRD to participate in the main project. A broad recruitment strategy was launched. All Norwegian municipalities received a recruitment flyer *via* email, and we contacted governmental and non-governmental personnel associated with organizations working with those affected by drug use. We used research networks and clinical practice professionals to contact the bereaved, and also recruited participants through conferences and various media channels. The participants were invited to fill in a questionnaire, either on paper *via* post or digitally *via* email. The participants received an email reminder after 14 days.

Ninety-five parents were enrolled for the survey. The inclusion criteria for this study stipulated that each participant had lost a child due to a DRD at least 3 months before participation. No other restrictions were established concerning the time since death. An additional inclusion criterion for interviews was that participants spoke fluent Norwegian. Participants who missed out more than 25% of the items in the questionnaires were excluded [Post-traumatic Growth Inventory questionnaire ($n = 5$); Prolonged Grief Disorder-13 ($n = 1$)].

Since many more parents ($n = 75$) agreed to be interviewed than could be included, parents were selected according to background variables such as gender, age and place of residency (city/village and northern/central/western/southern/eastern part of Norway), the time since death, and the age and gender of the deceased. We looked to Malterud et al. (2016) for guidance on "information power" to ensure the final sample's adequacy. Hence, after interviewing seven fathers and six mothers, another mother was invited to participate in case gender became relevant to our discussion, and we concluded that we had reached a satisfactory level of information power. The 14 included parents represented 14 deceased persons (Table 1). One parent represented two deceased, and a divorced couple represented one deceased. One mother withdrew for personal reasons, and one of the recruited participants failed to attend the planned interview.

TABLE 1 Demographic and loss-related variables for the survey and the in-depth interview sample.

Variables	*n*	Survey *n* (%)				*n*	In-Depth interviews *n* (%)			
Men/women sample	89	16 (18)/73 (82)				14	7 (50)/7 (50)			
Men/women deceased	89	68 (76.4)/21 (23.6)				14	10 (71.4)/4 (28.6)			
Level of education	89					14				
Primary school		10 (11.2)								
High school		35 (39.3)					3 (21.4)			
College/university		44 (49.4)					11 (78.6)			
Employment	89					14				
Full-time job		31 (34.8)					7 (50)			
Part-time job		13 (14.6)					1 (7.1)			
On sick leave		3 (3.4)					1 (7.1)			
Retired		20 (22.5)					3 (21.4)			
Studying		1 (1.1)					1 (7.1)			
Other		21 (23.6)					1 (7.1)			
Sick leave before death	88	33 (37.1)				14	4 (28.6)			
Sick leave after death	88	67 (75.3)				14	11 (78.6)			
		M	SD	Md	range		*M*	SD	Md	range
Age of participant (years)	87	59.2	7	59	45–80	14	58.3	7.6	58	45–75
Age of deceased (years)	86	26.6	6.3	25	18–45	14	27.4	8.7	24	19–45
PG-13 sum score*										
mothers	73	30.9	8.1	31	15–48	7	30.1	3.5	31	23–34
fathers	16	29.1	11.5	30	15–49	7	32.1	4.7	31	25–39
Months since loss	88	79.9	78.8	60	3–420	14	37.9	38.5	18	3–126

*The PG-13 total score ranges from 11 to 55, with higher scores indicating more severe grief symptoms. A preliminary cut-off score of 35 or more meets the diagnostic criteria for PGD (Pohlkamp et al., 2018). In the survey sample, 28.7% of the parents' total score was 35 or higher.

Data collection and analysis

Table 2 shows an overview of the quantitative and qualitative data collection and how the data were analyzed and integrated at the results stage. The END-project survey consisted of 22 background variables and 87 items from different questionnaires. Our choice of items in this study was made on the basis of literature about PTG after bereavement and studies involving parents bereaved as a result of a DRD (Titlestad et al., 2020a,b, 2021; Titlestad, 2021; Titlestad and Dyregrov, 2022).

We included the background variables of gender, age, time since loss, and level of education, as these have been considered to be influential factors in previous studies. The Post-traumatic Growth Inventory (PTGI-SF; Cann et al., 2010) was used to measure the dependent variable since the prevalence of PTG experiences and variables associated with high levels of PTG constitute the primary outcome of our quantitative analyses (see descriptions of this instrument in Table 2). The PTGI-SF scale consists of five subscales and was developed for American samples. Blix et al. (2015) argue that religiosity seems less relevant for a Norwegian sample. Hence, in line with Blix et al. (2015), we excluded the "Spiritual Change" subscale (i.e., item 4: "I have a better understanding of spiritual matters," and item 8: "I have a stronger religious faith"). The General Self-Efficacy Scale-SF (GSE-SF; Schwarzer and Jerusalem, 1995), Crisis Support Scale (CSS; Elklit et al., 2001), Work and Social Adjustment Scale (WSAS; Marks, 1986; Mundt et al., 2002), and Prolonged Grief Disorder-13 (PG-13; Prigerson and Maciejewski, n.d.) are described in Table 2.

Mixed analysis matrix

Johnson and Christensen (2016, p. 593) have described several strategies and procedures that may potentially be involved in the analytical process of mixing research. The different approaches involve quantitizing and/or qualitizing data, combining the quantitative and qualitative data to create new datasets, or visualizing the quantitative and qualitative findings separately (Johnson and Christensen, 2016, p. 593). In this study, we used the data display strategy to visualize the quantitative and qualitative findings separately. We then compared and integrated the results from the survey and the interviews in a joint display (see Johnson and Christensen, 2016, p. 593–595). We used data from the qualitative interviews to elaborate on the quantitative findings.

Ethics statement

The END project was approved in February 2018 by the Norwegian Regional Committees for Medical and Health Research Ethics (reference number 2017/2486/REK vest). All participants signed a written informed consent form, which described the purpose of the study and the planned method and procedure. The well-being of the research participants was prioritized throughout the research process. Participants who agreed to take part in an interview also received written information before the interview, and consent and confidentiality protocol and safeguards were repeated verbally in the interviews. The parents decided where the interviews were to be conducted, e.g., in their homes, where they felt safest and most comfortable. In addition, the participants were made aware of the possibility of contacting the project manager if answering questions about difficult life experiences prompted the need to talk to someone afterward. We ensured the participants' anonymity and confidentiality at all times, and they had the option to withdraw from the study at any time. We also confirmed that all identifying information concerning survey data, transcripts, and recordings would be anonymized and stored on the research server at the university.

Results

Quantitative findings

The parents' average PTGI-SF sum score was 27.7 (SD = 9.08), and the scores ranged from 8 to 47. The mean sum score for mothers was 27.7 (SD = 9.2) and was 27.8 (SD = 8.77) for fathers. The mean scores for the eight items and the four included subscales are shown in Figure 1. The participants scored highest on the item "I discovered that I'm stronger than I thought I was" ("Personal Strength" subscale) and lowest on the item "I am able to do better things with my life" ("New Possibilities") subscale.

Pearson's product–moment correlations were computed to assess the bivariate relations between the outcome of the PTGI-SF and all potential predictor variables (Table 3). There were no statistically significant correlations between the PTGI-SF and any of the demographic background variables, which were consequently excluded from the regression analysis.

The WSAS, GSE-SF, and CSS combined explained 21.7% of variations in the PTGI-SF in step 1 [$R^2 = 0.217$, $F(3, 85) = 7.867$, $p < 0.001$]. As shown in Table 4, both the GSE-SF ($\beta = 0.30$, $p = 0.007$) and CSS ($\beta = 0.24$, $p = 0.018$) had a statistically significant relationship with the PTGI-SF. The regression weight of the WSAS was not statistically significant ($p = 0.33$).

The PG-13 in step 2 did not explain a statistically significant amount of variation in the PTGI-SF beyond the variables entered in step 1 [$\Delta R^2 = 0.001$, $F(1, 84) = 0.133$, $p = 0.72$]. The GSE-SF ($\beta = 0.28$, $p = 0.016$) and CSS ($\beta = 0.23$, $p = 0.022$) remained the only statistically significant predictors in the final model. Both variables explained a comparable amount of variation in the PTGI-SF, with the GSE-SF explaining 5.6% ($sr^2 = 0.056$) and the CSS explaining 5.1% ($sr^2 = 0.051$).

Adding the polynomial PG-13 term in step 3 did not statistically significantly increase the amount of explained variation in the PTGI-SF [$\Delta R^2 = 0.003$, $F(1, 83) = 0.267$, $p = 0.61$].

TABLE 2 Overview of the methodology.

Type of data	Research question(s)	Sample	Data collection	Analysis	Results
QUAN	Do parents bereaved by DRDs report PTG post loss, and if so, which factors can explain high levels of PTG?	$n = 89$ 73 mothers 16 fathers	**Background variables and five instruments:** The **Post-traumatic Growth Inventory (PTGI-SF**; Cann et al., 2010) is an 8-item questionnaire, based on a 6-point scale, ranging from "not at all" (1) to "extremely" (6), with higher scores indicating high levels of post-traumatic growth (PTG). We assessed four subscales of the PTG: "Relating to Others," "New Possibilities," "Personal Strength" and "Appreciation of Life." Internal consistency with eight items was good, and Cronbach's alpha (α) = 0.865. The **General Self-Efficacy Scale-SF (GSE-SF**; Schwarzer and Jerusalem, 1995) measures self-efficacy. A 5-item short version was used in this study (Tambs and Røysamb, 2014), based on a 4-point scale, ranging from "not at all true" to "exactly true," with higher scores indicating high levels of self-efficacy; this was applied to investigate whether high levels of self-efficacy are associated with high levels of PTG. Internal consistency was good: $\alpha = 0.861$. The **Crisis Support Scale (CSS**; Elklit et al., 2001) measures social support following a crisis. The first five items measure positive support, scored on a 7-point rating scale, ranging from "never" to "always"; a higher total score indicates more support received (Christiansen et al., 2013). The CSS was applied to investigate whether high levels of support are associated with high levels of PTG. Internal consistency was acceptable: $\alpha = 0.777$. The **Work and Social Adjustment Scale (WSAS**; Marks, 1986; Mundt et al., 2002) measures self-experience of whether the event affects the ability to perform daily activities (e.g., work, housework, leisure activities, and maintaining social relationships). This is a 5-item questionnaire, scored on a 9-point scale, ranging from "no impairment" (0) to "very severe impairment" (8). This was used to investigate whether high scores on the WSAS are associated with low levels of PTG. Internal consistency was good: $\alpha = 0.886$. The **Prolonged Grief Disorder-13** (PG-13; Prigerson and Maciejewski, n.d.) measures symptoms of prolonged grief (PG). A 13-item questionnaire is scored by summing the 11 symptom items (cognitive, behavioral, and emotional), rated on a 5-point Likert scale. Total scores range from 11 to 55, with higher scores indicating more severe grief symptoms. This was applied to investigate whether high levels of PG symptoms constitute a predictor of low levels of PTG. Internal consistency for the 11 items was good: $\alpha = 0.892$.	Descriptive, correlation and regression analyses were performed using SPSS 26. Continuous variables were described by means (M), standard deviations (SD), medians (Md) and range, whereas frequencies and percentages described categorical variables. The PTGI-SF sum score was chosen as the dependent variable since positive changes and predictors for high levels of change constitute the primary outcome of our analyses. Missing scores were imputed using the individuals' mean for all items completed (for the PTGI-SF, $n = 1$ (one missing); for the PG-13, $n = 1$ (one missing), and $n = 1$ (two missing)). No replacement was provided for background variables. Hierarchical multiple regression analysis was used to examine the influence of the WSAS, GSE-SF, CSS, and PG-13 on the PTGI-SF outcome variable. The PTGI-SF was regressed on the WSAS, GSE-SF, and CSS in the first step, and the PG-13 was included in the second step. A possible curvilinear effect of prolonged grief was also examined by including a polynomial PG-13 term (PG-132) in the third and final step. The PG-13 was centered around its mean prior to computing the polynomial term.	Presentation of PTGI-SF descriptive analyses, correlations and a hierarchical multiple regression analysis

(Continued)

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TABLE 2 Continued

Type of data	Research question(s)	Sample	Data collection	Analysis	Results
QUAL	What positive changes do parents bereaved by DRD describe?	*n* = 14 seven mothers and seven fathers	**In-depth interviews:** A semi-structured interview guide, based on questions in the survey, was developed for the interviews. The guide consisted of five topics: (1) the time before the death; (2) the loss; (3) stigma from the environment and self-stigma; (4) help, support, and coping; and (5) post-traumatic growth (PTG). Data from the fifth PTG topic were included in this study. The following topics were explored: • What is the most important thing you have been able to do to live on after the death? • What has promoted or inhibited adjustment to life? • Have you experienced that you have changed as a person after the death – and if so, can you describe how? The interviews were carried out between August 27 and December 4, 2018. To synchronize the interview method and pilot-test the interview guide, the third author conducted a trial interview with a bereaved parent, with the first author present. The interview was discussed with the bereaved individual and the research interviewers. The interview guide was adjusted according to discussions after the trial interview and before other in-depth interviews.	Reflexive thematic analysis, as described by Braun and Clarke (2022), is a 6-phase process: (1) familiarization with the data; (2) coding; (3) generating initial themes; (4) reviewing themes; (5) defining and naming themes; and (6) writing up. Each phase builds on the previous one, and the analysis moves back and forth between the phases. After reading and rereading all the interviews to become immersed and familiar with their content, the entire dataset was coded in Nvivo. We collated data to identify broad patterns of meaning illustrated by themes.	Presentation of codes and themes
MIXED	Can integrating quantitative and qualitative data provide a deeper understanding of PTG experienced by bereaved parents following a DRD?	QUAN: *n* = 89 QUAL: *n* = 14	Data from the survey and the in-depth interviews were collected in parallel.	Quantitative and qualitative data were independently analyzed. The mixed-method analysis was completed at the results stage. We used data from the qualitative interviews to elaborate on the quantitative findings.	Presentation of results from the survey and interviews in a joint display

Overall purpose: To explore positive changes among bereaved parents following a DRD and factors that can explain positive changes.

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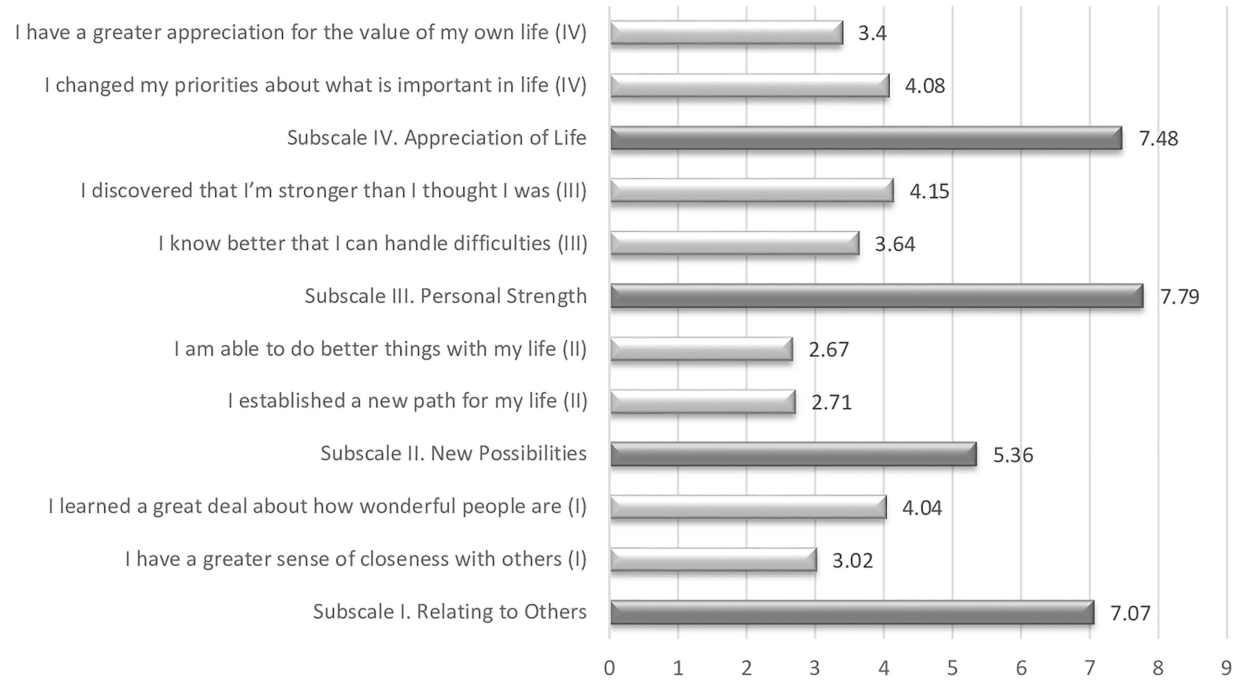

FIGURE 1
Scores for the four subscales and included items in the PTGI-SF.

TABLE 3 Mean (SD), internal consistency estimates, and inter-correlations for all study variables (n=89).

Variables		1	2	3	4	5	6	7	8	9
1	Gender	—								
2	Age	0.01	—							
3	Time since death	−0.09	0.25*	—						
4	Education	0.06	0.26*	−0.10	—					
5	GSE-SF	0.06	0.16	0.08	0.21*	α = 861				
6	CSS	0.05	0.02	−0.21	−0.03	0.24*	α = 777			
7	WSAS	−0.31**	−0.30**	−0.17	−0.09	−0.41**	−0.12	α = 886		
8	PG-13	−0.08	−0.27*	−0.24*	−0.24*	−0.52**	−0.22*	0.64**	α = 892	
9	PTGI-SF	0.01	−0.02	0.14	−0.07	0.40**	0.32**	−0.25*	−0.30**	α = 865
M		18%[a]	59.2	79.9	49%[b]	15.20	24.35	14.45	30.58	27.70
SD		—	6.97	78.76	—	2.69	6.65	10.16	8.89	9.08

GSE-SF, The General Self-Efficacy Scale; CSS, The Crisis Support Scale; WSAS, The Work and Social Adjustment Scale; PG-13, Prolonged Grief Disorder; PTGI-SF, Post-traumatic Growth Inventory.
[a]Indicates percentage of men in the sample.
[b]Indicates percentage of the sample with a high level of education.
*$p < 0.05$; **$p < 0.01$.

Qualitative findings

Only one father stated that he had not changed after the death. Though the parents were asked about growth after losing a child, some of the changes they described started before death.

Two themes were generated from the data: (I) *new perspectives on life*; and (II) *new paths in life* (Table 5). The themes and the codes are linked and influenced each other (e.g., new perspectives on life and hence new paths in life meant that individuals felt tougher, and it was therefore easier to choose to change).

The theme of new perspectives on life was related to (a) *changed attitudes towards what is essential in life*; and (b) *increased need for togetherness*. These two codes describe the parents' new thoughts and points of view.

Changed attitudes towards what is essential in life reflect an appreciation of what is meaningful in life. The participants who described changed priorities recognized that there was no need to

TABLE 4 Summary of multiple regression analysis predicting: PTGI-SF (n=89).

			Final model estimates	
Variables	β_{Step1}	β_{Step2}	b	**95% CI**
GSE-SF	0.30*	0.28*	0.95	[0.178, 1.720]
CSS	0.24*	0.23*	0.32	[0.047, 0.590]
WSAS	−0.10	−0.08	−0.07	[−0.294, 0.157]
PG-13		−0.05	−0.05	[−0.332,0.229]
R^2	0.217	0.219		
F(3, 85)	7.867**			
F(4, 84)		5.874**		

GSE-SF, The General Self-Efficacy Scale; CSS, The Crisis Support Scale; WSAS, The Work and Social Adjustment Scale; PG-13, Prolonged Grief Disorder; PTGI-SF, The Post-traumatic Growth Inventory.
*$p < 0.05$; **$p < 0.01$.

TABLE 5 Two main themes describing positive changes (n=14).

Themes	Codes
I. New perspectives on life	(a) Changed attitudes toward what is essential in life
	(b) Increased need for togetherness
II. New paths in life	(a) Felt tougher and braver
	(b) Chose to change
	(c) Increased respect and tolerance for others

worry about insignificant matters and expressed that they were less materialistic:

R: Um, I think the worst has happened, so I'm probably not so, how should I put it, I'm not so concerned that everything must be perfect, no. In my house and at home. (ID 91).

Being less materialistic also reflected a change in values:

R: Well, you become a different person in a way, and you have to, you have to learn to live again and think new thoughts and try to find other values in life, right, and some meaning to life, right. So, I've probably changed a lot regarding that, and as I said, I do not take everything so seriously anymore. (ID 125).

New perspectives were also related to strengthening relations with other family members as some of the parents experienced an *increased need for togetherness*. Family members were described as most important, and the participants prioritized and valued them. Some also stated that this unity (the need to take care of the "herd") was a positive change in the family dynamic which actually started before the child died:

R: But what has been positive is that we, my daughter and my ex-husband, the father of NN (deceased), have managed to maintain a good relationship and see more of each other now because we have this one grandchild together. At least there is no point in making problems out of it, like getting mad at each other. We just have to try to collaborate and share the experience of being with our grandchild and her mom. (ID 15).

The theme of new paths in life reflects active sets of changes: (a) *feeling tougher and braver*; (b) *choosing to change*; and (c) *having increased respect and tolerance for others*. These three codes reflect new behavior and actions, changes reported by some of the parents to have occurred before the loss of their child.

Those who described themselves as *tougher and braver* felt that they could handle life's challenges better. One parent described this as having built a defensive shell to cope with new challenges, so they affected him less. Another explained that being tougher meant being better able to set boundaries for himself, so life did not wear him out:

R: Well, if I had to rush out in the night and go into some "rat's nest" and pick him up, I did so… Yes, maybe braver is the word. (ID 123).

The child's drug use was all-consuming when the child was alive. Deciding to have things in life other than challenges due to drug use was important for many. For some, *choosing to change* meant that they made a conscious decision to be involved in what they described as meaningful activities (e.g., further education). Others decided to "stop feeling sorry for themselves" and look for positives:

R: I once stood out on the porch with a coffee before heading to school and thought, because then I was so drained of energy, "[T] his is not working out." And then there was something in me like, "I want to do this. I will do it. I will get this degree." (ID 7).

Increased respect and tolerance for others resulted from the fact that they were now less judgmental and more understanding, primarily regarding people who experience drug dependency. Several parents reported that over time they had become humbler and more generous. One parent explained that it was now easier to understand underlying factors and hence had a broader perspective on drug dependency, compared to when their child first started using narcotics:

R: Yes, I have changed. I might have become a little more humble towards other people and how they live their lives. Now I look a little more behind what is in front of me, look for why things are the way they are, like the negative things… Also, regarding showing consideration or interest for "excluded" people. Previously, I could be a little scared to get too close to them, afraid they were psychotic and dangerous, right? You never know. But I've got increased confidence. I'm not so fearful that something will happen to me anymore. Previously, I was much more afraid of other people. I was skeptical of those who were different, and that has changed. (ID 160).

Mixed-method findings

Table 6 illustrates integration of the survey and interview data and how the qualitative findings elaborated on the quantitative results. The qualitative finding "felt tougher and braver" expanded on the quantitative result for the highest score on the "Personal Strength" subscale and the strong association between high levels of PTG and self-efficacy. Those who described themselves as tougher and braver reported problem-focused coping when they experienced challenging life experiences. The parents also talked about the personal characteristic "choosing to change," in the

TABLE 6 Integration of survey and interview data in a joint display.

Quantitative results ($n = 89$)	Qualitative interviews elaborated quantitative findings ($n = 14$)	How qualitative findings helped to explain quantitative results
Highest score on the "Personal Strength" subscale	"Felt tougher and braver"; "Chose to change"	For those interviewed, personal strength involved feeling tougher and braver, and particularly that they felt they could handle life's challenges better. Personal strength can involve feeling more self-assured (Tedeschi and Calhoun, 1996); the finding "Chose to change" might elaborate on an increase in confidence.
High scores on the "Appreciation of Life" subscale	"Changed attitudes towards what is essential in life"	The qualitative finding reflected an appreciation of what is meaningful in life. Interviewed parents who described changed priorities recognized that there was no need to worry about insignificant matters, and they reported being less materialistic. This reflects an appreciation for smaller aspects of life and taking life easier.
A relatively high score on the "Relating to Others" subscale	"Increased need for togetherness"; "Increased respect and tolerance for others"	A positive change in terms of relating to others was mainly strengthening of existing relationships with family members. Closer relationships with members of participants' social network were not described. Changes in relating to others also involved greater compassion toward other people who use drugs. Through recognizing and understanding drug dependence as a health issue, many found it easier to relate to people with a drug dependency.
The lowest scores on the "New Possibilities" subscale and the two included items "I established a new path for my life" and "I am able to do better things with my life"	"Chose to change"; "Increased respect and tolerance for others"	Even though the survey responses did not mention establishing a new path in life, the participants interviewed did. New possibilities involved taking a new and different path in life, such as engaging in "meaningful activities," e.g., further education. The increased respect and tolerance for others that the parents described could involve new relationships.
The strongest association was found between a high score on the PTGI-SF and high levels of self-efficacy.	"Felt tougher and braver"; "Chose to change"	The qualitative findings elaborated that for the interviewed parents, self-efficacy was embedded in personal strength. Self-efficacy is defined as the perception that a person has the capability to react effectively and functionally to environmental demands (Bandura, 1982). Feeling tougher and braver and that they could choose to change constituted a personality resource that could have influenced how individuals coped with their loss.
A strong association was found between a high score on the PTGI-SF and high levels of positive social support.	"Increased need for togetherness"	Through the qualitative findings, we learned that strengthened relationships mainly involved relationships with family members. This indicates that positive social support leading to increased PTG mainly comes from social support provided by family members (although this finding may have important nuances that need to be discussed further).

interviews. Taking control of their mindset (like deciding to stop feeling sorry for themselves) and having strategies for coping with their grief as they were focusing on life's positives also reflect increased personal strength and a high level of self-efficacy.

The quantitative findings showed that the lowest scores on the PTGI-SF were for the "New Possibilities" subscale and the two included items "I established a new path for my life" and "I am able to do better things with my life." However, in the interviews, the parents reported new paths in life, especially through the possibility of taking a new and different path, such as a career change. In addition, increased respect and tolerance for others characterized the "New Possibilities" subscale, which might lead to new/better relations.

The parents also scored relatively high on the PTGI-SF subscale "Relating to Others," and the regression analyses showed a strong association between high levels of PTG and positive social support. The qualitative findings highlighted that an "increased need for togetherness" is connected with a greater sense of closeness to other family members, not social networks in general.

Discussion

In this study, we sought to gain a deeper understanding of PTG experienced by parents bereaved by a DRD, by combining survey results with results from interviews. The highest mean score, indicating high levels of PTG, was found for the "Personal Strength" subscale, and data from the interviews elaborated that these bereaved individuals had increased confidence and felt they could handle life's challenges better. A low mean score on the "New Possibilities" subscale suggests low levels of PTG. However, data from the interviews were conflicting as recognition of new paths in life was important for many interviewed parents.

We have previously identified high levels of prolonged grief symptoms in the parents included in this study (Titlestad and Dyregrov, 2022). Hence, we highlight again that although PTG was identified, these parents reported that losing a child due to drug use was profoundly disturbing. The correlation analysis showed that high levels of prolonged grief symptoms were associated with low levels of PTG. Though, unlike what others have found when doing more advanced analyses (e.g., Johnsen and Afgun, 2021), we observed no significant association between prolonged grief and PTG when we investigated a possible curvilinear effect of prolonged grief in the hierarchical multiple regression analysis.

Many of the interviewees reported that positive changes started occurring before losing their child, so the major crises for some individuals bereaved by a DRD might be linked to living with and being associated with a child who uses narcotics, and not only the death itself. Since our findings also showed that high levels of self-efficacy are associated with high levels of PTG, we will discuss how self-confidence can be affected by circumstances linked to a person's drug use. Finally, as high levels of received positive social support are associated with high levels of PTG, we will discuss the potential for shared understanding of a framework for communicating about DRD among parents and people in their network.

Traumatic experiences linked to the child's drug use

Our findings shed light on traumatic experiences as a continuous struggle with the consequences of having a child who experiences drug dependency. Having a family member with a dependency can be a long-lasting strain (Lindeman et al., 2021). The meta-ethnography by Lindeman et al. (2021) summarized studies exploring how substance use influences family life. It showed that families constantly have to adapt to their family member's needs and that new strategies bring hope at first, which soon turns to despair when it becomes clear that these strategies are insufficient. The bereaved parents in our study described having to cope with a child suffering from drug dependency as an enduring overload and being in a state of constant emotional and physical preparedness (Titlestad et al., 2020a). Maltman et al.'s (2019) study of parental grief showed that this burden increases when parents felt they lacked the skills to manage their child's drug use. In the study presented here, parents reported an increase in personal strength. Through the interviews, we learned that they could handle life's challenges to a greater extent through feeling tougher and setting boundaries so that life's challenges did not wear them out. Since the child's drug use was all-consuming, parents decided to engage in meaningful activities. Changes in "Relating to Others" (e.g., greater compassion toward people who use drugs and strengthened ties with family members) and appreciating smaller aspects of life indicated changed values. Thus, some of the parents in our study described having reconstructed their beliefs and goals, making an effort to engage in meaningful activities before the child died, and experiencing these changes as helpful when it came to coping with the subsequent loss and life in general.

After years of fearing death, many interviewees still reported that death came as a shock (Titlestad et al., 2020a), although a cross-sectional study by Feigelman et al. (2022), comparing individuals bereaved by a DRD ($n = 115$), suicide ($n = 185$,) or sudden natural death ($n = 103$), showed that those bereaved by a DRD anticipated their loved one's death to a greater extent, while those bereaved by suicide were more shocked. Fearing the death of your child from an overdose, combined with an overload of stress, can be considered as a highly challenging life crisis and hence a traumatic experience (see Tedeschi and Calhoun, 2004b). Feigelman et al. (2022) study supports our findings, indicating that such traumatic experiences are not only linked to the death of a child but also to the consequences of having a child who uses narcotics.

Consequences of spillover stigma

Having a close relationship with a person who uses drugs and then suffering a drug-related bereavement are linked to stigmatization and self-stigmatization (Dyregrov and Selseng, 2021; Titlestad et al., 2021). Goffman (1963) writes about associative stigma as a spillover; the tainting of an individual in such a way that social discredit affects them to the same degree. Such discrediting can lead to the stigmatized person feeling shame. Self-stigma or internalization of public perceptions can lead individuals to believe that they are incompetent (Sheehan and Corrigan, 2020). Corrigan et al. (2009) have reported that internalized stigma is linked to depression, low self-esteem, and reduced self-efficacy. The parents interviewed in this study have previously reported low self-efficacy due to years of labeling, discrediting, and devaluation as a parent by others and themselves (Titlestad et al., 2020a). The attitudes, norms, and values that people, helpers, bureaucrats, and politicians have toward people who use drugs were internalized in the bereaved, which complicated their grieving process.

We found an important association between belief in one's own ability to cope with challenges (i.e., self-efficacy) and high levels of PTG. In line with Konaszewski et al. (2019), the results of this study suggest that those who experience PTG have strategies for coping with their grief and believe that they can influence the grieving process by taking control of their mindset, i.e., "choosing to change." Since self-efficacy can affect how a person copes with a loss (Bandura, 1982), it is essential to help build a sense of self-efficacy among parents bereaved by DRDs, after years of devaluation by themselves and others.

Previously, we have documented that the parents included in this study described shame and self-imposed guilt for failing as a parent, thus triggering rumination (Titlestad et al., 2020a). Service providers need to be aware that deliberate reflection may be helpful as this can help the bereaved make sense of traumatic events and reconstruct a new understanding of others and the world, leading to PTG (Calhoun et al., 2010). Calhoun et al. (2010) argue that failing to rebuild a functional assumptive world belief can

be associated with continued high levels of intrusive rumination. Hence, understanding this type of cognitive processing and when it occurs may be crucial to understanding the cognitive routes to PTG (see Tedeschi and Calhoun, 2004b). For the bereaved to cope with loss and be able to adjust to life by oscillating between loss-orientation and restoration-orientation stressors (see Stroebe and Schut, 1999), it is therefore vital to understand that the intrusive rumination they experience may be due to spillover stigma.

The challenges of providing and receiving support

A strong association was found between high levels of PTG and high levels of positive social support. The qualitative findings elaborated on the quantitative results and showed that the parents had an "increased need for togetherness." We also learned that strengthened relations were mainly linked to family members. We know from Titlestad et al. (2020b) that the same parents as in this study reported that families with good dynamics before the loss shared their grief and were brought closer together, while many divorced parents who were in conflict before the death experienced a more complicated relationship. As social support is documented as being one of the most important factors for coping with the loss of a loved one (Dyregrov and Dyregrov, 2008), there is a need to shed light on the potential for support for those bereaved by DRD from people other than a family member, i.e., support from social networks.

Through a common understanding that communicating details relating to DRDs is challenging and perhaps extreme for the parties involved, both the bereaved individuals themselves and those who support them can enhance their interaction and communication (see Dyregrov and Dyregrov, 2008). Parents bereaved by a DRD can influence and improve their social relationships by openly communicating their personal needs and educating others on how they can best be supported. Even more importantly, family and friend networks need to be informed of their potential role in healing as respectful and empathetic listeners. To improve such interaction, the bereaved need to know the advantages of openness and how to educate people in their network on the best way to support them. As social support may play a strong role in the development of PTG (see Tedeschi and Calhoun, 2004b), enhancing the relationship between parents bereaved by DRDs and their potential supporters can improve the chances of PTG. Service providers should be aware that bereaved individuals with a high degree of self-efficacy will probably find it easier to stimulate their network by being transparent and open, compared to parents with low self-esteem (see Dyregrov and Dyregrov, 2008).

Strengths and limitations

The PTGI-SF was one of several other questionaries included in the END survey. Baker et al. (2008) have discussed the challenges associated with instruments that only allow respondents to describe experiences related to positive personal changes. Negative experiences have been reported in several studies (e.g., Titlestad et al., 2020a, 2022). Thus, we argue that one of the strengths of the survey in the END project is that it allows participants to report negative as well as positive experiences.

Cann et al. (2010) have described limitations and areas for caution that should be considered when applying the short form of the PTGI. They argue that the PTGI-SF should be used when a single total score for growth is desired (since two items for each factor might be unreliable in smaller samples) and that several non-English studies have failed to replicate the factor structure in translated versions of the PTGI. In Norway, Blix et al. (2013) used the PTGI-SF in a longitudinal study after the 2011 Oslo bombing. Their results showed that items within the "Spiritual Change" domain came lowest on the PTG factor, resulting in a poor overall model fit. Religiosity seemed less relevant for this Norwegian sample than for the American samples that the scale was developed for. Hence, the two questions in the PTGI-SF on spiritual change did not affect the main findings but improved the overall model fit. We relied on the results of Blix et al. (2013) and assessed PTG with 8 items rather than 10. A consequence of this is that the total score for our participants is not comparable with participants in studies from other countries. Thus, in order to be transparent about the results for the PTGI-SF, we chose to describe scores for factors and single items (Figure 1), as we believe that these results are more informative for readers.

The cross-sectional design used in this study has its limits. It may be challenging to determine whether exposure or the outcome comes first, so we documented associations and not the causality of our findings. The prevalence is derived from a convenience sample, depending on the recruitment method, thus limiting the findings' generalizability. As no data from the registry of bereaved parents were available, we sought to recruit widely by all possible means for 1 year, resulting in the world's largest sample of parents bereaved as a result of a DRD.

Conclusion and implications for practice

This study identified PTG in parents bereaved by DRD and factors that can lead to positive growth. The findings add perspectives to other results from the same sample (Titlestad et al., 2020a, 2022) as they show that intense emotional pain and significant psychosocial impairment can exist alongside positive experiences. We have discussed how having a child who uses narcotics can be a traumatic experience that leads to PTG before the child dies. Thus, the major life crises that led to positive psychological changes for the parents were a continuation of incidents that happened before the loss, followed by the loss of a child due to an unnatural death.

We argue that on an individual level, the consequences of spillover stigma, low self-efficacy, and intrusive rumination may reduce PTG, while on a group level, enhancing network support may be related to PTG experiences. Proactive bereaved individuals

can help those in their social networks take the first challenging step in talking about DRDs. Social networks can benefit from being informed that support must be provided on the terms of the bereaved and that listening with respect and empathy can enhance communication with the bereaved (Dyregrov and Dyregrov, 2008). Overall, this study may give service providers greater insight into how to activate parents' social networks and help them understand how enhancing self-efficacy may increase PTG in the midst of crisis and pain. More research is needed to identify what promotes or inhibits self-efficacy in parents bereaved by DRD and to identify contextual, conditional triggers.

Data availability statement

The datasets presented in this article are not readily available because the research ethics committee does not approve of sharing the datasets presented in this article. Requests to access the datasets should be directed to kbti@hvl.no.

Ethics statement

The studies involving human participants were reviewed and approved by The Norwegian Regional Committees for Medical and Health Research Ethics. The participants provided their written informed consent to participate in this study.

Author contributions

KT, PK, MO'C, SH, and KD conceived this study. Together with other colleagues in the END project. KT and KD collected the quantitative and qualitative data. KT and SH analyzed the quantitative data. KT and KD analyzed the qualitative data. All authors contributed to the article and approved the submitted version.

Funding

This work was supported by the Research Council of Norway [grant no. 300732] and the Western Norway University of Applied Sciences.

Acknowledgments

We would like to express special thanks to the bereaved parents for generously sharing their experiences and time.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 09 September 2022
DOI 10.3389/fpsyg.2022.992310

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 12 July 2022
ACCEPTED 16 August 2022
PUBLISHED 09 September 2022

CITATION
Koutná V, Blatný M and Jelínek M (2022) Posttraumatic stress and growth in adolescent childhood cancer survivors: Links to quality of life. *Front. Psychol.* 13:992310. doi: 10.3389/fpsyg.2022.992310

Posttraumatic stress and growth in adolescent childhood cancer survivors: Links to quality of life

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Pediatric cancer can be considered an event potentially leading to posttraumatic stress symptoms (PTSS) as well as posttraumatic growth (PTG). While clinically significant levels of PTSS are rare in childhood cancer survivors, PTG is common in this population. However, the relationship of PTG to overall adaptation and quality of life (QOL) in pediatric cancer patients is not clear. Therefore, our study aims to analyse the relationships of PTSS and PTG with QOL in childhood cancer survivors. In this study, 172 childhood cancer survivors completed measures of quality of life (*Minneapolis-Manchester Quality of Life Scale*; child and adolescent version), posttraumatic stress (*UCLA PTSD Reaction Index for DMS-IV*) and posttraumatic growth (*Benefit Finding Scale for Children*). Correlation analyses were carried out separately for the child (up to 13 years, N = 47) and adolescent (more than 13 years, N = 125) groups and each QOL dimension. In the adolescent group, the relationship of PTSS and PTG with QOL was further verified by regression analyses while controlling for age, gender, and time off treatment. In children, negative relationships between PTSS and QOL were found, but the relationships between QOL and PTG were not significant. In adolescents, significant relationships were found for all dimensions of QOL and PTSS and also for several dimensions of QOL and PTG. The relationships between PTSS and QOL dimensions were negative in both groups, and the relationships between PTG and QOL in the adolescent group were weakly positive. In adolescents, regression analyses controlling for age, gender and time off treatment were performed and confirmed a negative relationship of PTSS with all QOL dimensions except for social functioning. For PTG, regression analyses revealed a significant positive relationship with QOL dimensions of social functioning, outlook on life and intimate relations. While the relationship between PTSS and QOL is negative for almost all QOL dimensions in children and adolescents, the nature of the relationship between PTG and QOL appears to be more complex and changing over time. PTG in children may reflect different processes with different outcomes than PTG in adolescents.

KEYWORDS

posttraumatic stress, posttraumatic growth, benefit finding, quality of life, childhood cancer surivors

10.3389/fpsyg.2022.992310

Introduction

Although childhood cancer is relatively rare and medical advances in recent years have led to an increase in the success rate of treatment, it is the second most common cause of death in childhood (following accidents; Ward et al., 2014). It is a life-threatening condition affecting the life of the whole family even after successful completion of treatment due to the risk of cancer recurrence and late effects. Therefore, long-term assessment of psychosocial adaptation of childhood cancer survivors has become one of the Standard of Care in Pediatric Oncology (Lown et al., 2015). As a part of this assessment, researchers frequently investigated the health-related quality of life (QOL) of survivors and the influence of various physical and psychosocial late effects of treatment. These studies showed that, in general, childhood cancer survivors do not usually report higher levels of anxiety, depression, emotional and behavioral difficulties or poor wellbeing (Yallop et al., 2013). Most of them do not reach clinically significant levels of posttraumatic stress (PTSS; Howard Sharp et al., 2015) and their QOL can be described as comparable with peers/healthy controls (Patenaude and Kupst, 2005; Harila et al., 2010; Blatný et al., 2011). Risk factors for PTSD and poor adaptation include female gender, problematic family background and diagnosis of a central nervous system tumour (Bruce, 2006). However, recent research has even found that a large proportion of childhood cancer survivors report positive consequences of their illness such as greater family closeness, reorganization of values or priorities and psychological maturity (e.g., Meyerson et al., 2011).

The positive consequences are usually described as posttraumatic growth (PTG) and occur in the domains of personal strength, relating to others, appreciation of life, new possibilities and spirituality (Calhoun and Tedeschi, 2006). Several studies (Meyerson et al., 2011; Turner et al., 2018; Berkman et al., 2020) analysed PTG correlates among demographic or psychosocial variables. However, it is not yet clear how the perception of positive change affects adaptation to trauma. While PTSS in childhood cancer survivors has been connected with higher levels of distress and poorer QOL (e.g., Meeske et al., 2001), the relationship of PTG with the overall adaptation seems to be more complicated.

Although intuitively it may seem obvious that PTG should have a positive relationship with overall adaptation, research in this area has produced conflicting results. In childhood cancer survivors, considerable attention has been devoted to the study of the PTG-PTSS relationship. Most of these studies operate with 4 possible forms of the relationship: positive, negative, curvilinear and PTG-PTSS as mutually independent (Casellas-Grau et al., 2017). Although some authors lean more toward the option of independence of PTG and PTSS (Klosky et al., 2014; Koutná et al., 2021), a recent systematic review found a positive relationship between PTG and PTSS (Marzilliano et al., 2019) in childhood cancer patients and survivors.

Some studies have also focused on the relationship between PTG and health-related QOL with similarly contradictory results and with different results for different dimensions of QOL. For example, a prospective follow-up study of adolescent and young adult cancer survivors (Husson et al., 2017) found a positive predictive effect of PTG on the mental dimension of QOL but no relationship between PTG and the physical dimension of QOL. This study also tested the interaction of PTG and PTSS in predicting QOL and found no interaction effect, which further supports the perspective of PTG and PTSS as two independent constructs. However, another study on pediatric cancer survivors (Kwak et al., 2021) and meta-analysis (Helgeson et al., 2006) did not find a relationship between PTG and QOL. A recent systematic review of adult cancer survivors (Liu et al., 2020) found a positive relationship between PTG and QOL.

The conflicting results in the studies of the PTG-QOL relationship may be related to the varying role of PTG with the growing amount of time since the trauma. PTG shortly after diagnosis was connected with poorer mental health and unrelated to physical health or depressive symptoms in adult survivors 3 months after diagnosis, but it predicted better physical health 3 months later (Tomich and Helgeson, 2012). Time since trauma was identified as a significant moderator of the relationship between PTG and adaptation (Helgeson et al., 2006). PTG early after diagnosis was connected with reduced negative symptoms such as depression and anxiety, whereas with a longer time interval from diagnosis, PTG was linked with better mental health (Sawyer et al., 2010). Therefore, some authors suggest that PTG early after trauma may reflect more of a coping style but with a longer time since trauma, it may reflect more substantial positive changes (Helgeson et al., 2006; Tomich and Helgeson, 2012).

In adult cancer survivors, the relationship between PTG and psychosocial adaptation appears to be further influenced by age. The positive relationship of PTG with mental health and well-being was found to be stronger for younger survivors, whereas in older survivors, there was a stronger negative connection between PTG and depression, anxiety, posttraumatic stress and distress (Sawyer et al., 2010).

Although there are several meta-analyses and review studies on the relationship between PTG and QOL, most of them focus on adult cancer patients. However, as noted above, the relationship of PTG and overall adaptation may depend on age. In addition to disease-related differences (e.g., incidence, type of cancer, treatment success and late effects), paediatric cancer patients may differ from adults in their ability to understand the disease and its consequences as well as strategies they use to deal with it. In the adult PTG model, the cognitive processing of a traumatic event called rumination plays a key role (Calhoun and Tedeschi, 2006). A prerequisite for this processing is a certain level of cognitive maturity. The minimum age at which children are capable of this processing is not clearly

defined. Some authors consider the age of 11–12 years to be crucial for the development of cognitive abilities related to PTG (Turner et al., 2018).

This study aims to analyse the relationship of PTSS and PTG with individual dimensions of QOL in childhood cancer survivors. Based on the results presented above, we assume a negative PTSS-QOL relationship and a positive or neutral PTG-QOL relationship.

Materials and methods

Sample

The sample presented in this study is a part of the Quality of Life Longitudinal Study in Pediatric Oncology Patients (QOLOP) project. This project is focused on the longitudinal follow-up of the quality of life in long-term childhood cancer survivors and started in 2006. The project was approved by the Ethics Committee of the University Hospital Brno (02-300306/EK). Survivors were approached by the pediatric oncology clinic with an offer to participate in the study on the occasion of a regular check-up at the clinic (convenient sampling was performed). All survivors and/or their parents were thoroughly familiar with the aims, course and methods of the project and signed informed consent to participate in this study. All methods were administered to survivors in a paper-pencil form on the during the check-up. More details about the QOLOP project can be found in Blatný et al. (2011).

The sample used for the analyses included 172 childhood cancer survivors aged 11–25 (m = 16.76, SD = 3.64) at the time of assessment. This study is based on the cross-sectional data obtained in the second wave of data collection with a mean time off-treatment 8.55 years (SD = 2.72). A total of 217 survivors participated in the second wave of data collection. However, some of them were administered only a shortened version of the questionnaire set due to more severe cognitive late effects of treatment, and some did not provide complete data.

The sample in this study was almost balanced in terms of gender composition (53% males) and the majority of survivors were treated with leukemia or other solid tumors with no late effects. Only the minority was treated with CNS tumors (less than 15%) or suffered more serious late effects (less than 12%). For this study, the sample was divided into child and adolescent groups according to the version of the Minneapolis-Manchester Quality of Life Scale (MMQL) questionnaire used. The sample characteristics for these groups are presented in **Table 1**.

TABLE 1 Sample characteristics for child and adolescent groups.

		Child	Adolescent
		***N* = 47**	***N* = 125**
Gender *N* (%)	Male	21 (44.7)	70 (56.0)
	Female	26 (55.3)	55 (44.0)
Current age	*m* (SD)	12.33 (0.5)	18.42 (2.82)
	Range	11.5–13.7	14.0–25.3
Age at diagnosis	*m* (SD)	3.72 (2.01)	8.18 (3.93)
Time off-treatment (years)	*m* (SD)	7.17 (1.55)	9.07 (2.88)
Diagnosis *N* (%)	CNS	5 (10.6)	20 (16.0)
	Leukemia	27 (57.4)	41 (32.8)
	Other	15 (31.9)	64 (51.2)
Late effects *N* (%)	No	30 (63.8)	52 (41.6)
	Mild	13 (27.7)	42 (33.6)
	Moderate	1 (2.1)	19 (15.2)
	Severe	3 (6.4)	12 (9.6)
PTSS	*m* (SD)	1.44 (0.43)	1.69 (0.55)
PTG	*m* (SD)	3.25 (1.02)	3.59 (0.93)

CNS, central nervous system.

Methods

Minneapolis-Manchester Quality of Life Scale (MMQL) was used for the assessment of QOL. MMQL is a disease-specific measure of QOL in cancer patients and two age-appropriate versions reflecting different needs and language abilities of different age groups were used in this study. MMQL-YF (Bhatia et al., 2004) is designed for survivors from 8 up to 12 years and includes 32 items divided into 4 subscales: outlook on life and family dynamics (e.g., looking forward to the future, Cronbach's alpha = 0.744), physical symptoms (e.g., pain, Cronbach's alpha = 0.685), physical functioning (e.g., have a lot of energy, Cronbach's alpha = 0.720) and psychological functioning (e.g., feeling sad, Cronbach's alpha = 0.667). The total Cronbach's alpha for MMQL-YF = 0.612. MMQL-Adolescent form (Bhatia et al., 2002) is intended for survivors older than 13 years and includes 46 items divided into 7 subscales: outlook on life (e.g., happy with life in general, Cronbach's alpha = 0.806), physical functioning (e.g., feeling strong and healthy, Cronbach's alpha = 0.804), psychological functioning (e.g., worried about health, Cronbach's alpha = 0.825), social functioning (e.g., have many close friends, Cronbach's alpha = 0.824), cognitive functioning (e.g., difficulty in concentrating, Cronbach's alpha = 0.782), body image (e.g., being happy about the way they look, Cronbach's alpha = 0.824) and intimate relations (e.g., difficulty in making friend, Cronbach's alpha = 0.768). The total Cronbach's alpha for MMQL-Adolescent form = 0.903. Survivors report their QOL on a 4 or 5-point scale. The MMQL-Adult form was not available at the time of data collection, therefore the MMQL-Adolescent version was used without the upper age limit. The MMQL-YF was exceptionally (in 5 survivors) administered to 13-year-olds according to the recommendation of the clinic staff because its shorter and simpler form was more suitable for them.

The University of California at Los Angeles Posttraumatic Stress Disorder Index for DSM-IV (UCLA_PTSD) was used for the assessment of PTSS. The questionnaire measures the frequency of individual symptoms of posttraumatic stress as defined in the DSM-IV (avoidance, re-experiencing and increased arousal) in the past month (Pynoos et al., 1998; Steinberg et al., 2004). The DSM-IV version was used because it was the current version at the time data collection began. The reliability of UCLA_PTSD in this study was good (Cronbach's alpha = 0.907). Survivors report the frequency of PTSS on a 5-point scale. In this study, the experience of illness was explicitly identified as the event to which each questionnaire item relates. For example, instead of item "When something reminds me of *what happened*, I get very upset, afraid or sad" we used item "When something reminds me of *my disease*, I get very upset, afraid or sad," or instead of "I have dreams about *what happened* other bad dreams" we used "I have dreams about *my disease* or other bad dreams."

Benefit Finding Scale for Children (BFSC) was used to assess PTG in childhood cancer survivors. BFSC is a frequently used measure in PTG research and consists of 10 items addressing positive change on a 5-point scale (Phipps et al., 2007; Michel et al., 2009). The reliability of BFSC in this study was good (Cronbach's alpha = 0.908).

Ale methods were administered to the survivors in Czech language. The severity of late effects was evaluated according to Common Terminology Criteria for Adverse Events v3.0 so that the most serious of the occurring late effects was decisive to the resulting degree of severity. The evaluation was performed by a physician.

Statistical analysis

To analyse the relationship between PTSS/PTG and QOL, correlation analyses were carried out separately for the children (MMQL-YF) and adolescent (MMQL-Adolescent form) groups and individual MMQL dimensions. In the adolescent group, the relationship of PTSS and PTG with QOL was further verified by regression analyses while controlling for age, gender, and time off treatment. The children group was not further analysed due to the small sample size. All analyses were performed using SPSS 27.

The sample was divided in two age groups based on the version of MMQL. Due to differences in the number of subscales and items, item wording as well as response scale between MMQL_YF and MMQL-Adolescent form, data obtained by this method cannot be merged and we treat them separately. In addition, the age limit of 12 years, which determines the use of these two versions of MMQL, represents a developmental milestone in terms of the development of PTG-related cognitive abilities (Turner et al., 2018).

Results

The sample for this study includes 172 survivors divided into child (N = 42) and adolescent (N = 125) groups analysed separately due to different versions of MMQL. More details about these groups can be found in **Table 1**. In the comparison of the child and adolescent group, adolescent survivors reported higher levels of both PTSS (t = −3.20**) and PTG (t = −2.03*). Based on the 38 cut-off PTSS score (Steinberg et al., 2004), a clinically significant level of PTSS was reported by 10 (6.2%) survivors.

The results of the correlation analysis of PTSS and PTG with individual QOL dimensions are presented in **Tables 2**, **3**. In both age groups, PTSS was connected to decreased QOL in all dimensions. On the other hand, significant relationships between PTG and QOL were found only in the adolescent group. Adolescents with higher levels of PTG report higher scores on the outlook of life (life satisfaction) and cognitive functioning dimensions of QOL.

Table 4 presents the result of regression analyses controlling for age, gender a time off-treatment when analysing PTSS/PTG-QOL relationship in the adolescent group. Models for all QOL dimensions were significant explaining 10–47% of the variance (the lowest level of explained variance was found for the domain of social functioning, and the highest level of explained variance was found for the domain of psychological functioning). The analyses confirmed the negative relationship of PTSS with all dimensions of QOL except for social functioning. The strongest PTSS-QOL relationship was found for the psychological functioning domain (β = −0.682), the weakest for the intimate relations domain (β = −0.237). In the case of PTG, the relationships with the outlook on life (life satisfaction), social functioning and intimate relations yielded significant results – survivors with a higher level of PTG report greater life satisfaction, better social functioning and more confidence in intimate relations. In the case of outlook on life and intimate relations, both PTSS and PTG significantly contributed to the final model. Age was a significant individual predictor of outlook on life and social functioning domains of QOL (younger survivors report higher QOL in these domains). Gender was a significant individual predictor for the domain of intimate relations (boys reporter higher level of satisfaction in intimate relations). Time since treatment completion was not a significant predictor for any of the QOL domains.

Discussion

This study aimed to clarify the relationship between PTSS/PTG and QOL in long-term childhood cancer survivors with taking into account individual dimensions of QOL and basic demographic factors which are known to be related to PTSS, PTG and QOL: age, gender and time off-treatment.

TABLE 2 Correlation analyses for the child group (N = 47).

	PTG	Physical symptoms	Outlook on life	Physical functioning	Psychological functioning
PTSS	0.010	0.324*	−0.603**	−0.499**	−0.576**
PTG	–	0.045	−0.073	0.036	−0.108
Physical symptoms		–	−0.211	−0.384**	−0.288
Outlook on life			–	0.611**	0.491**
Physical functioning				–	0.373**

*$p < 0.05$; **$p < 0.01$.

TABLE 3 Correlation analyses for the adolescent group (N = 125).

	PTG	Outlook on life	Physical functioning	Psychological functioning	Cognitive functioning	Body image	Social functioning	Intimate relations
PTSS	−0.117	−0.467**	−0.433**	−0.668**	−0.568**	−0.471**	−0.179*	−0.272**
PTG	–	0.205*	−0.022	0.020	0.190*	0.063	0.161	0.159
Outlook on life		–	0.460**	0.393**	0.378**	0.480**	0.454**	0.374**
Physical functioning			–	0.519**	0.368**	0.406**	0.414**	0.408**
Psychological functioning				–	0.507**	0.422**	0.279**	0.370**
Cognitive functioning					–	0.424**	0.242**	0.271**
Body image						–	0.323**	0.396**
Social functioning							–	0.568**

*$p < 0.05$; **$p < 0.01$.

TABLE 4 Regression analyses controlling for age, gender a time off-treatment in the adolescent group (N = 125).

	Physical functioning β	Psychological functioning β	Outlook on life β	Cognitive functioning β	Social functioning β	Body image β	Intimate relations β
Age	−0.087	−0.054	−0.166*	−0.022	−0.212*	−0.036	−0.057
Gender	−0.107	−0.060	0.070	0.069	−0.105	0.065	−0.197*
Time off treatment	0.081	−0.130	−0.027	−0.003	0.054	−0.044	0.023
PTSS	−0.427**	−0.682**	−0.461**	−0.561**	−0.151	−0.480**	−0.237**
PTG	−0.018	−0.038	0.178*	0.113	0.230*	−0.002	0.195*
	R^2 = 0.214**	R^2 = 0.474**	R^2 = 0.275**	R^2 = 0.344**	R^2 = 0.100*	R^2 = 0.229**	R^2 = 0.128*

*$p < 0.05$; **$p < 0.01$.
For gender: 1 = female, 0 = male.

Correlation analysis revealed negative relationships for PTSS and all domains of QOL for both age groups. The connection of elevated levels of PTSS with lower QOL is in line with previous research (Meeske et al., 2001). The strength of most of these correlations ranged from medium to high. Only the correlations with social functioning and intimate relations were rather weak. For PTG, a significant positive relationship was found only in the older age group and only for two domains of QOL – outlook on life and cognitive functioning. Although these relationships were less tight than in the case of PTSS, we can assume that the PTG-QOL relationship evolves with age. While no association has been found between QOL and PTG in children, the relationship between PTG and QOL begins to emerge in adolescents. Therefore, we believe that PTG in children may be of a different nature than PTG in adolescents/young adults. Finding meaning in a traumatic event requires a certain level of cognitive maturity that cannot be expected from children. Some authors date the development of these abilities to early adolescence in the period of 11–12 years (Turner et al., 2018). This is consistent with the results of the present study, in which adolescents reported higher PTG scores compared to children. As cognitive abilities develop, adolescents may be better able to assess the impact of the disease on their lives (Blatný et al., 2013), and this more accurate assessment can then be reflected in their quality of life and overall adaptation.

When analysing the PTSS-QOL relationship using regression analysis controlling for age, gender and time off-treatment in the adolescent group, the significant relationship

of PTSS with QOL was confirmed for all dimensions except for social functioning. In contrast, social functioning was one of the few dimensions with a significant relationship with PTG. This may reflect the fact that interpersonal relationships belong to the dimensions in which PTG typically occur (Calhoun and Tedeschi, 2006) – improvements in relating to others as a part of PTG may reflect in better social functioning domain of QOL. However, social functioning was also the domain with the lowest level of explained variance. More research is needed to analyse the importance of other factors contributing to the social aspects of QOL.

PTG was also associated with a better outlook on life (life satisfaction) and intimate relations. The intimate relations subscale is very close in content to the social functioning subscale and its association with PTG could also be explained by the fact that interpersonal relations represent one of the fundamental dimensions of PTG. However, the association of PTG with these QOL dimensions may also be explained by the fact that patients with greater satisfaction in social relationships and higher levels of social support may be more likely to report positive changes following trauma. Social support has been connected with PTG in several studies (e.g., Prati and Pietrantoni, 2009).

We can think in a similar way about the connection between PTG and outlook on life. In addition to improved interpersonal relationships, PTG often results in a change in the philosophy of life and reorganization of priorities (Calhoun and Tedeschi, 2006). These changes are usually described as changes in what is perceived as important in life, greater respect for life, awareness of the importance and the joy of ordinary little things etc. This new perspective can then translate into greater life satisfaction. Perhaps these findings could be perceived as overlaps of PTG and QOL rather than their associations. Positive changes in dimensions such as interpersonal relationships or changed philosophy of life may be reflected in subjective evaluations of corresponding QOL domains and life satisfaction.

Our study did not find an association between PTG and physical, psychological and cognitive functioning or body image. Unlike social functioning, intimate relations and outlook on life, these QOL dimensions are not as directly represented in the areas typical for PTG. Instead, these dimensions of QOL were more closely related to PTSS. After a closer examination of individual items in the MMQL questionnaire, a part of these connections is quite easily explainable. The items of the psychological functioning subscale are narrowly focused on the presence of negative emotions. Negative cognitions and moods form a separate symptom cluster of PTSS in the DSM-5 (American Psychiatric Association, 2013). Intrusive thoughts as another PTSS symptom cluster together with negative moods can interfere with the cognitive functioning of survivors and their ability to concentrate. Although the association between physical functioning and body image with PTSS cannot be explained so straightforwardly, the lack of energy and uncertainty about one's health and appearance fit in with negative beliefs or expectations about oneself typical of posttraumatic stress (American Psychiatric Association, 2013). Moreover, the lack of association between PTG and the physical domain of QOL is in line with the literature (Husson et al., 2017). From this point of view, it seems logical that these subscales are more strongly related to PTSS than to PTG.

Taken together, our results show that the relationship between PTSS and QOL in childhood cancer survivors is more pronounced than the relationship between PTG and QOL. The relationship of PTG with QOL was found only in some dimensions of QOL and was rather weak, but was not negative for any dimension. Thus, PTG is not necessarily always associated with better overall QOL, but neither is it associated with reduced QOL. In addition, the nature of the PTG-QOL relationship is not universal, it may change with the age of survivors.

Our results also offer several implications for clinical practice. The finding that PTG is not necessarily reflected in better QOL implies that psychosocial support may be suitable even for survivors who perceive benefits in their experience. Even their QOL may be compromised in some dimensions. Perception of the positive consequences of a traumatic event does not diminish the negative impact of this event. PTG can co-exist with PTSS (Calhoun and Tedeschi, 2006) and this must be kept in mind when planning psychosocial care for childhood cancer survivors. Moreover, some authors (e.g., Zoellner and Maercker, 2006) think of PTG more in terms of a positive illusions with possible negative consequences, and our results suggest that while PTG may not always be beneficial, it is probably not harmful either.

This study has some limitations that must be kept in mind when interpreting the results. First of all, it is a cross-sectional study, which prevents us from drawing conclusions about causality. The relationships identified by our results must be considered in both directions. Survivors with higher levels of PTG report better QOL in several dimensions. Or the other way round, those with better QOL report more benefits from their experience. Longitudinal studies are needed to understand the causal link between PTG and QOL. The sample of this study includes only 47 survivors in the children group compared to 125 adolescents and our results regarding children must be considered preliminary. More research with higher sample size is needed to verify these findings. Furthermore, the majority of our sample reported low levels of PTSS, which is comparable with results reported in the reviews of PTSS in childhood cancer survivors (Taïeb et al., 2003; Bruce, 2006) and indicative of their good overall psychosocial adaptation (Patenaude and Kupst, 2005). However, our results need to be verified in the sample with a higher prevalence of clinically significant levels of PTSS in studies using a more up-to-date method for assessing PTSS. Future research should also focus on the specifics of PTG processes and outcomes in children and adolescents and their

association with overall adaptation or quality of life as well as on the identification and development of key cognitive abilities in relation to PTG.

Data availability statement

The datasets presented in this article are not readily available because participants of this study did not agree for their data to be shared publicly. Requests to access the datasets should be directed to VK, koutna@psu.cas.cz.

Ethics statement

The studies involving human participants were reviewed and approved by Ethics Committee of the University Hospital Brno. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

VK and MB: conceptualization and writing – review and editing. MJ: data curation. VK and MJ: formal analysis. MB and MJ: methodology. MB: supervision. VK: writing – original draft preparation. All authors have read and agreed to the published version of the manuscript.

Funding

This work was supported by the Czech Science Foundation under grant No. 19-06524S.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 28 September 2022
DOI 10.3389/fpsyg.2022.969253

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 14 June 2022
ACCEPTED 09 September 2022
PUBLISHED 28 September 2022

CITATION
Blom DM, Sulkers E, Post WJ, Schroevers MJ and Ranchor AV (2022) Sub-groups (profiles) of individuals experiencing post-traumatic growth during the COVID-19 pandemic. *Front. Psychol.* 13:969253. doi: 10.3389/fpsyg.2022.969253

Sub-groups (profiles) of individuals experiencing post-traumatic growth during the COVID-19 pandemic

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Objective: Some people experience post-traumatic growth (PTG), entailing positive changes such as a greater appreciation of life following traumatic events. We examined PTG in the context of the negative consequences of the COVID-19 pandemic, notably working from home and social distancing. We aimed to assess whether distinct sub-groups (profiles) of individuals experiencing PTG could be identified by how they appraised and coped with the COVID-19 pandemic.

Method: For this cross-sectional study, we used convenience sampling. In total, 951 participants from the general population completed an online questionnaire with items focusing on primary and secondary appraisal, positive reappraisal, rumination, and coping flexibility. For the latent profile analysis, we selected a sample of 392 individuals who had experienced moderate degrees of pandemic-related PTG, reporting at least two of the 10 positive changes in the PTG Inventory-Short Form.

Results: We identified two distinct profiles among people experiencing PTG. The first was characterised by low levels of primary appraisal and stressfulness and higher levels of secondary appraisal (e.g., resilient group), increased coping flexibility and greater use of positive reappraisal. The second was characterised by higher levels of stressfulness and primary appraisal (e.g., stressed group) and greater use of rumination.

Conclusion: The two sub-groups evidently appraised and coped with the COVID-19 pandemic differently. Therefore, future research should account for these different profiles of people experiencing PTG.

KEYWORDS

post-traumatic growth, benefit finding, COVID-19 pandemic, stress appraisal, coping

Introduction

During or after traumatic events, individuals may experience not only negative psychological outcomes, such as depressive symptoms, but also positive changes relating to their personal strength, spiritual beliefs, interpersonal relationships, life priorities and goals and appreciation of life (Tedeschi and Calhoun, 1996, 2004). These positive changes are described as post-traumatic growth (PTG) or benefit finding, which are closely related terms referring to the same phenomenon of positive change occurring in an individual during or after a traumatic event. Previous research findings suggest that many individuals experience PTG not only in the long term but also in the short term and even during stressful circumstances (Wu et al., 2019). For instance, PTG has been reported by 20 to 80% of the samples in previous research within 2 weeks following a sexual assault, within one and 10 months after a cancer diagnosis and within 1 and 3 months after experiencing an earthquake (Frazier et al., 2001; Manne et al., 2004; Marshall et al., 2015). Despite a growing body of research conducted on PTG over the last 20 years, an understanding of why some individuals are more likely than others to experience PTG remains limited. Acquiring insight into who is likely to experience PTG can illuminate ways of increasing PTG, thereby helping individuals to cope with stressful circumstances.

Several theories have attempted to explain the development of PTG. According to Tedeschi and Calhoun (1996, 2004), whose theory is widely accepted, being confronted with a traumatic event may challenge an individual's fundamental beliefs and assumptions about the world, which may be distressing. This process is thought to induce rumination, which at first is automatic and intrusive, later becoming more deliberate, reflective, and constructive. Together with social sharing, this process may induce the experience of PTG. Other scholars have posited that PTG may be induced when individuals' understanding about themselves, the world and others is shaken or threatened (Janoff-Bulman, 2004). Thus, in general, theories about PTG posit that it is not so much the event itself that prompts the experience of PTG; rather, it is the emotional and cognitive process of dealing with the event that induces PTG. Likewise, more general models of coping with stress posit that an event is appraised by a person in terms of its impact and that coping strategies (e.g., rumination) are applied to deal with that impact (Folkman, 2010). In turn, appraisal and coping strategies influence an individual's psychological outcomes, which include PTG.

Previous studies investigated the characteristics proposed by Tedeschi and Calhoun (1996, 2004) along with other relevant factors, such as coping strategies, in an attempt to predict PTG. The only consistent finding is a positive association between positive reappraisal and PTG with larger effect sizes (Helgeson et al., 2006). By contrast, other characteristics, such as sex, age and personality, which are assumed to be predictive of PTG, as theoretically postulated, and various additional characteristics that have been widely examined within the literature, such as stressor characteristics and the severity of the trauma, predicted PTG with low effect sizes. Thus, the findings of studies on the relationships among various characteristics (age, sex, rumination, and coping strategies) are inconsistent, irrespective of the type of traumatic event (Michael and Cooper, 2013; Grace et al., 2015; Casellas-Grau et al., 2017; Bernstein and Pfefferbaum, 2018; Zhai et al., 2019).

One reason for findings of mostly small effect sizes and contrasting results may be that these associations were studied at the group level, whereas there may be individual differences in the predictors of PTG. For instance, it could be argued that for some individuals, the experience of PTG may be the result of ruminative thoughts, whereas for others, a greater perceived impact of the event on their lives could be more strongly associated with PTG. When the results are aggregated at the level of the entire sample, individual-level effects may average out, resulting in small effect sizes or mixed results.

Therefore, rather than examining predictors of PTG at the overall group level, we used a different approach and examined whether there are distinct sub-groups (profiles) of individuals experiencing PTG. An individual-centered approach can be used to identify whether there are individual differences regarding predictors of PTG, thereby indicating that there are multiple pathways for experiencing PTG. We examined such individual PTG profiles in the context of the COVID-19 pandemic. Applying existing theory on PTG (Tedeschi and Calhoun, 1996, 2004; Janoff-Bulman, 2004) and previous empirical findings, we considered socio-demographic characteristics (age and sex), stressor-related characteristics (whether or not the individual belonged to a COVID-19 risk group), subjective appraisal, stressfulness and coping strategies as possible characteristics that differ between people experiencing PTG. We distinguished two types of subjective appraisal. The first is primary appraisal concerning perceived impact of the pandemic and the extent to which the impact is perceived as stressful. The second is secondary appraisal concerning an individual's belief regarding their ability to cope with the impact.

With respect to the pandemic, recent research indicates that COVID-19 has had a major psychological impact on many people (Salari et al., 2020). Only a few studies have examined the positive outcomes of the pandemic (Zhou et al., 2020; Vazquez et al., 2021). Although the COVID-19 pandemic is still ongoing, there is evidence that PTG was experienced by people right from its onset (Jin et al., 2014; Zhou et al., 2020). For instance, in a study among 2000 Chinese college students, it was found that 67% of students reported PTG, using a cut-off point based on a total score above the 75th percentile as an indication of PTG as suggested by a previous study (Jin et al., 2014). These high prevalence rates of PTG suggest that it is meaningful to examine predictors and individual profiles in PTG in the context of the worldwide COVID-19 pandemic. Previous research has shown that lower levels of PTG were associated with an older age and being female (Zhou et al., 2020). To date, and to the best of our knowledge, no studies have examined the

psychological predictors of PTG in the context of COVID-19, including stress appraisals and coping strategies.

Materials and methods

Participants

The only requirement for participation in the study was the ability to speak the Dutch language and living in the Netherlands; no other inclusion or exclusion criteria were used. Of the 1,133 participants who opened the online survey, 182 participants were excluded because they only clicked on the survey link, or they did not fill in the sections on demographic information or informed consent. In total, 951 individuals filled in the questionnaire at the baseline measurement at the beginning of the pandemic between 19 April 202 and 21 May 2020; of these participants, 684 completed the questionnaire, and 267 partially completed the questionnaire.

To be able to study PTG and address the research questions, we selected individuals reporting positive changes, using the PTGI-SF. As no clear cutoff exists for the PTGI-SF, we decided to use a cutoff based on the number of changes participants reported. First, we defined a positive change by a score of 3 or higher on an individual item, which indicates the participant experienced the change at least to a moderate degree. Second, a cutoff with higher scores used as an indicator of PTG was based on reporting a change on at least two of the 10 items. We believe this is a relevant indicator of the presence of PTG, while at the same time keeping a sample size with sufficient power. This cutoff yields a sample size of at least 300 participants which is recommended for latent profile analysis (Nylund-Gibson and Choi, 2018). As we realize, this is an arbitrary cutoff point, we conducted a sensitivity analysis, by repeating the analysis among people experiencing at least 1 and at least 3 positive changes to a moderate degree. In total, 438 out of 855 participants who provided data on PTG, achieved scores above this cut-off. Missing values were present for one or more variables in the questionnaires completed by 46 individuals. These individuals' responses were not therefore included, leaving 392 participants whose responses were analysed.

Procedure

The study was ethically approved by the Medical Ethics Review Board of the University Medical Center Groningen (UMCG; research register number 202000259). We used baseline measurements obtained from an ongoing longitudinal study on the psychological impact of the COVID-19 pandemic in areas such as well-being, coping strategies, PTG and mindfulness. This study was initiated during the first lockdown in the Netherlands that occurred between 19 April 2020 and 21 May 2020. Various researchers from the Department of Health Psychology at the UMCG invited the general public through Facebook and LinkedIn to participate in the online survey using the Qualtrics software. Followers within their networks could then share the invitations on their own pages. Thus, participants were recruited *via* convenience sampling, which may have induced bias affecting the generalisation of the results. At the beginning of the questionnaire, respondents had to give their consent for their responses to be used anonymously in the analysis.

Measurements

The following measurements, expressed in the Dutch language, were obtained.

PTG

PTG was measured using a validated, abbreviated Dutch version of the PTG Inventory-Short Form (PTGI-SF; Cann et al., 2010). This inventory comprises 10 items requiring respondents to rate their beliefs regarding various positive changes within five domains: relating to others, new possibilities, personal strength, spiritual change and appreciation of life. Sample items are: 'I appreciate the value of my life more', and 'I feel closer to others'. The response scale in the PTGI-SF was adapted to fit the context of the COVID-19 pandemic. The following original response, 'I did not experience this change as a result of my crisis', which had the lowest score (0) was adapted as follows: 'I did not experience this change as a result of the COVID-19 pandemic'. Similarly, the original response, 'I experienced this change to a very great degree as a result of my crisis', with the highest score, was adapted as follows: 'I experienced this change to a very great degree as a result of the COVID-19 pandemic'. A sum score was computed for each participant; a higher score indicated perceiving more positive changes as a result of the COVID-19 pandemic. The internal reliability of the total sample was.88.

Perceived impact, stressfulness and secondary appraisal

The items of primary appraisal (perceived impact and stressfulness) and secondary appraisal were based on the SARS Appraisal Inventory (SAI; Cheng et al., 2006). The English questions were adapted to fit the COVID-19 pandemic context and were translated and back translated. Although the measure was not validated, its internal consistency was found to be adequate (0.81–0.88). Perceived impact was assessed in the SAI using multiple items measuring the impact of SARS on multiple life domains (e.g., physical health, career or academic pursuits). In this study, one item was included based on the SAI by assessing the impact of the COVID-19 pandemic on their life. Participants were asked to rate the item using a 5-point Likert scale ranging from 0 (no impact) to 4 (a large impact). If individuals reported an impact (a score $\geq$1), the stressfulness of this impact was measured using one item, which queried the extent to which this impact of the COVID-19 pandemic on the respondents' lives was stressful. The response was rated using a scale ranging from 0 (not stressful) to 4 (very stressful).

A single item was used to measure secondary appraisal; the respondent was asked whether they believed that they were capable of coping with the consequences of the COVID-19 pandemic. Like perceived impact and stressfulness, this item was based on the SAI, which assesses an individual's confidence in coping with the impact of SARS on multiple life domains. Respondents rated the item using a 5-point Likert scale ranging from 0 (not being capable of coping with the consequences) to 4 (being very capable of coping with the consequences of the COVID-19 pandemic).

Coping strategies

Positive reappraisal was measured with four items derived from the validated Cognitive Emotion Regulation Questionnaire (CERQ; Garnefski and Spinhoven, 2001). For example, participants were asked to rate their response to 'I think I can learn something from the situation'. Furthermore, four items were included from the CERQ to measure rumination. An example question is: 'I often think about how I feel about what I have experienced'. Questions from CERQ were rated on a scale ranging from 0 ([almost] never) to 4 ([almost] always). A sum score was calculated for positive reappraisal and rumination, with higher scores indicating greater use of positive reappraisal and rumination. Internal reliability for the total sample was good for positive reappraisal (0.83) and rumination (0.76).

Coping flexibility was measured with the validated versatility scale of the coping flexibility questionnaire (COFLEX; Vriezekolk et al., 2012). This scale includes nine items, for example, 'I can easily change my approach if necessary', which participants rated on a scale ranging from 0 (seldom or never) to 3 (almost always). A sum score was calculated, with higher scores indicating greater coping flexibility. The internal reliability of this scale for the total sample was 0.92.

Socio-demographic characteristics

We included sex, age, marital status, education and living situation as socio-demographic characteristics in the study. Respondents could also indicate whether they had children and whether they have a chronic physical illness. Furthermore, they could indicate their employment situation. In case they indicated that they were engaged in wage labour, they could indicate their work situation (i.e., whether or not they worked from home).

COVID-19 related characteristics

Respondents could indicate whether or not they believed that they belonged to the COVID-19 risk group. Furthermore, participants could indicate whether they ever perceived COVID-19 like symptoms (either tested or not) or not.

Statistical analysis plan

Visual inspection of scatter plots of pairs of the included variables revealed no extreme outliers. Therefore, no respondents were omitted from the subsequent analyses. Additionally, the scatter plots revealed no clear profile structure in the data.

Prior to the analysis, the variables were standardised to enable a comparison of the scores for the variables within and between the profiles. To investigate the characteristics of individuals experiencing PTG, we performed a latent profile analysis on the following variables: sex, age, belonging to the risk group, perceived impact, stressfulness, secondary appraisal, coping strategies (rumination and positive reappraisal) and coping flexibility. There were computation issues for the dichotomous variables sex and belonging to the risk group because most participants were female and did not belong to the risk group, resulting in unequal groups. Therefore, separate analyses were performed for each category to explore whether the profiles in each category were similar as they were for the whole group. Because similar results were found for each sex and for belonging (or not) to the risk group, we excluded these categorical variables in the analysis to make the computation and interpretation of the results easier.

The analysis was performed using the 'tidyLPA' package in the RStudio software. As there is no consensus on a single fit index for determining the number of profiles, we used the recommendations of Nylund-Gibson and Choi (2018) when examining two fit indices: the Bayesian information criterion (BIC) and the Akaike information criterion (AIC). Although lower scores indicate a more optimal fit for BIC and AIC, these criteria are often associated with a decreasing function. Therefore, they generally yield a large number of profiles leading to a more complex interpretability, while there is only a small gain in the value of the criterium. For this study, the optimal number of profiles was determined at the point where values largely decreased until subsequent profile models showed the 'elbow point', indicated by a relatively small decrease.

Subsequently, in the chosen final model, the smallest profile should be larger than 5% of the sample (Hipp and Bauer, 2006) and entropy should preferably be above.80 to indicate greater profile separation (Celeux and Soromenho, 1996). Finally, we considered the interpretation of the profiles when confirming the number of profiles, ensuring that profiles could be clearly distinguished. Accordingly, we plotted the means for characteristics included in the profile models. Up to 10 profiles were considered. The resulting patterns in the final profile model were interpreted using the means and standard deviations of the included variables. Considering that the socio-demographic variables are categorical variables, proportions on characteristics for each profile were given.

Additionally, to test the robustness of the results, we repeated the analyses for a select sample with cutoff points for experiencing one or more positive changes and three or more positive changes to a moderate degree on the PTGI-SF. As no accepted cutoff point for PTG exists, we performed this sensitivity analysis to assess whether the results were in line with the main results and specifically whether profile means were similar.

Results

Descriptive characteristics of individuals experiencing higher levels of PTG

Table 1 depicts the descriptive statistics of the respondents. The sample comprised mostly women (84%) with children (66%), a majority of whom were married, in registered partnerships or cohabiting with their partners (69%). A total of 80% of the respondents had completed their higher education and 52% were engaged in wage labour while 60% were working from home during the COVID-19 pandemic. Furthermore, approximately one-fourth (24%) belonged to the COVID-19 risk group, about one-third (32%) had a chronic illness and only a few (13%) had symptoms and thought they had COVID-19 or had tested positive.

The sample comprised individuals who had experienced at least two positive changes to a moderate degree with reference to the PTGI-SF. Individuals who perceived positive changes had significantly higher scores on positive reappraisal than those who experienced less than two positive changes. Contrary, individuals experiencing at least two positive changes did not differ in terms of their ages, primary appraisals (perceived impact and stressfulness) and secondary appraisals, rumination and coping flexibility compared with those who experienced less than two positive changes to a moderate degree.

Table 2 depicts Pearson correlations among the included variables. Perceived impact was strongly positive in relation to stressfulness ($r = 0.58$) and moderately positive in relation to rumination ($r = 0.32$). Secondary appraisal was moderately negatively correlated with stressfulness ($r = -0.42$), whereas correlations with coping flexibility ($r = 0.38$) and reappraisal ($r = 0.35$) were positive. Finally, stressfulness was moderately positively correlated with rumination ($r = 0.41$), whereas PTG was moderately positively correlated to positive reappraisal ($r = 0.43$).

TABLE 1 Descriptive statistics (n=392).

Categorical variables	%
Sex (female)	84
Marital status	
Married, registered partnership or living together	68
Single, divorced, long-distance relationship or widow	30
Other	2
Education	
Lower and middle	20
Higher	78
Other	3
Living situation	
Living alone	20
Living with others (e.g., with a partner and/or children)	76
Other	3
Children (yes)	66
Chronic illness (yes)	32
Employment	
Wage labour	52
Entrepreneur, retired, incapacitated, unemployed or student	39
Other	10
Work situation	
Working from home or sent home	61
Working on-site as usual	23
Other	14
Belonging to a COVID-19 risk group (yes)	22
COVID-19	
'No symptoms' or 'I had symptoms, but I do not believe it was COVID-19'	87
'I had symptoms and I believe this was COVID-19' or 'I tested positive'	13
Continuous variables (range)	**Mean (SD)**
Age in years (18–89)	50.19 (13.77)
PTG (6–50)	18.71 (8.03)
Perceived impact (0–4)	2.48 (0.95)
Stressfulness (0–4)	1.60 (1.03)
Secondary appraisal (0–4)	2.70 (0.85)
Positive reappraisal (0–16)	9.04 (3.58)
Rumination (0–16)	6.39 (3.15)
Coping flexibility (0–27)	17.28 (5.10)

PTG = post-traumatic growth.

Profiles of individuals experiencing higher levels of PTG

Number of profiles

Table 3 depicts the fit indices for each profile model. As expected, multiple fit indices indicated different optimal profile models. According to the BIC and AIC, a two-profile model seemed to be the most appropriate model. Specifically, the values at the elbow point showed a relatively small decrease after the two-profile model. Additionally, the BIC value of the measure of fit increased moving from the two-profile model to the three-profile model. Although entropy did not extend beyond the preferred value of 0.80 for any of the profile models, the entropy value (0.79) was best for the two-profile model. Accordingly, the smallest sample size of the profiles, was sufficient in the two-profile model (39% of the sample).

The two-profile model also seemed appropriate on the basis of our interpretation of the profiles. The two profiles were reproduced in all of the other profile models. Notably, models containing more profiles included additional profiles that were less clearly identifiable than the two dominant profiles. For example, these models were characterised by scores close to the means for all variables or with minor differences compared with those for the two dominant profiles. Considering all of the criteria, the two-profile model appeared to be superior to the one-profile model and was selected as the final model, with, respectively, 238 individuals (60.7%) in profile 1 and 154 individuals in profile 2 (39.3%).

TABLE 2 Pearson correlations between the variables.

	1	2	3	4	5	6	7
Age	1						
Perceived impact	−0.13**	1					
Stressfulness	−0.12*	0.58**	1				
Secondary appraisal	−0.12*	−0.22*	−0.42**	1			
Positive reappraisal	−0.14**	−0.07	−0.20**	0.35**	1		
Rumination	−0.03	0.32**	0.41**	−0.20**	0.17**	1	
Coping flexibility	0.09	−0.05	−0.20**	0.38**	0.31**	−0.04	1
PTG	0.09	−0.07	−0.03	0.12*	0.43**	0.04	0.17**

PTG = post-traumatic growth.
*$p < 0.05$. **$p < 0.01$.

TABLE 3 Model fit indices for LPA.

Profile model	AIC	BIC	Entropy	Minimum N
1	7,766	7,821	1	1
2	7,478	7,565	0.79	0.39
3	7,462	7,581	0.70	0.20
4	7,380	7,531	0.68	0.20
5	7,334	7,517	0.72	0.13
6	7,301	7,515	0.73	0.11
7	7,292	7,539	0.75	0.04
8	7,284	7,562	0.76	0.03
9	7,287	7,597	0.73	0.05
10	7,271	7,613	0.78	0.03

LPA = latent profile analysis; AIC = Akaike information criterion; BIC = Bayesian information criterion.

The resilient and stressed groups

Figure 1 visualises the standardised scores of the included variables in the two-profile model. For each included factor on the x-axis, the standardised scores of the included variables can be found on the y-axis for both profiles. Profile 1 (the resilient group) was characterised by lower levels of perceived impact, stressfulness and rumination and higher levels of secondary appraisal, positive reappraisal and coping flexibility. Profile 2 (the stressed group) was characterised in the reverse manner, with higher levels of perceived impact, stressfulness and rumination and lower levels of secondary appraisal, positive reappraisal and coping flexibility. Age was a minor factor influencing the profiles and was relatively similar in both groups.

Table 4 presents the (unstandardised) means and standard deviations of the included variables and socio-demographic characteristics for each profile. The main differences between the profiles were related to the primary and secondary appraisals, stressfulness and rumination. Age, perceived impact, stressfulness, secondary appraisal, positive reappraisal, rumination and coping flexibility differed significantly among the profiles. There were no statistically significant differences among the groups for PTG and the socio-demographic variables with the exception of age. The results of the sensitivity analyses also differentiated these two groups.

Discussion

Previous studies have overlooked the possibility that people reporting PTG after confrontation with stressful circumstances may differ from each other and show a different profile. Our findings in the context of the COVID-19 pandemic suggest that there are two distinct sub-groups (profiles) of individuals reporting PTG, which differ in terms of their appraisals and coping strategies and, to a lesser extent, age. The so-called resilient group (61% of the sample) perceived a relatively low impact of the pandemic and associated stress on their lives. They were confident in dealing with the COVID-19 pandemic, used more flexible and adaptive coping strategies (i.e., more positive reappraisal and less rumination) and belonged to older age groups than the stressed group. The so-called stressed group (39% of the sample) evidenced the opposite profile, perceiving a relatively high and stressful impact of the COVID-19 pandemic, feeling less confident in dealing with COVID-19 and being more likely to ruminate as a way of coping with stressful situations. They also belonged to younger age groups.

Although the current study did not examine predictors/correlates of PTG, the identification of two distinct profiles within the group of individuals experiencing PTG suggests that there may be different pathways for experiencing PTG. The findings relating to these two groups may explain why previous studies found inconsistent or weak correlates of PTG at the group level. For example, a previous meta-analysis and recent studies indicated that stress predicted PTG inaccurately with a small effect size (Helgeson et al., 2006; Leppma et al., 2018; Seyburn et al., 2019). Our results showed that a perception of higher perceived impact and greater stress associated with the COVID-19 pandemic were only found in one group reporting PTG, whereas the other group perceived lower impact of the pandemic and associated stress. When studying correlates of PTG at the group level, the predictive value of these correlates could average out.

The stressed group that we identified seems more in line with theory stating that PTG is a result of the individual's struggle and a

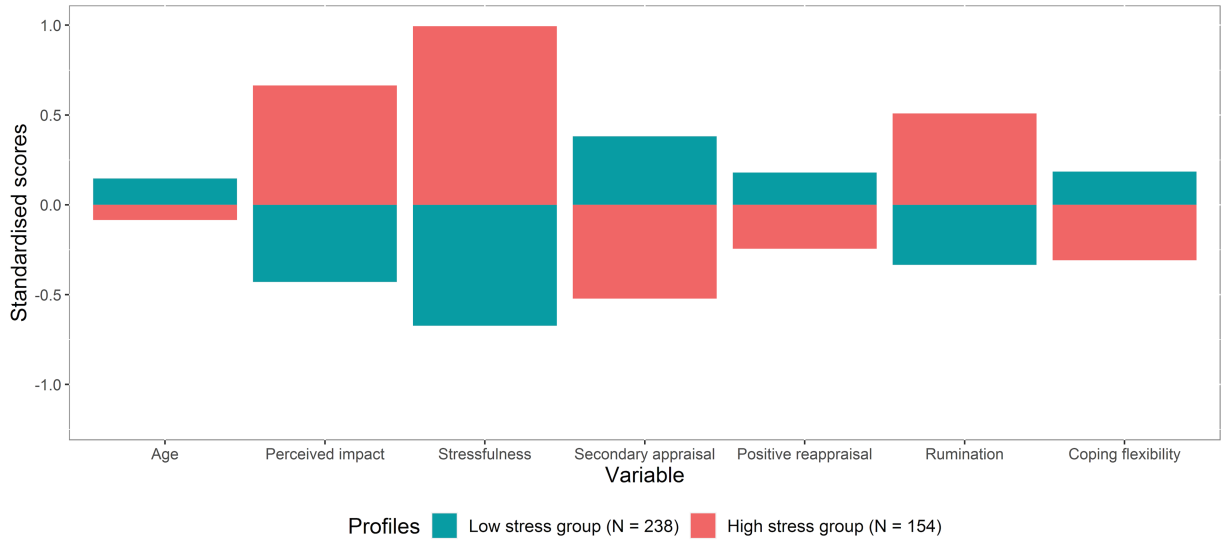

FIGURE 1
Visualization of the standardised scores of the included variables per profile of the 2-profile model.

process of rumination in the aftermath of stressful circumstances (Janoff-Bulman, 2004; Tedeschi and Calhoun, 2004). According to the theory, different types of rumination can be distinguished. The process of PTG and making sense of the circumstances starts with a more intrusive, uncontrollable rumination and continues later with a process of more deliberate rumination (Tedeschi and Calhoun, 2004). Others have made a distinction between rumination as a maladaptive cognitive process (a mode of responding involving perseverative thinking) and reflection (a mode of purposefully processing and thinking about our experiences with the intent of learning something) as a possible adaptive cognitive process (Nolen-Hoeksema et al., 2008). Although the underlying assumption of Tedeschi and Calhoun's model and this rumination process is that PTG takes time to emerge, previous literature has revealed that PTG is already reported soon after a traumatic event (Jayawickreme and Blackie, 2014). It can be reasoned that for these individuals, the experience of PTG may be a short-term outcome of the perceived impact of the pandemic and the use of rumination as a coping strategy.

Interestingly, we also found a group reporting PTG that perceived the pandemic to have had a low impact on their lives. Members of this group felt confident, were flexible in their coping strategies and made little use of rumination (the resilient group). Even though PTG is widely theorised to occur when an impact or stress associated with an event is experienced, in practice, this may not always be the case. This finding is in line with those of previous studies, which have shown that PTG has been reported by people with and without experiencing a traumatic event and therefore not having necessarily experienced feelings of stress and the impact of the event (Tedeschi and Calhoun, 1996; Taku et al., 2012). Another plausible explanation is that some people may, in general, experience the COVID-19 pandemic less negatively than others. The measures and consequences of the pandemic, such as working from home and having no social obligations, may be perceived more as benefits than as restrictions. Accordingly, individuals could perceive PTG without having experienced the impact of an event and associated stress. The reason may be that the study was conducted during the early stage of the pandemic, whereas its impact could have been perceived later on. Alternatively, it could be argued that PTG reported by the resilient group reflected a more illusory side of PTG, as described in the Janus Face model (Maercker and Zoellner, 2004) and the concept of positive illusions (Taylor, 1983). In this case, perceiving PTG could be a way of coping with the event. Consequently, such individuals may not have perceived the COVID-19 pandemic to have had much impact and associated stress.

Because of the cross-sectional design we could not be sure to what extent the appraisals and coping factors are apparent later in time. Given that our study was conducted at an early stage of the pandemic, longitudinal research is needed to determine whether the two groups continued to be discernible at later stages of the pandemic. Quantitative research could reveal to what extent the two profiles are differentially associated with levels of PTG over time and whether or not the two identified profiles were stable over time. Further research is needed to gain a better understanding of the differences between the two groups of people reporting PTG and to evaluate the theoretical assumptions underlying the interpretations for the groups. This could be done using a qualitative study design that includes interviews conducted with individuals belonging to either group.

From a clinical perspective, more research entailing a person-centred approach is required to study the predictors of PTG. If the finding that individuals experience PTG for different reasons or because of different processes is validated, then interventions could be designed based on a person-centred approach aimed at increasing PTG and helping individuals to find meaning after experiencing a traumatic or stressful event.

TABLE 4 Profile percentages and means (*SD*) per profile.

Categorical variables	Resilient group ($n = 238$)	Stressed group ($n = 154$)
Sex (female)	82	88
Marital status		
Married, registered partnership or living together	71	63
Single, divorced, long-distance relationship or widow	28	34
Other	1	3
Education		
Lower and middle	16	25
Higher	81	71
Other	2	4
Living situation		
Living alone	17	25
Living with others	79	71
Other	3	3
Children (yes)	69	61
Chronic illness (yes)	29	36
Employment		
Wage labour	52	52
Entrepreneur, retired, incapacitated, unemployed or student	38	35
Other	10	13
Work situation		
Working from home or sent home	69	56
Working on-site as usual	20	27
Other	11	18
Belonging to a COVID-19 risk group (yes)	22	26
COVID-19		
'No symptoms' or 'I had symptoms, but I do not believe it was COVID-19'	87	88
'I had symptoms and I believe this was COVID-19' or 'I tested positive'	13	12
Continuous variables (range)	**Mean (SD)**	**Mean (SD)**
Age in years (18–89)	51.47 (14.47)	48.21 (12.41)*
PTG (6–50)	19.08 (8.04)	18.14 (8.01)
Perceived impact (0–4)	2.06 (0.81)	3.12 (0.78)*
Stressfulness (0–4)	0.93 (0.53)	2.65 (0.68)*
Secondary appraisal (0–4)	3.00 (0.75)	2.23 (0.77)*
Positive reappraisal (0–16)	9.63 (3.35)	8.11 (3.72)*
Rumination (0–16)	5.34 (2.72)	8.00 (3.08)*
Coping flexibility (0–27)	18.27 (5.08)	15.75 (4.74)*

PTG = post-traumatic growth; *$p < 0.05$, significant difference with resilient group.

Limitations and strengths of the study

One strength of the study was the novel application of multiple variables within the widely used statistical approach to examine sub-groups of individuals reporting PTG. Furthermore, the variables considered in the study were strongly based on PTG theory. The results revealed one group that was in conformity with theory; in addition, a new pattern of characteristics of people experiencing PTG that has not yet been theorised was also identified. Moreover, the analysis had sufficient power as the sample, comprising more than 300 individuals, was the recommended size (Nylund-Gibson and Choi, 2018). However, there were two limitations relating to the study's internal validity. The first concerned the arbitrary way of selecting individuals reporting PTG according to their perception of at least two positive changes while the second concerned missing data. These limitations were addressed through additional analyses. Specifically, we conducted analyses of a selected sample of respondents who experienced at least one and at least three positive changes of the PTGI-SF to a moderate degree. Furthermore, to address a small number of missing values, we used multiple imputation to check whether the two profiles emerged in this analysis. These additional analyses also led to the identification of the two distinct profiles, which indicates the robustness of our findings.

Another limitation related to external validity. The sample comprised predominantly well-educated women. Therefore, the results cannot simply be generalised to other populations. The underrepresentation of male participants and individuals of lower education status may be a result of using convenience sampling (Emerson, 2015). Earlier studies conducted during previous pandemics found that less well-educated individuals reported that quarantine had a greater psychological impact compared with better educated individuals (Brooks et al., 2020). This finding could imply that perceptions of the impact of COVID-19 and associated stress were relatively lower within our sample compared to the population including more lower educated males. However, we identified two groups, one of which reported a high impact of COVID-19 and the other a low impact. Moreover, PTG levels were relatively low within this sample. Future research should be conducted including individuals experiencing more PTG, including more males and individuals who are less well-educated in order to confirm these findings. Furthermore, the entropy values of the two-profile model were slightly lower than the preferred value of.80. However, considering the slight deviation from the cut-off and the large number of variables used in this study, the entropy value was considered to be sufficient. The measures for primary and secondary appraisal, which relate to construct validity, were not validated. Even though we used items that were based on an existing appraisal measure, single item measurements cannot be used to average out errors and the specificities of a construct (DeVellis, 2016).

Conclusion

Previous studies have examined predictors of PTG, such as appraisals and coping strategies, at the group level. In the process, individual or sub-group effects were averaged out, leading to contradictory results. We found that individuals experiencing PTG differed in how they appraised and coped with the impact of the COVID-19 pandemic on their lives. This finding suggests that there are different pathways leading to the experience of PTG.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Medical Ethics Review Board of the University Medical Center Groningen. The patients/participants provided their written informed consent to participate in this study.

Author contributions

DMB drafted the manuscript, carried out data collection and performed data analysis. ES helped carrying out data collection, provided conceptual guidance and helped to draft the manuscript. WP participated in data analysis and helped to draft the manuscript. MS provided conceptual guidance and helped to draft the manuscript. AR provided conceptual guidance and helped to draft the manuscript. All authors read and approved the final manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 10 October 2022
DOI 10.3389/fpsyg.2022.1019273

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 14 August 2022
ACCEPTED 21 September 2022
PUBLISHED 10 October 2022

CITATION
Dominick W (2022) Changes in posttraumatic growth, core belief disruption, and social support over the first year of the COVID-19 pandemic. *Front. Psychol.* 13:1019273. doi: 10.3389/fpsyg.2022.1019273

Changes in posttraumatic growth, core belief disruption, and social support over the first year of the COVID-19 pandemic

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Post-traumatic Growth (PTG) is the positive psychological change that may occur after a highly stressful situation that shakes a person's core beliefs about the world. During 2020, the United States experienced the COVID-19 pandemic and a highly contentious political election, both of which have the potential to disrupt core beliefs and evoke perceptions of PTG. Post-traumatic growth, core belief disruption, perceived social support from humans and pets, coping strategies, and stressful events were assessed in 201 participants from the United States (M_{age}: 35.39, *SD*: 14.60) at four time points from April 2020 (T1) until April 2021 (T4). While total PTG did not significantly change from Time 1 to Time 4, perceptions of personal strength and new possibilities increased, as did core belief disruption, and the use of coping strategies decreased. Higher PTG was reported by those who owned pets, those who knew someone who had been hospitalized due to COVID-19, and those who knew someone who had died of COVID-19. While rating COVID-19 or politics as the most stressful event at Time 4 did not correspond to differences in PTG, those who perceived the event to be resolved had higher PTG than those who perceived the event to be ongoing. Having COVID-19 personally and vaccination status was not associated with differences in Post-traumatic Growth. PTG at Time 4 was predicted by core belief disruption and social support in the full sample and in the pet owners only sample, and by support from video conferencing for the full sample only. Time 4 PTG was also predicted by core belief disruption, problem-focused coping, and avoidance coping. Results are discussed in terms of the PTG theoretical model. Additionally, implications for interventions aimed at fostering psychological growth, including through non-traditional forms of social support (i.e., remote communication and perceived support from pets) are addressed.

KEYWORDS

COVID-19, post-traumatic growth, social support, coping strategies, pets, core belief disruption

Introduction

The 2019 Novel Coronavirus which caused the COVID-19 pandemic is an unprecedented global health crisis that has warranted research examining its effects on mental health worldwide. The implementation of policies such as social distancing, quarantine, and new hygiene practices have caused many to redefine their daily routines and has contributed to a large disruption in the global economy. Although life for many has returned to a "new normal," the global death toll has surpassed six million (Our World in Data, 2022) and disruptions to the global economy continue. Over one million of those deaths have occurred in the United States, where COVID-19 is the third leading cause of death behind heart disease and cancer (Shiels et al., 2022). According to a scientific brief released by the World Health Organization (2022), the pandemic has led to over a 25% increase in cases of major depressive disorder and anxiety worldwide, and nearly one-third of adults in the United States have reported so much stress from the pandemic that they struggle to make basic decisions (American Psychological Association, 2021).

Simultaneously, the United States experienced one of the most contentious presidential elections in decades, with more than two-thirds of adults in the U.S., regardless of political orientation, stating that the 2020 presidential election was a significant source of stress in their lives, up from just over half for the 2016 election (Bethune, 2020a). Unfortunately, that stress dissipated for only 17% of adults in the United States following the election, with another 27% indicating that their stress had increased (Bethune, 2020b).

Post-traumatic growth

While there are clear negative mental health impacts resulting from the COVID-19 pandemic and political environment, it is also possible that some people will experience Post-traumatic Growth (PTG; Tedeschi and Calhoun, 1996), the positive psychological changes resulting from the struggle with a highly stressful life event. PTG is typically experienced as a greater appreciation for life, a stronger sense of spiritual connection or faith, the recognition of new opportunities, an acknowledgment of personal strength, and/or a stronger sense of connection with others. According to the PTG theoretical model, for PTG to occur, a person's assumptive beliefs about the world must be challenged, following which, with the help of social support, reflection and meaning making, and time, one may be able to rebuild their core beliefs and experience growth (Calhoun and Tedeschi, 2006). Research conducted during the pandemic has indicated that frontline nurses working with COVID-19 patients in China experienced PTG (Cui et al., 2021), as did patients in Shanghai who had been diagnosed with COVID-19 (Sun et al., 2021) and pregnant Arab women (Chasson et al., 2022). Additionally, a cross-sectional study conducted in August of 2020 indicated that adults in the United States also reported PTG, and that PTG was positively related to perceptions of social support (Northfield and Johnston, 2022).

Social support

Many avenues of social support are linked to PTG experiences. Support from family, friends, and significant others is positively correlated with PTG (Bozo et al., 2009). Seeking social support in general was found to mediate the relationship between trauma intensity and PTG in those who experienced the loss of a child (Ogińska-Bulik and Kobylarczyk, 2019) and to mediate between interpersonal trauma and PTG and between the experience of multiple trauma types and PTG (Brooks et al., 2019). While typically social support is assessed as in-person support, it may also be possible to experience social support through virtual communication, especially for those who are more isolated. To that end, video conferencing was shown to provide emotional support for frontline workers during the start of the pandemic (Viswanathan et al., 2020), to increase aspects of social support in long-term care residents (Siniscarco et al., 2017), and to improve wellbeing in isolated elderly in Finland (Airola et al., 2020). However, technical issues and lack of familiarity with technology does reduce the benefits of video communication (Siniscarco et al., 2017; Airola et al., 2020). Moreover, video communication precludes physical touch, a component that may play a key role in perceptions of social support. Indeed, physical touch has been found to increase perceptions of empathy (Montague et al., 2013), reduce anxiety (Gagne and Toye, 1994), and buffer against stress (Coan et al., 2006). Previous research on quarantines, which limit physical touch between humans, has found increased anxiety, anger, and post-traumatic stress symptoms because of the quarantine (Brooks et al., 2020).

Despite limited human contact during the COVID-19 pandemic, pets, and physical contact with pets, remained stable and may also contribute to a sense of social support. Owning pets can increase both perceived and actual social support, as well as facilitating social capital (e.g., connectivity between people), indicating that those with pets may have larger support networks than those who are not pet owners (Wood et al., 2014). Indeed, a systemic review of the relationship between pet ownership, loneliness, and social isolation found that owning a pet was associated with lower levels of social isolation and that after the outbreak of COVID-19 pet ownership contributed to lower levels of loneliness (Kretzler et al., 2022). While pet ownership alone may provide benefits, the degree of attachment to pets may also contribute to a sense of social support. Pet attachment mediated the relationship between general health and loneliness in older women (Krause-Parello, 2008), was positively correlated

with life satisfaction in adults over 40 (Fu and Zheng, 2009), and corresponded with a higher sense of emotional support in adults from India (Joseph et al., 2019). Additionally, adolescents who spent more time with pets, which has been correlated to higher pet attachment (Joseph et al., 2019), reported higher PTG in the domain regarding social connections (Dominick et al., 2019). Chinese adults who spent more time caring for a pet also displayed increased attachment to that pet, which in turn reduced stress in the owners (Wu et al., 2018).

Coping strategies

Beyond seeking social support, the upheaval of 2020 may also have prompted the use of various other coping strategies, some of which have been linked to the experience of PTG. In breast cancer survivors, the use of positive coping skills was linked to the experience of PTG both 6 months and 2 years after treatment ended, although the link disappeared 7 years after treatment (Hamama-Raz et al., 2019). This same study found that participants who expressed higher levels of PTG subsequently engaged in more positive coping strategies, and that negative coping was unrelated to the experience of PTG. A meta-analysis examining coping strategies and PTG found that positive reappraisal coping had the largest impact on increasing PTG, with social support coping moderately related to PTG and acceptance coping yielding the smallest, yet still significant, impact on PTG (Prati and Pietrantoni, 2008). However, an examination of mediation models found that lower avoidance coping after experiencing multiple types of traumas or after experiencing childhood trauma was associated with higher PTG (Brooks et al., 2019), and in Greek healthcare workers and 911 telecommunicators, adaptive coping strategies, such as emotional-focused coping, and maladaptive coping strategies, such as avoidant coping, both contributed to PTG (London et al., 2017; Kalaitzaki and Rovithis, 2021). Given the conflicting impacts of different coping strategies, additional examination of their impact on PTG is called for.

Current study

The current study examines the impact of several types of social support and of coping strategies on the experience of PTG from April 2020 through April 2021. Traditional human support, support through video conferencing, support perceived through pets, and the impact of physical touch with pets are evaluated. The relative impact of problem-focused coping, emotion-focused coping, and avoidant coping on PTG are also assessed. Additionally, due to the chaotic nature of the year, differences in PTG between those most impacted by the pandemic and those most impacted by politics are examined. This study adds valuable insights into the importance of alternative methods of gaining social support and on the impact of both the nature of the stressor and coping strategies utilized, as well as overall ability to recognize positive mental growth following a highly stressful year in the United States.

Method

Participants

There were 201 participants who completed four surveys over the course of the first year of the pandemic. Participants ranged in age from 18 through 81, with a mean age of 35.39 ($SD = 14.60$). Participants who did not complete all four time points ($n = 797$) were excluded from analyses. See Table 1 for complete demographics.

Procedure

Participants were recruited through a midwestern university's undergraduate subject pool as well as through snowball sampling that was advertised on social media sites such as Instagram and Reddit. A total of 1,000 participants were issued the T1 online survey starting March 31st, 2020, and were sent follow-up surveys on April 30th, 2020 (T2), September 30th, 2020 (T3), and March 31st, 2021 (T4). Participants who enrolled through the subject pool earned research credit for completing the initial survey. To encourage retention of participants each participant was sent up to three reminder emails every seven days after the initial follow-up survey invitation. In addition, participants were entered into raffles for a $50, $75, and $150 e-gift card for the T2, T3, and T4 surveys, respectively. Demographics and COVID-19 exposure were assessed first. If participants were pet owners, they were asked about the social support provided by their pets. Questionnaires regarding human social support, PTG, and core-beliefs were presented in a randomized order following the demographic and pet support sections. Subsequently, T2, T3, and T4 targeted changes in participants' responses between surveys. All the questionnaires that were included in T1 were also included in the subsequent surveys, with modifications made to the instructions to reflect changes in timing. Questions assessing the use of video support were added to the T2 and ensuing surveys. Because the United States continued to experience disruptions over the summer and fall of 2020, including a racial justice movement and contentious presidential election, questions assessing experiences with several types of stressful events and their relative importance were added to the T3 and T4 surveys. Vaccinations for COVID-19 became available to the public in early 2021, so questions regarding vaccination status were also added to the T4 survey. Ethical approval for this study was granted by the university's internal review board.

TABLE 1 Participant demographics.

Variable	Participants ($N = 201$)	Variable	Participants ($N = 201$)
Age	35.39 (14.56)	Essential worker	35.3% Essential workers
			31.5% Live with essential worker
Sex	77.6% Female	High risk	28.9% High risk
			33.9% Live with high risk individual
Pets	71.0% Own pets	Living status	17.4% Live alone
			54.7% Live with romantic partner
			13.9% Live with parents
			13.9% Live with roommates
Race	83.6% White	Relationship status	37.7% Married
	4.5% Mixed		31.2% Dating/in relationship
	4.0% Asian		26.6% Single
	2.5% Latinx/Hispanic		3.0% Divorced
	2.0% Middle Eastern		
	1.5% Black		
State	25.4% Michigan	Employment	75.2% Employed
	12.4% Colorado		8.0% Unemployed/unable to work
	9.5% California		6.0% Students
	4.5% Virginia		6.0% Retired
	4.0% Texas		2.5% Out of work & looking for work
	4.0% Utah		2.5% Employed but not working
	4.0% New York		
Religion	47.5% Agnostic/Atheist	Had COVID	11.6% Yes
	36.5% Christianity		
	6% Unsure		
	2.5% Judaism		
	2.0% Buddhism		
Vaccination status	92.9% Vaccinated or plan to get vaccinated	Knew someone hospitalized	54.8% Yes
	6.5% Not vaccinated & no plan for vaccination		
		Knew someone who died	42.7% Yes

Measures

Social support: Pets

Pet ownership was first assessed by asking participants to indicate whether they owned a pet. If they did, the 23-item Lexington Pet Attachment Scale ($\alpha = 0.894$; Johnson et al., 1992) was used to assess pet attachment as a proxy for social support. Items were rated on a scale from 1 (*strongly agree*) to 4 (*strongly disagree*), with lower scores indicating higher attachment levels. It included items such as "Quite often I confide in my pet." Four additional questions regarding the use of pets for social support specifically were included. These items ranged from 1(never) to 5 (always), and included items such as "How often have you considered your pet a source of social support in the past week?" These questions had adequate reliability, $\alpha = 0.858$. The use of touch with pets for social support was assessed by two items ($\alpha = 0.801$) ranging from 0 (never) to 4 (always), and included items such as "How often has physically touching your pet provided comfort to you in the past week?"

Social support: Humans

The Multidimensional Scale of Perceived Social Support (Cheng and Chan, 2004) was used to measure human social support during the COVID-19 pandemic. On a 7-point scale ranging from 1 (*very strongly disagree*) to 4 (*very strongly agree*), participants indicated the human support they had from special people, family, and friends (e.g., "I get the emotional help and support I need from my family"). Scores were averaged for an overall score of human social support, and displayed high reliability, $\alpha = 0.929$. The use of video conferencing tools for social support was assessed by 8 items ranging from 0 (not at

all) to 3 (a lot), included items such as "Has video conferencing allowed you to feel connected with others?" and displayed adequate reliability ($\alpha = 0.778$). One additional item assessed the average frequency of video conferencing use per week.

Coping strategies

Coping strategies were assessed with the brief version of the COPE scale (Carver, 1997). This measure consists of 28 items ($\alpha = 0.801$) rated on a scale from 1 (not at all) to 4 (a lot) and included items such as "I've been taking action to try to make the situation better." A separate score was calculated for each of the three subscales: avoidant coping ($\alpha = 0.685$), emotion-focused coping ($\alpha = 0.548$), and problem-focused coping ($\alpha = 0.816$).

Stressful events

Participants were asked to assess experiences of, and stress caused by nine events on the T3 and T4 surveys using a sliding scale ranging from −1 to 10. The scale ranged from 0 (no stress, this has not impacted my life) to 10 (extreme stress, this has drastically impacted my life), with −1 indicating no experience with the event. Events included COVID-19, racial injustice, environmental concerns, politics/the November election, death of a loved one, illness/injury, romantic relationship breakup, and other events not listed above. In addition to rating stress from each event, participants were asked to select the event that impacted their life the most or caused them the most stress.

Post-traumatic growth

An expanded version of the PTG Inventory (PTGI-X; Tedeschi et al., 2017) consisted of 25-items that measure the degree to which the participants have experienced personal growth as a result of the COVID-19 pandemic or most stressful experience during the time of the study (e.g., "I changed my priorities about what is important in life"). The participants used a 6-point scale ranging from 0 (did not experience this change) to 5 (very great degree). Scores were averaged for a total PTG score ($\alpha = 0.956$), as well as a mean PTG score for each of the five domains (e.g., Relating to Others; α ranged from 0.844 through 0.889).

Challenged core beliefs

The Core Beliefs Inventory (CBI; Cann et al., 2010) consisted of 9 items used to measure the degree to which the COVID-19 pandemic had caused participants to seriously examine their beliefs (e.g., "Because of COVID-19, I seriously examined the degree to which I believe things that happen to people are fair"). Participants rated the items on a 6-point scale ranging from 0 (not at all) to 5 (very great degree). Scores were averaged for a total core-belief disruption score and showed good reliability, $\alpha = 0.886$.

Data analysis

Data was analyzed using SPSS 26. Preliminary correlations between T4 variables were assessed using Pearson's Correlation coefficient. Experiences with COVID-19, comparisons based on demographic information, and comparisons between those who completed all four time points and those who completed three or less time points were assessed using Independent Sample *T*-tests. Changes over time were assessed with Paired Sample *t*-tests and repeated measure ANOVAs using a repeated contrast. The Greenhouse-Geisser correction was used if Mauchly's test indicated a violation of the sphericity assumption for the repeated measure ANOVAs. Three hierarchical regressions were used to assess the relative impact of different methods of social support and different coping strategies on Time 4 Post-traumatic Growth. The first regression assessed the impact of social support for all participants, the second assessed the impact of social support for pet owners only, and the third assessed the impact of coping strategies on PTG for the full sample. For the social support regressions, age, sex, household count, and core belief disruption were entered in the first step, pet ownership (for the full sample) or pet attachment, support from pets, and touch with pets (for the pet owners only sample) were entered in the second step, and human social support, support from video conferencing and frequency of video conferencing were added in the third step. For the coping regression, age, sex, and household count were entered in the first step, core belief disruption was entered in the second step, and all three coping strategies were entered in the third step.

Results

Total PTG at Time 4 was correlated with core belief disruption, all forms of social support, and with both problem-focused and emotion-focused coping strategies. Core belief disruption was correlated with attachment to pets and all three coping strategies. Support from pets was weakly correlated with support from humans and video support, and video conferencing support was correlated with problem-focused and emotion-focused coping. All three coping strategies were moderately correlated with each other. Please see Table 2 for a complete correlation matrix and mean scores of the Time 4 variables.

Of the 201 participants, 28 did not indicate their most stressful event of the past year and were not included in the following percentages. Of the 173 remaining, 35.8% ($n = 62$) reported COVID-19 as the most stressful event of the past year, 22.5% ($n = 39$) rated politics as the most stressful event of the

TABLE 2 Correlations and mean scores.

	PTG (0–5)	CBI (1–6)	Pet attach (1–4)	Pet support (1–5)	Social support (1–7)	Video support (0–3)	Problem coping (1–4)	Emotion coping (1–4)	Avoidant coping (1–4)
Mean (SD)	1.61	3.26	1.72	3.67	5.23	1.33	2.27	2.20	1.66
	(1.10)	(1.10)	(0.52)	(0.89)	(1.16)	(0.60)	(0.60)	(0.37)	(0.41)
PTG	–	0.65**	−0.21*	0.24**	0.18*	0.27**	0.47**	0.25**	0.14
CBI		–	−0.18*	0.06	−0.04	0.10	0.45**	0.36**	0.36**
PA			–	−0.55*	−0.09	−0.06	−0.11	0.02	−0.06
PS				–	0.18*	0.18*	0.05	0.04	−0.01
SS					–	0.35**	0.12	0.08	−0.10
VS						–	0.17*	0.17*	−0.06
PC							–	0.46**	0.20**
EC								–	0.42**
AC									–

**p < 0.001; *p < 0.01. For pet attachment only, lower scores indicate higher levels of attachment. PTG, Post-traumatic growth; CBI, Core belief disruption; Pet Attach, Pet attachment.

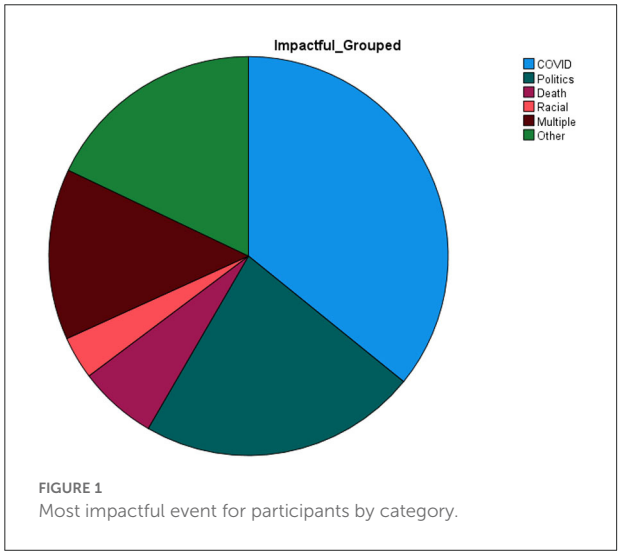

FIGURE 1
Most impactful event for participants by category.

past year, 13.9% ($n = 24$) rated multiple events (i.e., COVID and politics) as the most stressful, and 17.9% ($n = 31$) rated "other events" as the most stressful. Please see Figure 1 for complete comparisons of the most impactful events.

Group differences

The 201 participants who completed all four time points were significantly older [$t_{(270.94)} = -5.46$, $p < 0.001$; $M_{complete} = 35.39$, $M_{non-complete} = 29.31$; $d = -.049$] and reported slightly lower T4 PTG than those who completed three or less time points [$t_{(263)} = 2.08$, $p = 0.038$; $M_{complete} = 1.60$, $M_{non-complete} = 1.91$; $d = 0.28$]. Participants who owned pets reported higher total PTG than those who did not [$M_{Pet} = 1.75$, $SD = 1.09$; $M_{NoPet} = 1.26$, $SD = 1.05$; $t_{(183)} = 2.85$, $p = 0.005$; 95% CI: 0.139–0.773; $d = 0.46$], as did participants who knew someone who had died from COVID-19 [$M_{Yes} = 1.79$, $SD = 1.07$; $M_{No} = 1.45$, $SD = 1.11$; $t_{(182)} = -2.08$, $p = 0.039$; 95% CI: −0.602–−0.016; $d = -0.31$], and those who knew someone hospitalized from COVID-19 [$M_{Yes} = 1.80$, $SD = 1.09$; $M_{No} = 1.36$, $SD = 1.08$; $t_{(182)} = -2.76$, $p = 0.006$; 95% CI: −0.702–−0.115; $d = -0.41$]. There was no difference in total PTG between those who tested positive for COVID-19 over the year or those who knew someone who had tested positive and those who did not. Participants who rated COVID-19 as the most stressful event, those who had rated politics as the most stressful event, or those who gave multiple events as the most stressful also did not show a difference in total PTG, although those who considered the event resolved had significantly higher PTG than those who considered the event ongoing [$M_{Closed} = 2.08$, $SD = 1.13$, $M_{Ongoing} = 1.49$, $SD = 1.07$; $t_{(181)} = 2.97$, $p = 0.002$; 95% CI: 0.198–−0.981; $d = 0.55$]. There was also no difference in total PTG between those who lived alone and those that lived with others, people who had been vaccinated compared to the unvaccinated, high-risk individuals, essential workers, or those who lived with either a high-risk individual or essential worker compared to those who did not.

Changes over time

From April 2020 until April 2021, core belief disruption significantly increased [$F_{(2.87, 499.38)} = 15.96$, $p < 0.001$; $\eta^2 = 0.084$], as did growth in the new possibilities [$F_{(2.59, 455.23)} = 15.37$, $p < 0.001$; $\eta^2 = 0.080$] and personal strength domains of PTG [$F_{(2.75, 488.85)} = 3.34$, $p = 0.022$;

TABLE 3 Changes across time.

	Range	Time 1	Time 2	Time 3	Time 4
Total PTG	0–5	1.46 (0.96)	1.51 (1.02)	1.50 (1.11)	1.60 (1.10)
Relating to others	0-5	1.73 (1.15)	1.71 (1.21)	1.63 (1.30)	1.66 (1.19)
Personal strength	0–5	1.55 (1.23)	1.67 (1.29)	1.71 (1.42)	1.86 (1.46)
Appreciation of life	0–5	2.19 (1.33)	2.16 (1.38)	2.15 (1.36)	2.20 (1.46)
New possibilities	0–5	1.27 (1.01)	1.49 (1.10)	1.64 (1.30)	1.86 (1.34)
Spiritual change	0–5	0.81 (0.94)	0.83 (0.98)	0.78 (1.02)	0.85 (1.05)
Core belief disruption	1–6	2.80 (1.10)	2.93 (1.10)	3.19 (1.18)	3.25 (1.19)
Social support	1–7	5.37 (1.08)	5.26 (1.29)	5.25 (1.29)	5.23 (1.16)
Video conferencing	0.13–3	–	1.55 (0.66)	1.50 (0.63)	1.33 (0.60)
Pet support	1–5	4.05 (0.75)	3.77 (0.80)	3.57 (1.00)	3.67 (0.89)
Pet touch	0–4	–	3.04 (0.85)	3.00 (0.92)	3.09 (0.83)
Pet attachment	1–3.91	1.76 (0.52)	1.76 (0.51)	1.70 (0.46)	1.72 (0.51)
Problem-focused coping	1–4	2.40 (0.58)	2.27 (0.63)	2.29 (0.60)	2.27 (0.60)
Emotion-focused coping	1–3.83	2.27 (0.39)	2.23 (0.40)	2.28 (0.41)	2.20 (0.37)
Avoidant coping	1–3.5	1.87 (0.44)	1.83 (0.44)	1.79 (0.45)	1.66 (0.41)

Mean scores reported. Standard deviation in parentheses. Bold indicates significant change across time. Range indicates score range of data. For Pet Attachment, lower scores indicate higher levels of attachment. Video conferencing and Pet touch data was not collected at Time 1.

$\eta^2 = 0.018$]. Total PTG and the domains of relating to others, spiritual change and appreciation of life did not significantly change over the year. Perceived support from pets decreased [$F_{(2.74, 273.51)} = 15.26$, $p < 0.001$; $\eta^2 = 0.132$], as did use of video conferencing from May 2020 until April 2021 [$F_{(1.92, 347.08)} = 17.05$, $p < 0.001$; $\eta^2 = 0.086$], but attachment to pets, use of touch with pets for support, and human social support remained stable over the year. Use of all coping strategies decreased [problem-focused coping: $F_{(3, 531)} = 4.45$, $p = 0.004$; $\eta^2 = 0.024$; emotion-focused coping: $F_{(2.84, 482.02)} = 2.91$, p=0.035; $\eta^2 = 0.017$ avoidant coping $F_{(2.78, 500.31)} = 17.41$, $p < 0.001$; $\eta^2 = 0.088$]. Please see Table 3 for the mean ratings of PTG, social support variables, and coping strategies, across time points.

Regression analyses

Hierarchical regression analyses revealed that core belief disruption had the largest impact on Time 4 PTG, resulting in significant overall models for all three regressions that accounted for a large amount of the variance in PTG. Two social support models were assessed, one on the full sample which accounted for 46% of the variance in PTG and one on pet owners only, which accounted for 56% of the variance. Along with core belief disruption, human social support was a significant predictor for both models, while support through video conferencing predicted PTG for the full sample only. None of the pet support variables significantly predicted PTG. The coping regression accounted for 45% of the variance in PTG and was predicted by both problem-focused coping and avoidant coping. See Table 4 for the complete social support regression results and Table 5 for the coping strategies regression results.

Discussion

The COVID-19 pandemic disrupted life as we knew it, but also brought about the opportunity to experience growth. This study examined changes in mental health, social support, and coping strategies in adults living in the United States over the first year of the pandemic and during the 2020 presidential election, from March 30th, 2020, until March 30th, 2021. Almost all participants (92.4%) knew someone who had contracted COVID-19 over that year and more than four out of ten knew someone who had died from the virus. More than one third of the sample rated COVID-19 as the most stressful event of the past year while another 22% rated politics as the most stressful. It was found that core beliefs about the world were disrupted during this year, consistent with previous studies on pandemics (Brooks et al., 2020), yet psychological growth was also experienced. The degree of psychological growth perceived was impacted by experiences with the pandemic, social support, and coping strategies, consistent with the PTG theoretical model (Calhoun and Tedeschi, 2006) and prior research on coping strategies (Hamama-Raz et al., 2019).

Changes over time

During the year, participants experienced disruptions to their core schemas about the world, and the level of disruption to these core beliefs continued to increase throughout the

TABLE 4 Social support hierarchical regression results.

	Full sample ($N = 201$)	Pet owners only ($n = 142$)
Age	$\beta = 0.01, p = 0.935$ [−0.01, 0.01]	$\beta = 0.03, p = 0.672$ [−0.01, 0.02]
Sex	$\beta = -0.02, p = 0.691$ [−0.35, 0.23]	$\beta = -0.10, p = 0.920$ [−0.76, 0.12]
Household count	$\beta = 0.07, p = 0.920$ [−0.14, 0.15]	$\beta = 0.01, p = 0.947$ [−0.16, 0.17]
T4 CBI	**$\beta = 0.62, p < 0.001$ [0.46, 0.68]**	**$\beta = 0.73, p < 0.001$ [0.51, 0.75]**
Pet owner	$\beta = -0.07, p = 0.232$ [−0.46, 0.11]	–
Pet support	–	$\beta = 0.10, p = 0.245$ [−0.09, 0.34]
Pet touch	–	$\beta = 0.15, p = 0.084$ [−0.03, 0.46]
Pet attachment	–	$\beta = 0.04, p = 0.631$ [−0.32, 0.53]
T4 SS	**$\beta = 0.15, p = 0.021$ [0.02, 0.26]**	**$\beta = 0.22, p = 0.005$ [0.08, 0.40]**
T4 video support	**$\beta = 0.18, p = 0.026$ [0.04, 0.61]**	$\beta = -0.06, p = 0.510$ [−0.42, 0.21]
Video frequency	$\beta = -0.05, p = 0.536$ [−0.08, 0.04]	$\beta = 0.11, p = 0.206$ [−0.03, 0.12]
Model 1	**$F_{(4, 154)} = 27.29, p < 0.001$**	**$F_{(4, 94)} = 24.28, p < 0.001$**
Model 2	**$F_{(5, 153)} = 22.60, p < 0.001$**	**$F_{(7, 91)} = 15.96, p < 0.001$**
Model 3	**$F_{(8, 150)} = 17.81, p < 0.001$**	**$F_{(10, 88)} = 13.71, p < 0.001$**
Change 1 R^2 (ΔR^2, p)	0.010, $p = 0.105$	**0.043, $p = 0.039$**
Change 2 R^2 (ΔR^2, p)	**0.062, $p < 0.001$**	**0.058, $p = 0.007$**
% Variance	46.0%	56.5%

Model 1: sex, age, household count, CBI; Model 2 full sample: pet ownership; Model 2: pet owning sample: pet attachment, support from pets, pet touch; Model 3: human social support, video conferencing, video frequency. Significant predictors and models are bolded. [] = 95% Confidence Interval. % variance = Adjusted R^2. CBI: Core belief disruption. Negative beta values indicate males are lower for sex and pet owners are higher than non-owners.

TABLE 5 Coping strategies hierarchical regression results.

	T4 PTG
Age	$\beta = 0.03, p = 0.673$ [−0.01, 0.01]
Sex	$\beta = 0.01, p = 0.896$ [−0.26, 0.30]
Household count	$\beta = 0.02, p = 0.799$ [−0.13, 0.16]
T4 CBI	**$\beta = 0.59, p < 0.001$ [0.42, 0.67]**
T4 Problem-focused coping	**$\beta = 0.22, p = 0.002$ [0.15, 0.67]**
T4 Emotion-focused coping	$\beta = 0.01, p = 0.885$ [−0.38, 0.44]
T4 avoidance coping	**$\beta = -0.14, p = 0.036$ [−0.72,−0.03]**
Model 1	$F_{(3, 160)} = 0.16, p = 0.923$
Model 2	**$F_{(4, 159)} = 29.52, p < 0.001$**
Model 3	**$F_{(7, 156)} = 20.70, p < 0.001$**
Change 1 R^2 (ΔR^2, p)	**0.423, $p < 0.001$**
Change 1 R^2 (ΔR^2, p)	**0.055, $p = 0.001$**
% Variance	45.8%

Model 1: sex, age, household count; Model 2: CBI; Model 3: problem-focused coping, emotion-focused coping, avoidance coping. Significant predictors and models are bolded. [] = 95% Confidence Interval. % Variance = Adjusted R^2. CBI: Core belief disruption.

year. This is consistent with prior research on quarantining which found reports of anxiety, stress, and post-traumatic stress symptoms that increased along with the duration of the quarantine (Brooks et al., 2020). While disillusionment with the world increased over the year, perceptions of overall PTG started at a moderately elevated level 2 weeks into the pandemic compared to other ratings of PTG during the early days of COVID-19 (Shigemoto, 2021) yet only showed incremental increases throughout the year. It is important to note that despite the moderately higher levels of PTG reported in this sample during early COVID-19, the rate of PTG found during COVID-19 is lower than rates of PTG found after more specific traumatic events, such as natural disasters (Cao et al., 2018).

Despite overall perceptions of growth remaining stable, participants did report significant increases of growth in the new possibilities and personal strength domains of PTG. These changes indicate that as the year progressed participants became more comfortable and confident with the "new normal" of life with COVID-19 and the changes that entails, including changes in work or hobbies. Indeed, although specific changes in habits were not assessed in this study, a survey conducted in early 2021 found that 59% of participants had taken on a new hobby during the pandemic and 79% of those reported wanting to continue their new hobby once the pandemic was over (Schulz, 2021). Additionally, a survey conducted in late 2020 found that 71% of workers were currently working from home, up from 20% before the coronavirus outbreak, and that 54% wanted to work from home after the pandemic ends (Parker et al., 2020), revealing substantial changes from the pre-pandemic work force. The steady increase of PTG in the personal strength domain demonstrates the increasing confidence that participants appeared to have in themselves and their ability to cope with the pandemic and other challenges they may have faced during that year. As time progressed and life went on, participants recognized more strength in themselves than they had previously realized they possessed.

Factors impacting growth

COVID-19

Specific circumstances also appeared to impact the degree of psychological growth experienced by participants. Those who had more closely experienced the devastation of the

pandemic through knowing someone who became ill enough to be hospitalized or who was killed from the virus experienced more growth than those who did not know someone seriously harmed by the virus. Intriguingly, participants who contracted the virus themselves or who had to be hospitalized because of COVID-19 did not show the same increase in PTG compared to those who did not get sick. This apparent paradox lends support to findings of a curvilinear relationship between stress or trauma and PTG found in adults (Kleim and Ehlers, 2009), where either too little or too much stress limits the degree of PTG experienced. Not knowing someone seriously impacted by the pandemic may correspond with lower overall levels of stress but becoming seriously ill yourself may result in stress levels that are too high to recognize growth. Alternatively, different trauma types have been proposed to have differing impacts on PTG, with personal traumas associated with less growth than shared traumas (Kilic et al., 2015). Becoming seriously ill from COVID-19 can be considered a personal trauma compared to knowing someone who became seriously ill, which may then correspond with the differing levels of growth seen in this sample.

Nature of stressor

While participants differed in which events during 2020 were the most stressful for them, these differences did not result in differences in PTG. As both political turmoil and waves of the pandemic were still ongoing in April of 2021 and both are shared traumas, it follows that there would not be significant differences in levels of PTG between those considering each event their most impactful stressor. Rather, perceptions of the event as either ongoing or resolved impacted levels of PTG, with those who thought of the event as resolved reporting significantly higher PTG than those who perceived the most stressful event to be ongoing. These findings support the PTG theoretical model, which emphasizes the importance of rumination and meaning making in the development of PTG (Calhoun and Tedeschi, 2006). If the stressful event is considered ongoing there may be less ability to reflect on its meaning and less ability to search for positive outcomes than if the event is considered resolved and in the past. Resources are more likely to be spent coping with the event if it is ongoing rather than processing the event, as is possible when the event is over.

Social support

Although social support was predictive of PTG in this study and this study occurred during a time when human social contact was more limited, whether a person lived alone or not or how many people they lived with did not have an impact on PTG. However, pet ownership did have an impact, with those who owned pets reporting higher levels of PTG than those who did not own pets. Attachment to pets and perceived support from pets were both moderately correlated with PTG; participants who were more attached or who perceived more support from their pets reported higher levels of PTG than those who were less attached or who perceived less support. Despite this, neither pet ownership nor any facet of pet support was predictive of experiencing PTG in the regression analyses. These contradictory findings may be explained by the several types of analyses—while pets and perceiving support from pets may provide a degree of social support that is helpful in the development of PTG when considered in isolation, support from pets may be less important and play a smaller role than support from humans when both types of social support are considered together. This would correspond with the prior research which found that more time spent with pets corresponded with higher growth in the relating to others domain of PTG for adolescents (Dominick et al., 2019), which assessed the impact of pets independently from the impact of human social support.

It is also possible that support from pets may have a larger role when support from humans is more limited. Indeed, a previous analysis of the first two time points from this study found that attachment to pets 2 weeks into the pandemic predicted PTG 1 month later when social distancing regulations were more enforced, and the vaccine was not available. However, attachment to pets was still a weaker predictor of PTG than was support from humans (Dominick et al., 2021). Additionally, perceived support from pets declined over the year, indicating that as restrictions on human contact lessoned, so too did reliance on pets for social support.

Taken together, it can be concluded that pet ownership and perceiving support from pets may have a small positive impact on perceptions of PTG, but that human support remains a more crucial factor for PTG compared to pets. Comparing the two social support regressions lends additional credence to this hypothesis. In the full sample, both human social support and perceived support through video conferencing were predictive of PTG, yet in the pet owners only sample, video support no longer had a significant impact on perceptions of PTG. Pets may supplement the support garnered from humans, rendering virtual support less important for pet owners than for non-pet owners. However, for those who do not have pets, virtual support, especially when in-person contact is more limited, appears to be an effective method to garner social support, consistent with prior research (Siniscarco et al., 2017; Viswanathan et al., 2020), and can contribute to the experience of PTG.

Core belief disruption

Along with social support and consistent with the PTG theoretical model, core belief disruption was predictive of experiencing PTG. The PTG theoretical model states that psychological growth is experienced after a person, with encouragement from social support, engages in rumination and meaning making, which are triggered not by the stressful event

itself but by the impact of the event on a person's core beliefs about the world (Calhoun and Tedeschi, 2006). To that end, core belief disruption has consistently been found to predict PTG (Cann et al., 2010) and the relationship between core belief disruption and PTG has been found to be mediated by rumination (Taku et al., 2015). In this study, increased disruption of core beliefs corresponded with higher reported PTG, and core belief disruption was the driving force behind all three regression models. In fact, core belief disruption had a stronger impact on PTG than any measure of social support or coping strategy. However, combining social support measures with core belief disruption predicts approximately half of the variance in PTG observed in this sample, again providing additional support for the PTG theoretical model.

Coping strategies

Although core belief disruption had a larger impact than social support or coping strategies on PTG, coping strategies were predictive of PTG. Specifically, those who engaged in higher levels of problem-focused coping and lower levels of avoidance coping were more likely to experience PTG. Yet, participants appear to have decreased their use of coping strategies in general over the year. While emotion-focused coping was positively correlated to PTG, it was not a significant predictor when considered in tandem with problem-focused and avoidance coping strategies. However, this may be due to the lower reliability seen for the emotion-coping subscale in this sample. In general, avoidance coping is considered a maladaptive coping strategy while problem-focused coping is considered an adaptive coping style because each are associated with negative and positive mental-health outcomes, respectively, while emotion-focused coping can be considered as either adaptive or maladaptive depending on the situation (Carver, 1997). The results from this study replicate prior research which has found that both adaptive (problem-focused) and maladaptive (avoidance) coping were linked to PTG in samples of healthcare workers and 911 telecommunicators (London et al., 2017; Kalaitzaki and Rovithis, 2021). As healthcare workers and 911 telecommunicators are exposed to highly stressful or traumatic events over a prolonged period due to the nature of their jobs, perhaps these samples more accurately represent what many people in the United States were feeling during the year from April 2020 until April 2021, where the "stressful event" was not singular nor limited in time. Lending additional credence to this, lower levels of avoidance coping were associated with higher PTG for those who had experienced multiple traumas (Brooks et al., 2019) and for those in this study, who again may have perceived the year as a series of cumulative stressors rather than a single traumatic event. Thus, which coping strategies are the most effective may vary with the nature of the stressor—whether it is ongoing or sudden, how expected/unexpected it is, and whether it is a single event or cumulative events. In the case of the pandemic and the political turmoil in the United States during that year, increased use of problem-focused coping and decreased use of avoidance coping both appear to be effective at predicting the experience of PTG.

Implications

Overall, this study lends additional credibility to the PTG theoretical model by highlighting the importance of disruptions to core assumptions, coping strategies, and social support to the development of psychological growth, as has been found in previous community studies (e.g., Gul and Karanci, 2017). Disruptions to core beliefs plays the largest role in predicting post-traumatic growth, however social support and the use of various coping strategies when rebuilding shattered world views also contribute to the perception of growth, accounting for almost half of the variance seen in PTG. While human social support is clearly the most effective source of social support in fostering growth, a sense of support may also be garnered from pets and through virtual communication. These alternative sources of support, while they do not compensate for in-person social support, may be valuable tools during times in which in-person contact is limited.

Given the elevated levels of stress and anxiety observed in our society currently (Bethune, 2020b; American Psychological Association, 2021), methods that can help increase positive psychological growth are needed. Based on this study, intervention programs should focus on assisting clients with processing their assumptive beliefs about the world and how those may have changed, increasing perceptions of social support, and teaching adaptive, problem-focused coping methods. While in-person social support should be encouraged, for those who are more isolated non-traditional forms of social support may also be valuable. These include video conferencing and virtual communication along with the comfort and support that may be provided through animals. Additionally, focusing on encouraging problem-focused coping and lessening the use of avoidance coping would be valuable for fostering psychological growth.

Limitations and future directions

This study does have limitations. First, there was a high attrition rate over the course of the year, and it is possible that differences between those who choose to remain in the study and those who dropped out may have impacted the results. Those who completed the entire study were older than those who did not, likely due to university students who enrolled *via* the subject pool for research credit with the initial survey not responding to follow-up survey requests. The difference in PTG between groups may have resulted from additional stressors (such as from

politics) that were present toward the second half of the study, which may have appeared more ongoing than the pandemic and may have impacted overall results. However, there were no other significant differences between non-completers and those who completed all four time points, so the impact on results should not be drastic. Second, the sample skews toward white, female, pet owners, which may limit generalizability. Similarly, most of this sample chose to get the vaccination when it became available. However, given the politicized nature of the vaccine, this may indicate a lack of diversity in the sample regarding political views. A more diverse and representative sample may have highlighted additional differences that were masked by the heterogeneity of this sample. Third, some measures were added as the study progressed, such as the impact of touch with pets on social support, limiting the possibility of assessing changes throughout the entire year. It is possible different patterns of change may have been observed had all variables been included from the beginning.

Although most social distancing policies have been lifted, future studies should continue to investigate the use of non-traditional sources of social support and their impact on mental health. Additionally, studies should continue to evaluate the use of various coping strategies after experiencing a variety of stressful events to help determine the most effective coping strategies for prompting psychological growth and whether they differ for shared vs. individual traumas and single vs. cumulative events.

Interventions aimed at fostering psychological growth should focus on the importance of social support and of problem-focused coping strategies, as well as assisting with examining and rebuilding core schemas about the world. Emphasis should be placed on the possibility of multiple forms of social support, such as virtual support and support through pets, depending on the unique situation of individuals. Those who can process through shaken beliefs using problem-focused coping, with the assistance of social support, are the most likely to experience high levels of psychological growth.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Oakland University Institutional Review Board. The patients/participants provided their written informed consent to participate in this study.

Author contributions

Study design, data collection, analyses, and writing were conducted by WD.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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frontiers | Frontiers in Psychology

TYPE Brief Research Report
PUBLISHED 20 October 2022
DOI 10.3389/fpsyg.2022.998836

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 20 July 2022
ACCEPTED 06 October 2022
PUBLISHED 20 October 2022

CITATION
Yasdiman MB, Townsend E and Blackie LER (2022) Examining the protective influence of posttraumatic growth on interpersonal suicide risk factors in a 6-week longitudinal study. *Front. Psychol.* 13:998836. doi: 10.3389/fpsyg.2022.998836

Examining the protective influence of posttraumatic growth on interpersonal suicide risk factors in a 6-week longitudinal study

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Research has found an inverse relationship between posttraumatic growth (PTG) and suicidal ideation in military and community samples that holds when controlling for other suicide risk factors. However, further research is needed into the underlying mechanisms to clarify how PTG protects against the formation of suicidal ideation. The current two-wave longitudinal study examined whether perceiving PTG from recent adverse circumstances while in a national lockdown during the COVID-19 pandemic attenuated the positive relationship of two interpersonal suicide risk factors – perceived burdensomeness (PB) and thwarted belonginess (TB)–over 6weeks. Participants (n=170) were recruited online from Prolific from income-deprived areas in the United Kingdom (mean age=37.65; SD=12.50; 53.5% female). *Post-hoc* power analyses indicated we had insufficient power to examine the hypothesised mediation for TB. We examined whether PTG mediated the relationship between PB at wave 1 and wave 2 while controlling for depression and anxiety in a sample of individuals at-risk for suicidal ideation. PTG did significantly and partially mediate the positive relationship between PB at wave 1 and 2. We discuss the theoretical and clinical implications that could result if future research successfully replicates these initial exploratory findings.

KEYWORDS

posttraumatic growth, suicide, burdensomeness, thwarted belongingness, longitudinal design

Introduction

Posttraumatic growth (PTG) is the positive psychological changes individuals may report in their identity, relationships, and worldviews after struggling with distressing, and potentially traumatic life experiences (Tedeschi and Calhoun, 2004). It is typically measured *via* self-report questionnaire, asking individuals to rate positive changes experienced in

personal strength, spirituality, appreciation of life, personal relationships, and identification of new possibilities in life (Tedeschi and Calhoun, 1996). Although this methodology is retrospective and might not mirror how individuals change in these dimensions over time (Frazier et al., 2009), the act of perceiving PTG from past adversity could have an adaptive role in helping individuals cope with current stressors (Tennen and Affleck, 2002). Indeed, researchers have started to examine whether PTG is a protective factor against the development of suicidal ideation due to calls to explore suicide resiliency (Wingate et al., 2006). Bush et al. (2011) found an inverse relationship between PTG and suicidal ideation in a correlational study with US army personnel when controlling for risk factors, such as depression, PTSD, and combat exposure. Similarly, Gallaway et al. (2011) found this inverse relationship between PTG and suicidal ideation in US army soldiers. This relationship between PTG and suicidal ideation has also been observed in non-military populations (Yu et al., 2010; Sheline, 2013; Yasdiman et al., 2022), indicating that PTG could have a protective role in this context.

However, although these findings are promising, research into the underlying mechanisms is needed to understand how PTG protects against the formation of suicidal ideation. Recent research by Yasdiman et al. (2022) has started to address this question by exploring how PTG fits into the Integrated Motivational-Volitional (IMV) Model of Suicidal Behaviour (O'Connor and Kirtley, 2018). The IMV is an established model of suicide behaviour mapping the potential pathways between risk factors to suicidal ideation and behaviours. In a pre-registered design and with a well powered community sample, Yasdiman et al. (2022) found that contrary to predictions derived from the IMV model, PTG did not moderate the relationship between defeat and entrapment or between entrapment and suicidal ideation. Yet, Yasdiman et al. (2022) did find the inverse relationship between PTG and suicidal ideation. The current study builds on this research to examine whether PTG has a protective function on suicidal ideation indirectly by attenuating some of the interpersonal suicide risk factors that increase feelings of entrapment and strengthen the IMV pathway between entrapment and suicidal ideation (O'Connor and Kirtley, 2018).

Theoretical rationale for current study

The IMV model (O'Connor and Kirtley, 2018) outlines a pathway from distressing experiences to feelings of defeat, to feelings of entrapment, to suicidal ideation. The model outlines how after a distressing experience an individual may feel overwhelmed by negative thoughts (i.e., defeated) and may have perceptions of being unable to change their circumstances (i.e., entrapment), thereby increasing their risk of suicidal ideation. The IMV model also identifies risk factors that strengthen these pathways and increase the risk of suicidal ideation, and protective factors that weaken these pathways and reduce the risk of suicidal ideation. Of relevance to the current study, two interpersonal risk factors–perceived burdensomeness (PB) and thwarted belongingness (TB) - have been proposed in the IMV model to strengthen the pathway between entrapment and suicidal ideation. It should be noted that negative interpersonal thoughts were first introduced by Joiner (2005) in the Interpersonal Theory of Suicide as direct pathways to suicidal ideation and were added as motivational moderators in the IMV model in 2011. PB is defined as perceiving oneself as ineffective and incompetent, which leads to the feeling of being a liability to other people (Joiner, 2005). TB is defined as an unmet need to belong, resulting in failed social connectedness (Van Orden et al., 2012).

Research that has examined these two risk factors within the context of suicidal ideation and behaviours (e.g., Forkmann and Teismann, 2017; Levi-Belz and Aisenberg, 2021) has shown the importance of their inclusion when assessing suicide risk; and as theorised by the IMV model, researchers have found PB and TB moderate the pathway between entrapment and suicidal ideation (Lucht et al., 2020). Recently, Blevins (2019) examined the association between PTG and these two suicide risk factors in a correlational study with a military personnel population and found negative associations between PTG and both PB and TB. Considering findings from Blevins (2019) and the findings from Yasdiman et al. (2022) showing PTG did not moderate key pathways within the IMV model, we propose that PTG could mitigate the development of suicidal ideation indirectly through attenuating interpersonal risk factors.

Current study design and hypotheses

Although researchers have examined the IMV model cross-sectionally (e.g., Yasdiman et al., 2022), it is a model that outlines the temporal dynamics between key processes that increase individuals' risk of suicide behavior over time (O'Connor, 2011; O'Connor and Kirtley, 2018). In this study, we examined whether perceiving PTG from recent distressing experiences would reduce the levels of PB and TB experienced by individuals over a period of 6-weeks, which theoretically, would weaken the relationship between these interpersonal risk factors and entrapment and thereby weaken the relationship between entrapment and suicidal ideation. We examine whether PTG mediates the relationship between PB at wave 1 and wave 2 (Figure 1), and between TB at wave 1 and wave 2 (Figure 2) while controlling for depression and anxiety (Dhingra et al., 2016) in a sample of individuals at-risk for suicidal ideation. We expect wave 1 PB (and TB) scores to correlate positively with their own respective wave 2 scores, but for this relationship to be reduced when PTG is included as a mediator. We used a short-term longitudinal study (6 weeks) because Ribeiro et al. (2016)) emphasised the need for studies with shorter timeframes from their meta-analysis of longitudinal studies on suicidality.

We examined whether perceiving PTG from recent adverse circumstances while in a national COVID-19 lockdown reduced PB and TB across 6-weeks within an at-risk population of

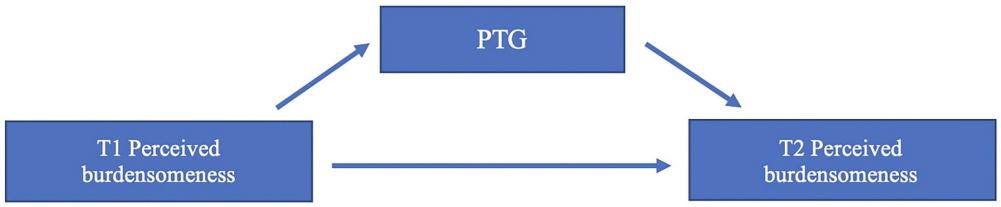

FIGURE 1
PTG mediating the relationship between perceived burdensomeness (PB) at T1 and perceived burdensomeness (PB) at T2. Anxiety and depression were considered as covariates.

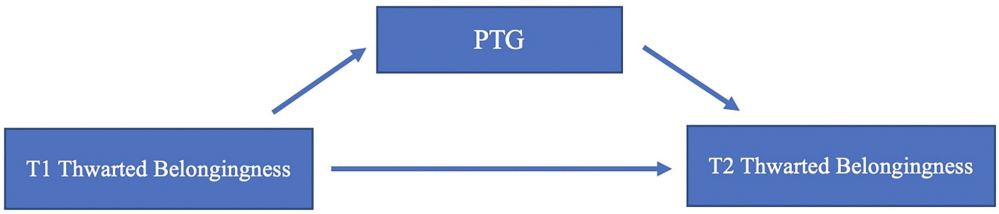

FIGURE 2
PTG mediating the relationship between thwarted belongingness (TB) at T1 and thwarted belongingness (TB) at T2. Anxiety and depression were considered as covariates.

individuals living in economically deprived areas in the United Kingdom. A similar recruitment strategy was used by Griffiths et al. (2014) who found over half of their participants reported clinically relevant levels of psychopathology, indicating that individuals who live in deprived areas are a clinically meaningful group and at increased risk of developing suicidal ideation. This group has been further identified as a vulnerable and at-risk group during the COVID-19 pandemic (Gratz et al., 2020; Raj et al., 2021), indicating the importance of research examining factors supporting suicide resiliency within this group.

Materials and methods

We pre-registered the design, hypotheses, and data analytic plan on OSF.[1]

However, we changed our hypotheses and adapted our data analytic plan accordingly after data collection. We had planned to examine the influence of PTG on moderators in the IMV model examining the relationship of PTG on PB and TB while controlling for baseline measures of PB and TB. On reflection, we consider PTG as an active process that might strengthen or weaken the influence of some IMV moderators on set pathways. This longitudinal study allowed us to test these hypotheses, albeit in a short timeframe, but within a context that reflects the temporal pathways specified in the IMV model. The analyses should therefore be considered exploratory and will require further replication.

Design

This study employed a two-wave longitudinal design. Data was collected at wave 1 (T1) in October 2020 and 6-weeks later at wave 2 (T2) in December 2020 during national lockdowns in the COVID-19 pandemic. One hundred and seventy participants in some of the most income-deprived areas in the United Kingdom completed the T1 and T2 questionnaires.

Participants

Two hundred and 12 participants aged 18 or older were recruited from income deprived areas in the United Kingdom[2] according to the Ministry of Housing, Communities, and Local Government (2019) on Prolific and were financially compensated according to Prolific payment guidelines. The final sample consisted of 170 participants who completed both waves. The mean age of the sample was 37.65 ($SD = 12.50$, with an age range

1 https://osf.io/qhpd9/?view_only=b9a5783098ec4207b7a7d63043247232

2 These were some areas within Middlesbrough, Liverpool, Knowsley, Kingston upon Hull, Manchester, Blackpool, Birmingham, Burnley, Blackburn with Darwen, and Hartlepool.

from 18 to 73). Most of the sample were female ($N = 91$; 53.5%), and 86.5% ($N = 147$) identified as White, 6.5% as Asian, 2.9% as Black, and 4.1% answered in the open-text box. Most of the sample were in full-time employment ($N = 99$, 58.2%), while 27 were in part-time employment (15.9%). The remaining participants chose 'other' or 'unemployed and not seeking job' options. The mean scores of T1 PB and TB were 11.25 (6.66) and 28.41 (12.82), respectively. The mean scores of these two interpersonal risk factors are comparable to Cero et al. (2015) within a sample of psychiatric in-patients (i.e., 11.73 (11.33) for PB and 24.07 (13.61) for TB) and higher than the means Cero et al. reported for an undergraduate sample (i.e., 2.06 (4.31) for PB and 10.63 (9.40) for TB). This suggests that participants in this sample were an at-risk group with high levels of interpersonal suicide risk factors of PB and TB.

Procedure and questionnaires

Ethical approval was obtained from the authors' School Ethics Committee prior to data collection (S1279). Participants were recruited *via* the United Kingdom Prolific website in exchange for financial compensation based on Prolific payment recommendations[3]. The T1 survey was completed online *via* a Qualtrics survey link through Prolific. This online survey contained the information sheet, consent form, and the T1 questionnaires (as outlined below). After 6 weeks, the same participants were invited to take part in the T2 Qualtrics survey *via* the Prolific website. At the end of both surveys, participants were presented with funny images to elicit a positive mood (Goritz, 2007), relevant United Kingdom support services, and the researchers' contact information. For brevity we report only the questionnaires used in these analyses, but interested readers can review the full list of questionnaires administered on the OSF pre-registration URL.

Demographic information: Questions on age, gender, ethnicity, and employment status were collected.

Interpersonal Needs Questionnaire: This 15-item questionnaire assesses whether people are feeling a burden to others or experiencing a low sense of social belongingness (Van Orden et al., 2008) during the past few days. Example items from the burdensomeness (PB) sub-scale is '*These days, I think my death would be a relief to the people in my life*' and one from the belongingness (TB) sub-scale is '*These days, I feel disconnected from other people*'. Participants answered each item on a seven-point scale ranging from: (1) '*Not at all true for me*' to (7) '*very true for me*'. Cronbach's Alpha for the PB scale was 0.94 and for TB was.93 at T1 (and 94 and.92, respectively at T2).

Hospital Anxiety and Depression Scale (HADS): This scale was used in the T1 survey to assess symptoms of anxiety and depression (Zigmond and Snaith, 1983) on a 4-point scale (from 0 to 3) during the past week with higher scores indicating greater symptoms of anxiety and depression. It consists of 14 questions, of which 7 correspond to the anxiety subscale, and 7 correspond to the depression subscale. Cronbach's Alphas were.85 and.82 for anxiety and depression, respectively.

Post-Traumatic Growth Inventory: This measure was used within the T2 survey because our hypotheses are about the potential beneficial value of perceptions of PTG from adversity, rather than if genuine PTG manifests over time. Participants were first asked to think about a stressful life event that had happened to them recently, which did not have to be about COVID-19 pandemic specifically. They were given 15 s before proceeding to the next page. After that, they were presented with the 21-item PTGI measure and asked to answer questions referring to the recent stressor they thought about on the previous page. This scale assessed perceived positive changes as a result of stressful event on the following subscales: personal strength, appreciation of life, relating to others, new possibilities, and spiritual change (Tedeschi and Calhoun, 1996). Respondents answered each item on a 6-point scale, ranging from (0) '*I did not experience this change as a result of the event*' to (5) *'I experienced this change to a very great degree as a result of the event'*. An example item from the scale includes: *'I have a greater appreciation for the value of my own life'*. Cronbach's Alpha here was.94.

Results

The analyses were conducted using SPSS 28 and the PROCESS macro plug-in on SPSS to test mediation (Hayes, 2017).

Data preparation

Forty-two participants were either excluded ($n = 14$) or did not return to participate in wave 2 ($n = 28$). Participants were excluded if their ID at wave 1 and wave 2 could not be matched ($n = 8$) or if their completion rate was less than the *a priori* criterion of 75% of the full survey ($n = 6$; Wetherall et al., 2019). Item-level missing data was checked for each questionnaire, and there were no missing data issues. There were no significant differences in the mean age between the retained sample ($n = 170$; $M = 37.67$, $SD = 12.44$) and the excluded sample ($M = 34.92$, $SD = 12.19$), $t(197) = 1.066$, $p = 0.14$. Nor were there any significant differences between the samples in gender, $\chi^2(1) = 0.315$, $p = 0.574$.

Power analyses

We ran a Monte Carlo post-hoc power analysis using the power estimator tool developed by Schoemann et al. (2020)

3 At the time of the data collection (in 2020), the minimum amount Prolific researchers could pay participants was £5. We compensated participants with an average of £6.62 and £6.41 per hour for T1 & T2 participation, respectively.

TABLE 1 Means, standard deviations, and correlations coefficients between PTG, depression, anxiety, and burdensomeness (waves 1 and 2).

Variable	1	2	3	4	5
1. PTG	–				
2. Perceived Burden1	0.226**[0.088, 0.350]	–			
3. Perceived Burden2	−0.155*[−0.284, −0.024]	0.528***[0.374, 0.684]			
4. Anxiety	0.207**[0.055, 0.357]	0.355***[0.219, 0.481]	0.311**[0.208, 0.425]	–	
5. Depression	0.008[−0.153, 0.177]	0.408***[0.274, 0.542]	0.381***[0.225, 0.528]	0.605***[0.493, 0.694]	–
M	35.00	11.68	10.17	7.81	5.84
SD	22.46	6.68	6.14	4.15	3.98
Range	0–105	6–42	6–42	0–21	0–21

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, Perceived Burden1, Perceived burdensomeness at T1; Perceived Burden2, Perceived burdensomeness at T2. Bootstrapped confidence intervals are presented in brackets [lower CI, upper CI].

because we deviated from our pre-registered data analytic plan, as previously justified in the method section. These analyses were to find the power we had to observe mediation when including the covariates and with our set sample size of $n = 170$. The analyses showed we were sufficiently powered at 0.83 to detect the H1 mediation involving PB, but insufficiently powered at 0.25 to detect the H2 mediation involving TB. For this reason, we conduct and report only the results for the H1 mediation.

Descriptive statistics and correlations

Table 1 reports the mean (*M*), standard deviation (*SD*), and Pearson correlations between PTG, T1 PB, T2 PB, depression and anxiety using bootstrapping set at 1000 samples, which is a robust method to deal with skewness in the data (Field, 2017). PB at T1 and T2 were significantly positively correlated with large effect sizes, indicating that higher perceptions of burden at wave 1 were also associated with higher perceptions of burden at wave 2. PTG was positively associated with PB at T1 with a medium effect size and negatively associated with PB at T2 with a small effect size. PB at T1 and T2 were positively associated with depression and anxiety with large effect sizes. The effect size interpretations are based on Gignac and Szodorai (2016)'s categories of effect size (small: 0.10, medium: 0.20, large: 0.30).

Mediation analyses

Before examining whether PTG mediated the relationship between PB at T1 and T2, we examined whether the data met assumptions required for regression (e.g., outliers, normality and homoscedasticity). We did not identify any extreme cases that exceeded the cut-off scores when using a conservative strategy requiring cases to exceed cut-off scores of at least 2 or more of these outlier statistics: Mahalanobis distance, Cook's distance and Leverage. Thus, no participants were excluded. We did identify violations to both the normality of the residuals and homoscedasticity assumptions. To correct for these issues, we followed recommendations made by Field (2017) and used the bootstrapping procedure and report the heteroscedasticity-consistent standard errors (HC4; Hayes and Cai, 2007) in the mediation.

We tested the H1 mediation using the PROCESS macro (Hayes, 2017; using model 4; 2000 resamples). We regressed PB at T1 (X) onto PTG (M) and PB at T2 (Y) entering anxiety and depression as covariates. As predicted, the direct effect of PB T1 on PB T2 (Figure 3) was significant and positive. The indirect pathway between PB T1 and T2, *via* PTG, was significant (indirect effect, $b = -0.064$, SE = 0.025, 95% BCa CI = [−0.1181, −0.0157]; Figure 3), therefore PTG did mediate the relationship between PB T1 and T2. As expected, the relationship between PB T1 and T2 remained significant (b = 0.405, $p = 0.004$, BCa CI = [0.1298, 0.6799]) when PTG was entered into the regression, indicating partial mediation.

Discussion

We examined whether individuals in an at-risk group who perceived PTG from recent adversity while in a lockdown in the COVID-19 pandemic[4] would report lower levels of interpersonal suicide risk factors over a period of 6-weeks. The results for one interpersonal suicide risk factor – PB – confirmed our hypotheses, as PTG (at T2) partially mediated the relationship between scores of PB over 6 weeks from T1 to T2. Thus, individuals who perceived higher levels of PTG from their recent experiences of adversity during the COVID-19 lockdown in the United Kingdom in 2020 had an attenuated relationship between PB scores across 6-weeks.

4 We would like to note here that when responding to the PTG questions, participants were asked to consider a recent stressor; however, they were not asked to consider a stressor that was connected to COVID-19. People might have thought about COVID-19-related stressful events, such as lockdowns. However, they were not asked to reflect on the pandemic-related stressors. We wanted to draw attention to the fact that the study was performed during a pandemic, which may increase vulnerability to suicide risk.

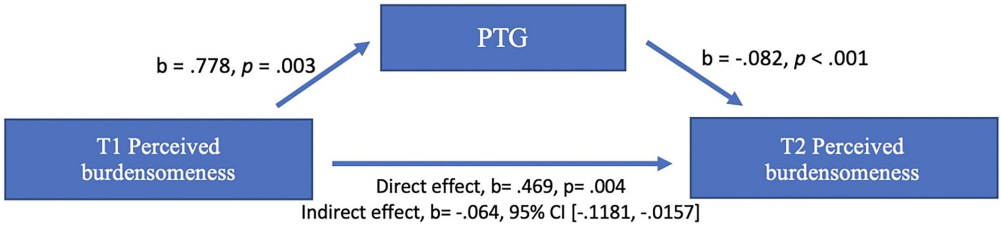

FIGURE 3
PTG mediating the relationship between T1 perceived burdensomeness and T2 perceived burdensomeness. Unstandardised regression coefficient (b) values are reported. Depression and anxiety were controlled in the analysis. The indirect effect is not associated with a *p* value (see Hayes, 2017).

The direct association between PB at T1 and T2 was positive and significant, therefore, as expected, higher feelings of burdensomeness were associated with higher feelings of burdensomeness 6 weeks later. According to the IMV model of suicidal behaviour (O'Connor and Kirtley, 2018), higher levels of burdensomeness could serve to strengthen the pathway between entrapment and suicidal ideation. Thus, although a small effect, it is not insignificant to find that PTG attenuated the existing positive relationship of a key interpersonal suicide risk factor over time. This finding extends the correlational findings reported by Blevins (2019) between PB and PTG, and to our knowledge is the first study to examine this relationship longitudinally. Blevins (2019) documented an inverse relationship between TB and PTG as well, but unfortunately, we were too underpowered in this study to examine the hypothesis for TB. Future research is needed to first examine if this exploratory finding that we observed between PB and PTG can be replicated, and to examine if a similar finding is observed between PTG and TB.

Implications and future directions

Our findings are consistent with existing research on this topic and expand knowledge in this area. First, we found an inverse relationship between PTG and key interpersonal risk factors for suicide that have been previously documented in correlational cross-sectional research (Blevins, 2019). Second, our short-term longitudinal study expanded the current research by observing that perceiving PTG from recent adversity could attenuate the existing positive association between feelings of burdensomeness over 6 weeks. This builds on recent work by Yasdiman et al. (2022) who had observed PTG did not moderate key pathways to suicidal ideation in the IMV model, but it did correlate directly and negatively with suicidal ideation. Through the lens of the IMV model, the results of this study suggest that PTG may exert a protective function not by influencing key pathways between defeat and entrapment or entrapment and suicidal ideation, but instead by indirectly influencing other motivational phase moderators (i.e., risk factors), such as PB that strengthen the pathway between entrapment and suicidal ideation. We note that this study focused only on whether PTG reduced the saliency of these two risk factors. It did not measure entrapment or suicidal ideation. Future research would be needed to examine the longitudinal associations between PTG, interpersonal risk factors (PB and TB), entrapment, and suicidal ideation.

In this study, we found that greater perceptions of PTG weakened the relationship between PB over 6-weeks, but we did have scope to examine the causes for why some individuals experienced more PTG than others. Our finding is consistent with some past research documenting a positive relationship between PTG and distress (e.g., Shakespeare-Finch and Lurie-Beck, 2014; Zhen and Zhou, 2022), suggesting that perceiving PTG might be a coping strategy that individuals can use when trying to manage high levels of distress from adverse experiences. However, we should note that the association between distress and PTG is inconsistent, with some researchers finding a positive association (e.g., Dekel et al., 2012) and others finding a negative association (e.g., Frazier et al., 2001) therefore further research is needed to examine the relationship between the severity of distress and PTG within the context of suicide models.

Although these initial findings should be viewed as exploratory given the deviation from our pre-registered hypotheses (as previously justified in the method section), the findings have some important implications for research and suicide prevention strategies, if replicated in future research. Perceptions of burdensomeness are a robust predictor of suicidal ideation and suicide attempts controlling for other risk factors, such as depression and hopelessness (Van Orden et al., 2006; Hill and Pettit, 2014). Suicide models, however, suggest that perceptions of burdensomeness are a modifiable risk factor (Joiner, 2005; O'Connor and Kirtley, 2018) and are not stable and will vary over short time periods (Kleiman et al., 2017), in which case if PTG does exert a robust protective function on reducing burdensomeness, then it might inform psychosocial interventions to reduce suicidal ideation. For example, some aspects of PTG can be integrated into existing therapies (e.g., cognitive-behavioural therapy or emotion regulation psychotherapy; see Roepke et al., 2018) and these therapies have been found to be effective in decreasing the risk for self-harm repetition over time (Witt et al., 2021), which is a known risk factor for suicide (Hawton et al., 2003; Guan et al., 2012).

Limitations

Despite the promising nature of our findings, there are some limitations and caution should be taken until these initial exploratory findings are replicated. We collected our data during the ongoing COVID-19 pandemic and resulting national lockdowns, so the relationships need to be examined in a non-pandemic climate to assess the generalisability of results. We asked our participants to report PTG based on a recent challenging experience. It might be quite challenging for individuals to perceive and identify PTG when in the midst of managing recent experiences of adversity. Although there is some longitudinal evidence demonstrating that individuals report increases in their perceptions of PTG across a short time period (e.g., 4–5 weeks; Danhauer et al., 2013), more research is needed to examine how perceptions of PTG change and the beneficial versus harmful consequences of perceptions of PTG over time. Relatedly, this was a short-term longitudinal study with only two waves of data, and therefore longitudinal research with three or more time points would provide greater insight into how perceptions of PTG change over time and how these changes in perceived PTG may influence interpersonal suicide risk factors, such as PB. In addition, 86.5% of our participants were identified their ethnicity as White, which may limit the generalisability of the results to the other people identified with different ethnicities. Despite these limitations, our study did find a potentially important result regarding the protective influence of PTG against suicidal ideation in a sample of participants living in some of the most income-deprived areas and at greater risk of suicide (Griffiths et al., 2014). Thus, if future research does replicate these findings, there could be significant advancements in researchers' understanding of suicide resiliency that could inform clinical interventions.

Data availability statement

The datasets presented in this study can be found in online repositories. The names of the repository/repositories and accession number(s) can be found at: Open Science Framework; https://osf.io/mpcuw/?view_only=a5d22fc8b2c4473e92abf2dce67796e9.

Ethics statement

The studies involving human participants were reviewed and approved by University of Nottingham, School of Psychology Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MY, LB, and ET: study design, interpretation of data, drafting of manuscript, and revisions. MY: data collection and analysis. All authors contributed to the article and approved the submitted version.

Acknowledgments

This work was supported by the Republic of Turkey Ministry of National Education, Directorate General for Higher and Overseas Education as part of MY's PhD project.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 26 October 2022
DOI 10.3389/fpsyg.2022.995187

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 15 July 2022
ACCEPTED 06 October 2022
PUBLISHED 26 October 2022

CITATION
Menger F, Deane J, Patterson JM, Fisher P, O'Hara J and Sharp L (2022) The nature and content of rumination for head and neck cancer survivors.
Front. Psychol. 13:995187.
doi: 10.3389/fpsyg.2022.995187

The nature and content of rumination for head and neck cancer survivors

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Introduction: Head and neck cancer (HNC) diagnosis and treatment can be a significant life trauma. Some HNC survivors experience post-traumatic growth (PTG), which has been linked with better health-related quality-of-life. Empirical research on PTG, and theoretical models, point to the importance of being able to purposely make sense of the traumatic experience. Intrusive rumination, by contrast, is linked to poorer outcomes. This study explored HNC survivors' experiences of rumination.

Methods: Twenty HNC survivors between 9 months and 5 years post-diagnosis were recruited (11 male, 9 female, age range 46–83). They had a range of HNC sub-types and cancer treatments. Participants underwent a semi-structured interview about their cancer diagnosis and treatment. Reflexive thematic analysis identified themes and sub-themes around rumination.

Results: Four themes with linked subthemes on the content and process of rumination were identified. Theme 1 was *rumination and worry related to diagnosis*. Here, survivors discussed how the HNC diagnosis and plans for treatment had dominated their initial thoughts. Theme 2 was *processing the trauma of HNC*. This theme reflected rumination on the traumatic experience of diagnosis and treatment and how the participant was reacting to it. Theme 3 was *considering the impact*. This theme encompassed retrospective thinking (e.g., on treatment decisions made) and comparisons between the participant now versus the early days after diagnosis. Theme 4 was *continued rumination*. This theme included ongoing intrusive and distressing rumination about the trauma and impact of cancer. Those who expressed ongoing rumination revisited fears (e.g., concerns about their future) or returned to negative experiences (e.g., distressing exchanges with healthcare professionals or what they perceived as poor care).

Conclusion: This study uniquely describes the nature and content of rumination following HNC. Early intrusive rumination is common and may reflect perceptions of cancer as an existential threat. Over time, rumination can become more reflective and move towards deliberate meaning-making. Some HNC survivors may benefit from interventions to reduce barriers to this transition. The content of distressing and difficult to control rumination

(commonly focused on ongoing fears or inability to resolve difficult experiences) helps to identify those who may benefit from more directed psychological support.

KEYWORDS

rumination, head and neck (H&N) cancer, cancer surviorship, post-traumatic growth, post-traumatic stress disorder, cancer

Introduction

Head and neck cancer (HNC) is a significant life trauma (Bingo et al., 2020). Combined, cancers of the lips, oral cavity, larynx, pharynx, and salivary glands are the 8th most common cancer worldwide (Sung et al., 2021) and incidence rates are rising (Cancer Research UK, 2022). People from deprived socioeconomic backgrounds are disproportionately affected (Taib et al., 2018) and diagnosis is often made at a late stage.

It can be argued that the emotional and psychological trauma of HNC is unique. There are often negative consequences for quality of life (Qualizza et al., 2019). Because of the location of tumours, treatment for the cancer is often arduous and multimodal and can lead to ongoing alteration of vital functions of everyday life such as speech, voice, and swallowing (Patterson et al., 2013; Rogers et al., 2016). Survivors are likely to have many medical appointments and will have multiple interactions with healthcare professionals. Living with the condition often presents ongoing trauma and distress (Björklund et al., 2010). Survivors may be unable to work for a period, or permanently (Pearce et al., 2015). Moreover, they experience poor psychosocial adjustment (Buchmann et al., 2013; Clarke et al., 2014), high rates of distress, and significant levels of depression and anxiety (De Leeuw et al., 2000). This patient group has high rates of pre-existing mental illness and substance abuse, and many have restricted access to social support (Rieke et al., 2016). Incidence of suicide is also significantly higher relative to survivors of other cancers (Jansen et al., 2018). Consequently, there is a recognized need for targeted psychosocial support (Scott et al., 2013; Smith et al., 2017). However, high quality evidence informing the development of interventions towards improving psychosocial outcomes is poor (Semple et al., 2015). Interventions such as CBT, which have been effective in other cancers, do not successfully reduce distress for the HNC population and there is limited to no evidence base to support interventions aimed at improving quality of life (Calver et al., 2018).

Accumulating evidence suggests many cancer survivors may experience post-traumatic growth (PTG) (Shand et al., 2015; Casellas-Grau et al., 2017). Those who do have been shown to have better health-related quality of life; (Ruini et al., 2013; Liu et al., 2020) Health-related quality of life has been identified as a prognostic indicator of survival (Ediebah et al., 2018). Focused quantitative studies suggest that PTG is also experienced following HNC, (Holtmaat et al., 2017; Harding, 2018; Sharp et al., 2018) and these experiences are described within qualitative reports (Ruf et al., 2009; Thambyrajah et al., 2010; Menger et al., 2022). However, levels of PTG have been reported to be lower in HNC than in other cancers (Sharp et al., 2018). Some psychological interventions have shown promise in relation to supporting the development of PTG in cancer survivors (Li et al., 2020). However, they have not yet been tested in those with HNC who may, arguably, be considered a more challenging patient population with specific needs. Moreover, while the available qualitative and quantitative studies on PTG in HNC provide valuable insight into factors that may influence PTG, and describe how it is experienced in this group, the extent to which they can inform the development of interventions is limited, as they do not shed light on how and why some cancer survivors–but not others–progress from experience of trauma and distress towards the recognized PTG outcomes, i.e., greater appreciation of life, changed relationships, personal strength, new possibilities, and spiritual growth (Menger et al., 2021).

The revised model on development of PTG provided by Tedeschi et al. (2018) acknowledges influences such as the person-pre trauma, the centrality of the event, disruption of core beliefs, sociocultural influences, and the management of emotional distress and coping. Rumination following trauma is central to the model. Therefore, its role in relation to the development of PTG following cancer has been of interest to applied cancer researchers seeking to identify the best means to provide psychological support. Existing research recognizes the possibility that the earlier stages of rumination and perseverative thinking are not problematic and allow natural adaptation to occur (Wells, 2000; Wells and Sembi, 2004). Rumination may only become problematic when it becomes difficult to control.

Quantitative research (across cancer types) suggests that the ability to purposely make sense of traumatic experiences and to find meaning amidst challenges are important following the trauma of diagnosis and treatment (Wang et al., 2016; Ogińska-bulik and Kobylarczyk, 2019). Conversely, intrusive rumination/a focus on negative thoughts and feelings has been related to post-traumatic stress and poorer outcomes (Caspari et al., 2017; Zhang et al., 2018; Ogińska-bulik and Kobylarczyk, 2019). Qualitative studies on cancer survivorship present findings that investigate lived experiences across diagnosis and treatment pathways and beyond. Themes related to the existence of rumination and experiences of PTG frequently occur across this literature but are not overtly addressed: for example, distressing thoughts (Stenhammar et al., 2017), recognition of self-awareness as a

coping mechanism (Walshe et al., 2017), and moves towards redemption and psychological change (Scrignaro et al., 2018). Qualitative studies focused broadly on HNC survivorship also touch upon rumination, e.g., the importance of meaning-making and introspection (Threader and Mccormack, 2016; Grattan et al., 2018), and individual needs to reduce perseverative thinking styles (Calver et al., 2018). However, studies specifically focusing on rumination in HNC survivors are lacking.

Understanding why rumination, worry, doubting, and over-analysis continues for HNC survivors is of interest if effective psychological interventions are to be developed. It is, therefore, important to have insight into the nature and content of rumination experienced. A key action in the development of interventions is to obtain a thorough understanding of service user contexts and user experiences, particularly in contexts where any future interventions may be implemented. Therefore, better understanding of how rumination and reflective behaviours manifest would help towards building theory on pathways to PTG and contribute towards a "framework of actions" for intervention development (O'Cathain et al., 2019). This could help identify means to promote PTG following HNC and also identify and support those who develop cancer-related post-traumatic stress symptoms (PTSS).

Given the unique characteristics of the HNC patient group and the many related sequalae that may trigger ruminative thinking, the above literature (and broader literature on rumination in other traumas) is insufficient to illuminate the nature and content of rumination for a HNC population. This study, therefore, aimed to explore ruminative thinking following HNC. From this, the hope is to better understand how rumination may influence the development of PTG following HNC, and how PTSS are maintained.

Materials and methods

This qualitative study focused on cancer survivors who have lived through HNC diagnosis and subsequent treatment and who hold unique understanding of those experiences.

Participants

Participants were recruited *via* HNC outpatient lists at a specialist ENT centre. All had received a diagnosis of HNC and were at least 9 months and up to 5 years after completion of treatment. This time-period was chosen to allow time for a period of reflection post-diagnosis and treatment that was sufficient to allow any PTG to develop (Tedeschi et al., 2018) but not beyond a period where participants may have struggled to recall details of their experiences.

Data collection

Semi-structured interviews took place either on the telephone or within a private office. The interviewer (FM) used a topic guide developed in collaboration with a cancer research patient and public involvement group and a person who had received treatment for head and neck cancer. The topic guide was influenced by Tedeschi et al.'s (2018) revised model of PTG. It was designed to elicit data that might illuminate pathways towards PTG; the interviewer encouraged participants to return to their cancer diagnosis and treatment by discussing how they coped with their experiences, how they felt about living with head and neck cancer, and whether anything positive had come out of their situation. Interviews were audio recorded and transcribed.

A reflexive thematic analysis approach was chosen, guided by the approach of Braun and Clarke (2019a). This allowed for inductive analysis that would capture themes from patient recollections of diagnosis and treatment. Data collection ceased at twenty participants, when the interviewer felt transcripts contained sufficient diversity of experience and relevance in relation to the research questions to have reached 'information power' (Malterud et al., 2016; Braun and Clarke, 2019b).

Data analysis

Initial data familiarization took place by reading and re-reading transcripts and by checking back to the original recordings. Two researchers (FM & JD) individually coded the first five transcripts using specialized software (NVivo V.12). This involved highlighting areas of the text which were felt to be related to rumination or reflection on the HNC cancer experience. The remaining 15 transcripts were split between the two researchers to code independently; they then met regularly to discuss the emerging coding framework. Once completed, each set of transcripts was then reviewed by the other researcher to discuss and resolve any remaining discrepancies. This approach supported quality of coding by allowing for 'situated, reflexive interpretation' (Braun and Clarke, 2019b) as researchers were immersed in the data during a period of intense collaboration. Once coding was completed, the primary author brought together codes which reflected overarching themes on the type of ruminative thinking described and sub-themes reflecting "shared patterns of meaning" on the nature of those thought processes. By taking this approach, subjectivity is acknowledged as a core assumption, but also a strength of reflexive thematic analysis, which recognizes researchers as a resource towards construction of themes from qualitative data (Braun and Clarke, 2022).

Results

Twenty participants took part in the study, demographics are outlined in Table 1. Four main themes were identified following analysis, with related subthemes (Figure 1). Theme 1 was *rumination and worry around diagnosis* (subthemes: impact on others, fear and uncertainty, questioning, comparisons). Theme 2 was *processing the*

trauma of HNC (subthemes: looking inwards, challenging self, moves to acceptance, positivity, and resilience). Theme 3 was *considering the impact* (subthemes: recognizing changes to self, looking back on the experience, reflection on coping). Theme 4 was *continued rumination* (subthemes: going over negative experiences, seeking resolution and closure, ongoing unresolved issues). Each of the themes are described below, using pseudonyms for participant quotes.

TABLE 1 Participant characteristics.

Characteristic	*n*	Characteristic	*n*	Characteristic	*n*
Sex		**Cancer directed treatment**		**Cancer site**	
Female	11	Surgery	15	Neck	3
Male	9	Radiotherapy	15	Base of tongue	6
		Chemotherapy	8	Tonsil	5
				Larynx	2
Age at interview		**HPV Status**		Nasopharynx	1
40–49	1	Positive	14	Salivary gland	1
50–59	7	**T stage at diagnosis**		Hypopharynx	1
60–69	8	T0/T1	10	Parotid	1
70+	4	T2	8		
		T3/T4	2		

Rumination and worry around diagnosis

In this theme, survivors discussed how the HNC diagnosis and plans for treatment had dominated their initial thoughts.

Impact on others: Some participants discussed experiencing intrusive thoughts about the impact of their situation on those close to them; in the early stages of either realizing there was a medical problem that needed 0to be investigated or in the light of the HNC diagnosis, they commonly focused their thoughts on the impact if they were to die from cancer.

> *You think about, you know, the stage of life you are at. You're very much aware of the impact it* [the cancer diagnosis] *has on the people around you and those people that you love… so it makes a pretty heady cocktail to have to react and come to terms with.* Martin

> "*I think you sort of run ahead of it, and it was about the death and the dying. And I had three, sort of, quite young teenagers then, and I just wanted to live until* [youngest child] *was eighteen.*" Victoria

Fear and uncertainty: Fearful thoughts about an unclear future dominated, as participants recounted how they entered *"some*

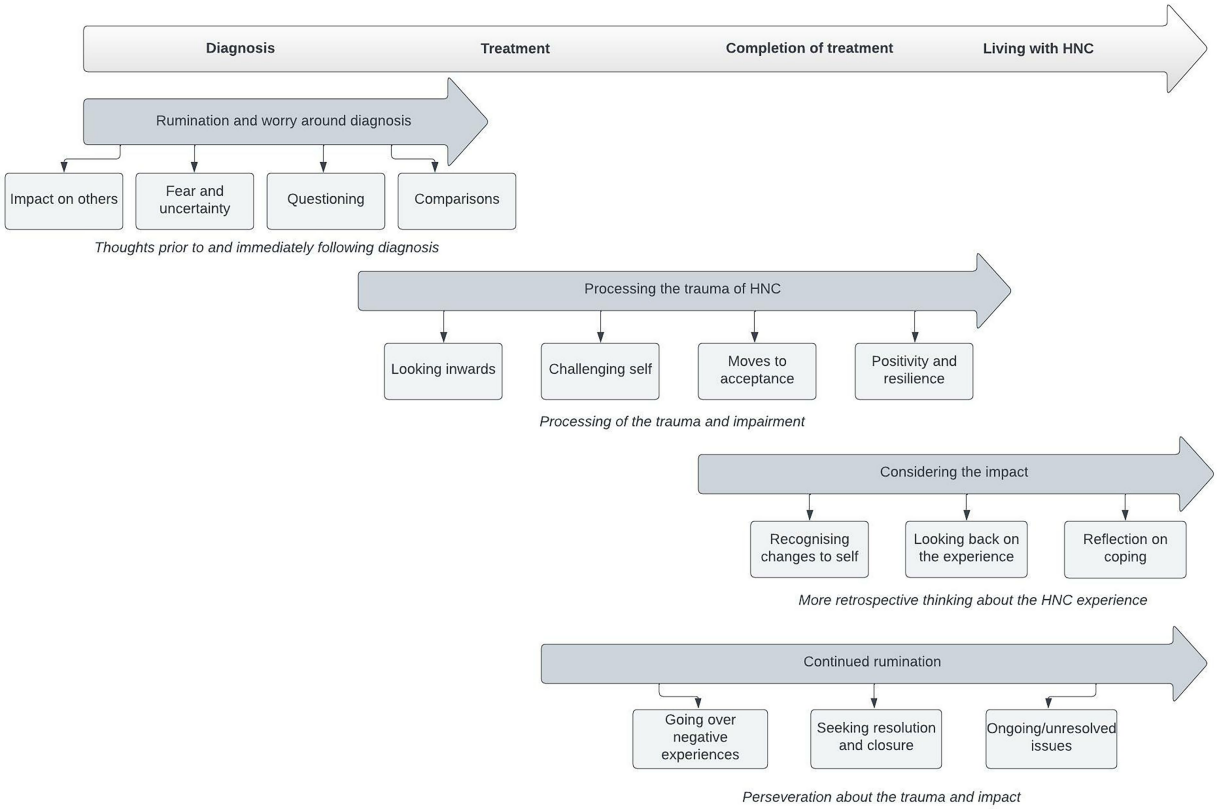

FIGURE 1
Temporal visualization of themes related to rumination in HNC survivors.

pretty dark places" (Martin) and would dwell on what might happen, often exploring every possible outcome, including possible consequences of treatment and their own death. Jackie said, "*I was very emotional and very scared,*" while Doreen gave more insight into the precise nature of her early thoughts, "*Oh, I would expect it to be, I'd be losing hair, I would be awful, losing my weight, I'm not able to… I had a terrible dark imagination*."

Questioning: Early ruminative thinking often questioned why HNC had happened and what might be the possible cause. "*It was really quite a shock, because* [I had] *no family history and I wondered if it was connected to the immune system or something*" (Doreen). Some dwelled upon lifestyle causes. "*I smoked and drunk quite a lot when I was younger. I blamed that. They did tell me it wasn't from smoking or anything, but it does not help.. I still blamed myself for the cancer.*" (Bianca).

Comparisons: During the early stages of treatment, participants commonly described comparing their own situation with others. This sometimes focused on people who did not have cancer, or on those who could do the things in life they could not. Most commonly, participants described how they made comparisons between themselves and other cancer patients. Thoughts were around how others were worse off or worries about how a fellow patient was faring. For example, Bianca discussed a person she met during her treatment:

> *I think it was just I so many times wanted to go back up on to the ward when I was going for my reviews just to see if he's still here. But then I didn't know how I would feel if… I think he was going to stop his treatment because he knew there was nothing they could do for him. It was just really pain, I think, relief that they were going to be giving him after that.*

Although most comparison was downward, one participant (Victoria) made upward comparisons, reporting she often felt annoyed or exasperated at others with less traumatic cancer experiences or who told her about other problems in their lives, feeling she had to '*bite her tongue*' not to make the point that what she had experienced was worse.

Processing the trauma of HNC

This theme concerned the trauma of cancer diagnosis and treatment and reaction to participants' experiences. After rumination on the uncertainty a diagnosis of HNC brings, coupled with fear and uncertainty about many aspects of life, many described moving towards thinking about how the diagnosis and treatment could have had a positive impact.

Looking inwards: When forced to spend a lot of time thinking about cancer and what it would mean for them, some spoke of how they spent time focusing on their own character and how they responded to the situation, e.g., Martin said "*… it's in those quieter moments a lot of it at night asleep or awake you learn to come to terms, as in come to terms as a result of any therapeutic intervention or reliance on others because ultimately it's you. You have to deal with it.*" Several reported that this type of thinking happened at night or when alone.

Some experienced a sense of disconnection, struggling to see themselves as someone who was unwell or needed help. Victoria, who had worked in hospitals, resisting seeing herself as a patient, saying," *…when you go into the radiotherapy area, and it was always, "I'm not supposed to be here. I do not know why I'm here*" Others acknowledged the threat of cancer to themselves but chose not to focus thoughts on possible negative outcomes, e.g., Billy observed "*I do not know whether that's just in my psyche, but I can honestly say all through the whole thing I never felt afraid. I never thought I was going to die. I never dwelt on anything like that*."

Challenging self: The experience of cancer treatment also brought opportunities for self-questioning. Participants spoke about questioning how they wanted to spend the remainder of their lives, their faith, and their relationships. Clive came to recognize that he had previously behaved unsupportively towards his partner, *"I was in the radiotherapy, wasn't really strapped down that long but things like that go through your mind, you are thinking about it on and off. It is just something you realize, you know.…"*

Moves to acceptance: As treatment progressed, some participants spoke of deliberate rumination towards acceptance of their situation, including that they might die from cancer. For example, as Jackie said, "*You know, thinking about, if I do die, what…? You know, nice things, and how nice it was to have children, and things like that, yeah*." There was recognition of being fortunate, despite ongoing difficulties:

> *I don't feel heartbroken about not being able to sing* [anymore] *but I sometimes think, I just want to… you're listening to your favourite tune, and you want to sing along. I whistle along with great enthusiasm. That's another minor thing…But I mean I'm alive, I'm fit and well, so I don't mope about any of these things. I had brilliant treatment and I survived it.* Tania

Positivity and resilience: Many participants thought about the need for positivity throughout the treatment process, spending time thinking about the need to move away from negative emotions. Kenneth spoke about this when he felt himself challenged, "*I think I just took a positive attitude throughout. I was in this situation, and I just had to make the best of it and get through it.*" Participants spoke of recognizing their own strength through positivity, e.g., Mel's determination. "*Well, you have got to be positive. It's no good moaning, you have got to have a positive attitude. I thought I was going to do these things. I'm still going to see my grandkids again, simple as that.*" This deliberate positivity was also seen in inward self-motivation, e.g., Joyce talked about her resolution after a difficult night dealing with side effects, "*Sometimes if I've got a little bit of a cold, things are really nasty. I get up in the morning and I just think, "Thank goodness I can get up and go to work and forget about all this.*"

Considering the impact

Reflection on specific aspects of the cancer experience was common, with this theme and subtheme focused on how participants described their ongoing questioning and self-analysis.

Recognising changes in self: Participants recognized that, following their experience, some things about themselves had changed and indeed their thought processes had changed:

> *I think in the quiet moments when I was on my own, I did think about it and I thought well, I hope this all comes back and* [I] *recover my face, and that's my only brush with cancer. I hope that I don't – nothing else comes up but that is in the back of your mind. I don't feel a thing now, I have to say. I feel in a good place now and I feel now that I'm coming up to the second year of that, I don't feel so affected by it.* Janice

Changes to thought processes also came about because of shifts in belief systems, e.g., a previously held belief that cancer would lead to death and increase in awareness shifting that belief.

> *I think, when I was a child, you know, one or two people that we knew – like, you know, family members or close friends – got cancer, and it was just a death sentence. So, everyone I knew who had got cancer… and that could well be because I didn't hear about people getting it and recovering. To me, it was always a death sentence.* Jackie

Looking back on the experience: Much reflective thinking was focused on looking back at the experience of treatment for HNC, recalling the difficult journey, the traumatic aspects, treatment decisions that were made, and how expectations met the reality of treatment. For example, Billy said, "*Just out of the blue he* [oncologist/consultant] *just told me he was going to try me on this different drug, which was Cetuximab. I think that's what saved my life.*" Reflecting on a more negative experience during radiotherapy and offering suggestions for improvement, Katherine said, "*Maybe to be told a little bit more because when I did go for my appointment, for my mask* [which holds the person's head in place while they have radiotherapy]*, they said I was the second or the third person not to be told what I was actually going for that day. I found that a bit horrendous.* Katherine.

Reflection on coping: For some participants, there was also personal reflection on how they had reacted to the cancer: for example, their role in decision-making and good vs. bad decisions they had made during the experience:

> *I think in hindsight I made the right choice. He said if you ever had to go back in again, that the scar tissue on the original cut that he had to make, that skin would be toughened, it would be a little bit more difficult to separate all the nerves to be able to get back in there. I just thought I'm not going to go for that. His advice would be he wouldn't go for that, but it was entirely my choice.* Janice

Participants also reflected on their behaviour towards others at the time. Mick told how the treatment effects had made him self-conscious of his looks and as a result more distant with people, saying' "*I have a collar which I wear. I am extremely self-conscious of.. one person has seen me wearing the mask and that was by mistake. I'm irritated that happened. So, in some ways it's forced me back in on myself a little bit.*" Bianca recalled how she had physically distanced herself from members of a multidisciplinary team by asking for more personal space following her realisation that so many people in one room must have meant a very serious problem. Tony looked back on his decision not to tell his daughters (who had previously lost their mother to cancer) that he was also suffering from the disease. This decision had led to him masking difficulties with eating and drinking and eventual hospitalization due to malnutrition:

> *Yes, just trying to protect them, in hindsight now, looking back, I suppose it'd be different if it hadn't happened to their mam and stuff, it probably wouldn't be as bad, but it was because I can still feed myself, I didn't want a feeding tube, all that type of thing, in hindsight I should have done because it would have kept me stronger because that last week I went downhill…*

For some, reflection involved comparisons between their situation during treatment and now. "*When you have been sitting there with tubes up your nose and you could not drink and you could not eat, this is a million per cent better because I can drink now, and I can eat now. So, it's a good result, as far as I'm concerned*" (Kenneth).

Continued rumination

This final theme included intrusive and distressing rumination about the trauma and impact of cancer. Although this phase was not reported by all participants, it was common and, when reported, provided clear insight into the ongoing nature of negative rumination containing distressing content.

Going over negative experiences: Some intrusive thoughts involved returning to negative experiences. For example, Mick was still dwelling on interactions with a charity organization he felt failed to provide him with support, while Billy was able to recount in detail an interaction with a doctor who delivered bad news in an insensitive way. Bianca recounted a distressing experience when someone had drawn attention to her radiation scars in public:

> *… we all know, you can walk along the street, and you see somebody with either a disfigurement or something wrong with them and yes, you tend to look… you try and stop yourself because you're trying to not make somebody feel so bad. But to shout something across an open space, it wasn't like I was*

> *standing right beside him or anything like that, and just go, "What have you done to your neck?" or something like that. It obviously still bothers me.*

Seeking resolution and closure: There were participants who discussed ongoing thoughts about situations they felt needed to be resolved. For example, Jackie was seeking affirmation for decisions she had made about her own care, saying she felt she would have been more comfortable about her decision to pursue complementary treatment routes had she been offered an appropriate person to talk to who had been down the same route.

In Kenneth's case, the ongoing need for resolution related to a legal action over early failures of the healthcare system, which he felt had missed his diagnosis; he remained angry and emotional, feeling a need for justice and retribution. Although he initially said he had "*come to terms with it,*" he later stated that he had not. He expressed ongoing anger and loss, saying he was keen that others should hear his story and that "*I need them involved to be exposed one way or another.*"

Ongoing/unresolved issues: Some participants discussed ongoing physical problems. Although they had recovered well, they still noticed differences to how they were before, e.g., Katherine recalled how someone had asked if she had a sore throat, "*No I have not. It's just obviously the way things have turned out, there's a big change in my voice*." These types of changes acted as an ever-present reminder of the HNC experience.

> *I can eat anything I like, and I know I'm lucky in that. I can speak. Sometimes get the tickle at the back of my throat and think I'm choking, and I always need more water than anybody else, have a lot of phlegm. But my neck is never going to change. I've got pain in my right shoulder from a damaged accessory nerve. I know it's trivial, but it's a constant reminder that will never go away.* Victoria

Some participants needed resolution related to possible treatments and a belief that there was still more that might be done for them:

> *I sometimes wonder whether… there may be some avenues that remain unexplored and it's about signposting where might I want to go next. I'm sometimes sure that maybe I haven't seen the end of the level of support that is available for me from the team who do what they do.* Martin

Finally, some participants' responses indicated they had uncertainty about their futures, i.e., a fear of spread or of recurrence of their cancer. "*You cannot help but think about it. I do not care who they say that can, it's always in the back of your mind. Will it come back? Even now you are thinking it will come back again*" (Mel).

Discussion

This research set out to explore the nature of rumination after HNC. The resulting analysis provides unique insight into how HNC survivors ruminate upon the experience of cancer and into how rumination changes over time. A focus on the existential threat of cancer is common in the early stages after diagnosis. This frequently gives way to a process of meaning making. Ongoing rumination, when individuals return to aspects of their diagnosis and treatment that were unhelpful or disruptive, follows; survivors can also continue to ruminate on treatment sequelae or unresolved aspects of their care.

The nature of rumination following HNC does appear to be temporal as people first focus thoughts on what is to come and later look back on those experiences or dwell upon what feels unresolved. However, intrusive 'what if' thoughts and worries can also occur at any point, most notably fear of spread/recurrence or the consequences of ongoing sequalae. This in keeping with the revised model of PTG (Tedeschi et al., 2018) and the theory that, following trauma, individuals need time to ruminate for growth to occur. Our participants were deliberately recruited at least 6 months after completion of their treatment. That they had time to look back on their experiences is clearly reflected in our findings.

Early intrusive rumination related to the threats imposed by HNC was a very common response to diagnosis and plans for treatment. This is unsurprising, given societal narratives about cancer and related treatments as something to fear. HNC, when suspected or identified, presents a sudden deviation from what is described by the Common-Sense model as 'the normative self.' (Leventhal et al., 2016). Representations of threats to health that are activated as illness representations include predictions on the duration or consequences of a condition as well as pre-existing beliefs about treatment or cure (Hale et al., 2007). Our findings reflect these beliefs and public perceptions about cancer, which are present amongst the participants' early intrusive ruminations. Pre-existing beliefs about cancer (and HNC in particular) as an existential threat dominated people's thoughts. As survivors navigated this new and unknown experience, those beliefs were challenged as more reflection on what had happened in comparison with what they anticipated. This phase of rumination may be what either directly or indirectly leads a HNC survivor towards aspects of PTG.

Some may find this journey easier to navigate than others, while others may experience a longer period of experiencing threat and suffering before reaching a point of psychological change (Seiler and Jenewein, 2019). An increase in symptoms is related to more intrusive rumination, as shown by previous work on colon cancer (Thomsen et al., 2013); this is reflected in our findings as participants with HNC-related sequalae discussed the ongoing consequences of these difficulties on their lives and their thought patterns. Some, however, had come to a point of resolution where they no longer dwelt on the cancer and had been able to move forward. This ability to reappraise and find meaning and purpose in the HNC experience is likely to be key in the development of

PTG. Of note, the current study did not attempt to determine which participants had developed PTG or were on a route to do so, nor to make comparisons within the group. Our previous work with this dataset (Menger et al., 2022) reported that most participants had moderate to high scores on the PTG Inventory short form (Cann et al., 2010). The participants' ability to ruminate on how HNC diagnosis and treatment were handled is therefore reflective of the fact that most had attempted to find meaning in the experience. They did so by inwardly evaluating their response to specific aspects of their cancer journey, recognizing unhelpful thoughts and behaviors and adapting positively; they also acknowledged how their beliefs about HNC had been challenged.

The ability to reach a point of resolution following trauma is clearly beneficial; part of this involves letting go of the circumstances that are beyond an individual's control, something often influenced by internal and external factors (Curran et al., 2017). Variations in individual coping styles in HNC survivors (Sherman et al., 2000; List et al., 2002; Derks et al., 2005) are likely to play a role. Other important factors may be gender differences in rumination (Johnson and Whisman, 2013), levels of distress (Holtmaat et al., 2017), and external factors such as availability of social support (Kim and Son, 2021; Menger et al., 2022). How these factors interact and when HNC survivors make meaningful transitions towards growth would be better illuminated by longitudinal studies, which are currently lacking but would be of particular value in this field.

One outcome of this work should be to inform those aiming to develop interventions towards encouraging PTG following HNC. The current findings suggest that researchers should now focus on where barriers and opportunities exist along the care pathway to support HNC patients to tell their stories and reflect upon their journey. Cancer survivors do not necessarily want access to formal psychological support beyond the early stages of diagnosis, preferring the presence of family and friends and valuing the ability to speak openly about their cancer (Richardson et al., 2015). For those who do not have good access to practical and emotional support, interventions such as peer befriending could be effective in reducing distress and offering opportunity for self-disclosure (Hu et al., 2019; Hatton et al., 2022). Other researchers are exploring the power of narratives to encourage better psychological outcomes, (e.g., Wise et al., 2018).

The therapeutic benefit of participating in qualitative research such as this should not be disregarded. Murray (2003) discusses how connection and rapport with a skilled and non-judgmental interviewer offers a therapeutic opportunity. Indeed, several of our participants commented that they found the experience useful. By telling the story of their treatment, participants were able to look back reflectively; others have shown that this can lead to self-revelations (Drury et al., 2007). Participation in research may also offer opportunity to find meaning in the cancer experience and 'give back' (Grattan et al., 2018).

It is also vital to identify what aspects of HNC care and the linked negative thoughts trigger rumination. Leventhal et al. (2016) discuss the importance of preparedness for treatment within healthcare settings. Our participants experienced ongoing negative thoughts related to circumstances where they felt misinformed or uncertain. Treatments for HNC are often arduous and multi-modal; for instance, some patients may have combinations of cancer-directed surgery, chemotherapy, and radiotherapy. Survivors can be left with sequalae that are distressing and lifelong, and these sequalae are sometimes unexpected by the patient. Of course, not everything can be certain (or predicted) in cancer care, and not every patient wishes to be informed about the possible negative consequences of treatment. Longitudinal studies may shed more light on whether advance knowledge of possible distressing treatment effects following HNC is supportive of more positive reflections at a later stage.

Our study also reinforces a need to identify those who may have experiences on which they dwell or feel unable to resolve (Nik Jaafar et al., 2022), or those for whom there have been clinical incidents or conflicts with the care team. One participant's experience of early misdiagnosis and subsequent need for resolution had led to a prolonged period of intrusive rumination and anger over their experiences; in contrast, those who felt they had had good experiences of care, such as shared decision making, reflected positively upon the experience. Better social support following cancer–which could come from friends, family, and/or health professionals–is related to PTG (Sharp et al., 2018). Where this is strong, interactions with others may act to facilitate more deliberate rumination and self-disclosure. Conversely, conflict, negative interactions, additional burden, or unresolved issues within the recovery environment may trigger ongoing and intrusive thinking. To proactively avoid such conflicts, healthcare professionals may benefit from training in interactions which could facilitate deliberate rumination; this is work on improving services that could be designed *via* processes of user involvement (Attree et al., 2010).

Metacognitive therapy (MCT, Wells, 2000) could be valuable for those most at risk from poorer psychological outcomes. The MCT model proposes that metacognitive beliefs, i.e., beliefs about cognition such as "I cannot stop ruminating," "ruminating will help me to problem solve" prevent people from moving on from traumatic memories, images, and thoughts. MCT has been applied to cancer survivors in small scale studies (Fisher et al., 2017, 2019) and resulted in the reduction of emotional distress including clinically significant post-traumatic stress symptoms. Cancer survivors who engaged with the therapy (which was most participants) found it acceptable and useful to support understanding of unhelpful rumination and prevent becoming 'locked' into unhelpful thinking (Wells and Sembi, 2004). This type of intervention is supportive of the development of adaptive coping and resilience, which is related to better life satisfaction after cancer (Adamkovič et al., 2022).

This study was somewhat limited in that recruitment came from a single specialist center and there were only 20 participants. However, the group did represent diverse experiences. A further limitation is the cross-sectional design; a participant's current situation may influence how they recall past events and

experiences. Future studies could explore rumination concurrent to points in HNC pathways and beyond completion of treatment.

To conclude, this study provides a unique insight into the experiences of rumination for HNC survivors and how that rumination relates to cancer diagnosis and treatment. The findings support understanding of how some HNC survivors look back upon their cancer journey in a way that can be facilitative of PTG and how others experience ongoing and intrusive rumination. They shed light on the content both of rumination that is common but likely to be transitory following HNC diagnosis and treatment and later continued, negative rumination which may place survivors at risk of post-traumatic stress and poor psycho-social outcomes. In the early stages of survivorship, patients may benefit from supportive interactions and environments to enable them to successfully process the trauma of cancer diagnosis and treatment. Those experiencing later ongoing rumination may benefit from metacognitive interventions towards the reduction of emotional distress.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics statement

The studies involving human participants were reviewed and approved by NHS North of Scotland Research Ethics Service. The patients/participants provided their written informed consent to participate in this study.

Author contributions

LS, JO'H, JP, and FM contributed to conception and design of the study. LS, JP, and JO'H secured finding. JO'H facilitated recruitment. FM carried out the interviews. FM and JD conducted the analysis. PF consulted on psychology aspects of the work. FM wrote the first draft of the manuscript with support from LS. All authors contributed to the article and approved the submitted version.

Funding

This research was supported by funding from the Newcastle upon Tyne Hospitals Charity (Award no. BH172327).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 28 October 2022
DOI 10.3389/fpsyg.2022.1018569

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 13 August 2022
ACCEPTED 06 October 2022
PUBLISHED 28 October 2022

CITATION
Bakaitytė A, Puente-Martínez A, Ubilos-Landa S and Žukauskienė R (2022) Path to posttraumatic growth: The role of centrality of event, deliberate and intrusive rumination, and self blame in women victims and survivors of intimate partner violence.
Front. Psychol. 13:1018569.
doi: 10.3389/fpsyg.2022.1018569

Path to posttraumatic growth: The role of centrality of event, deliberate and intrusive rumination, and self blame in women victims and survivors of intimate partner violence

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Increased interest in positive changes in the aftermath of traumatic events led researchers to examine assumptions about the process of posttraumatic growth (PTG). However, existing studies often use samples from mixed trauma survivors and investigate separate factors and their associations with growth. Therefore, the purpose of the current study was to examine the path from centrality of event to PTG involving intrusive and deliberate rumination and self-blame as a coping strategy in women survivors of intimate partner violence (IPV). The study sample consisted of 200 women with a history of IPV (ages 18–69, *M* = 44.79, *SD* = 12.94). Results of the path analysis indicated that higher centrality of event was related to higher levels of intrusive rumination which was positively related to self-blame and deliberate rumination eventually leading to PTG. Indirect effects from centrality of event to PTG through intrusive and deliberate rumination, and from intrusive to deliberate rumination through self-blame were examined. This study gave support to some theoretical assumptions of the process of PTG and pointed out problematic areas of investigation of coping strategies in this process.

KEYWORDS

posttraumatic growth, intimate partner violence, centrality of event, rumination, coping, self-blame

Introduction

Intimate partner violence (IPV) is defined as physical, sexual, and/or psychological harm caused by a current or former partner (World Health Organization, 2012). IPV is gender-based violence as most often women are the victims of their partners' or ex-partners' violence (World Health Organization, 2012) and they suffer more severe consequences of

IPV compared to men (Ansara and Hindin, 2011). The dynamic of IPV is unique where the harm is done by a loved one, trusted partner, making this experience highly traumatic. Also, IPV involves controlling behaviors that isolate the victim from the outside world, and constant humiliation and mockery create an environment in which the victim loses the sense of self and her identity (Matheson et al., 2015). This kind of trauma causes well-known negative consequences such as PTSD, depression, and anxiety (Doane, 2010; Lilly et al., 2015; Chandan et al., 2020), but it can also lead to positive changes (Cobb et al., 2006; Valdez and Lilly, 2015).

For more than the past two decades, attention is given not only to negative consequences but also to positive changes experienced after traumatic events. The most widely used conceptualization of these changes was coined by Tedeschi and Calhoun (1995) and called posttraumatic growth (PTG). PTG refers to positive psychological changes that occur following the struggle with traumatic experiences (Tedeschi and Calhoun, 1995). The process of PTG is described in the model of PTG and the most recent version was published in 2018 (Tedeschi et al., 2018). The model indicates that traumatic experiences that challenge person's core assumptions about the world and people in it are the ones that can initiate the PTG process. Changes can be experienced in the view of the self, relationships with others, and/or worldview and philosophy of life (Tedeschi and Calhoun, 1995; Tedeschi et al., 2018). Studies investigate PTG in various trauma survivors such as war veterans (Maguen et al., 2011), terminal illnesses (Chi et al., 2022), natural disasters (Jia et al., 2017), and accident survivors (Nishi et al., 2010), however, some traumatic experiences such as IPV still receive less attention (Elderton et al., 2017). The dynamics of IPV make it hard to apply the knowledge about PTG from other traumatic contexts. For this reason, it is important to investigate PTG in women victims and survivors of IPV, anticipating that the PTG process in this context may be different compared to other traumas.

In the model of PTG, authors use a broader understanding of traumatic experience than described in DSM-V indicating that not the event itself but the personal perception of it makes the experience traumatic (Tedeschi et al., 2018). This perception can be expressed through the centrality of event which refers to the degree to which an event becomes a central part of a person's life story and identity (Berntsen and Rubin, 2006). If the traumatic event is perceived as central, it indicates that the experience became a turning point in which life is seen as one "before" and the other "after" (Tedeschi and Calhoun, 1995). This perception is an important precursor of PTG (Tedeschi and Calhoun, 1995), and studies with IPV and other trauma survivors confirm that the centrality of event is positively related to PTG (Groleau et al., 2013; Bakaitytė et al., 2021), indicating unambiguous importance of centrality of event in the process of PTG.

Another important factor for PTG is rumination. In general, rumination refers to repetitive thinking about something or "a cognitive "chewing the cud" (Cann et al., 2011, p. 138). Rumination belongs to the cognitive processing of trauma which is an essential part of the process of PTG (Tedeschi et al., 2018). Authors indicate two types of rumination: intrusive which is automatic and more present at the beginning of the process, and deliberate which is more reflective, appearing later in the process of PTG (Cann et al., 2011). Studies repeatedly indicate a positive relation between deliberate rumination and PTG (Ogińska-Bulik, 2016; Lafarge et al., 2020; Freedle and Kashubeck-West, 2021), and a negative or no relation between intrusive rumination and PTG (Stockton et al., 2011; Lafarge et al., 2020; Freedle and Kashubeck-West, 2021). The centrality of event is also found to be related to both types of rumination (Brooks et al., 2017; Kramer et al., 2020). Events that are central to a person initiate the cognitive processing of the traumatic experience, at first, through intrusive rumination, which is an inevitable part of trauma processing, but eventually, it must be transformed into more deliberate rumination to lead to PTG (Tedeschi et al., 2018). Besides theoretical assumptions, there is little empirical knowledge of what contributes to the shift from intrusive to deliberate rumination.

The model of PTG indicates that coping mechanisms also play a significant role in the cognitive processing of traumatic experiences. Coping is the response to stress that comes after a cognitive evaluation of the threat and possible responses to it (Lazarus and Folkman, 1984). It is assumed that in the process of PTG coping strategies help to manage distress caused by trauma and allow one to engage in cognitive processing through rumination (Joseph and Linley, 2005). Studies on coping and PTG often use so-called the fallacy of uniform efficacy (Bonanno and Burton, 2013) which is the tendency to combine different strategies into subtypes of coping based on different theoretical frameworks (e.g., adaptive/maladaptive, approach/avoidance, problem/emotion-focused coping). According to Bonanno and Burton (2013) concept of regulatory flexibility, coping is sensitive to the context of the event and environmental demands, meaning that the same strategy might be useful in one situation but not necessarily in others. This way of coping investigation is problematic as it gives generalized conclusions that most often could be debatable or questionable. This suggests that it is more useful to investigate separate coping strategies that are relevant to a given context rather than combining strategies in uniform constructs.

One of the forms of coping repeatedly reported in victims and survivors of IPV is self-blame (Reich et al., 2015; Ulloa et al., 2016). Although it partly comes from stigmatization in society (Kennedy and Prock, 2018) and is associated with negative consequences (Reich et al., 2015), it is also defined as a coping mechanism and can lead to positive outcomes (Tedeschi and Calhoun, 1995). Paradoxically, self-blame as a coping mechanism attributes control to oneself in this way helping to cope with what happened (Janoff-Bulman, 1979). Tedeschi and Calhoun (1995) indicate that self-blame helps to maintain beliefs that one has control in life and that positive changes are possible. In the context of IPV, the internal state of feeling responsible (self-blame) for experienced violence possibly stimulates thinking (rumination) about IPV experience and changes that are required to prevent it

in the future. Therefore, considering that self-blame is very common in victims and survivors of IPV and that there are arguments in the literature suggesting its' associations with rumination, this study focused on the analysis of the role of self-blame in the PTG process.

In categorizations of coping mechanisms, self-blame is most often attributed to avoidance coping. Studies using this conceptualization indicated a positive relation between PTG and avoidance coping in rehabilitation patients (Kunz et al., 2018), and 9–1–1 communicators who experienced childhood trauma (London et al., 2020), but in interpersonal violence survivors, avoidance coping was not related to PTG (Brooks et al., 2019). Little research investigates the relation between self-blame as an independent coping strategy and PTG, with exception of Frazier et al. (2004) who found no relation between behavioral self-blame and PTG in sexual assault victims. However, as argued before, it is possible that self-blame is more related to rumination leading to PTG than directly to the PTG itself.

The relationships between coping strategies and types of rumination are rarely investigated because most studies use them as direct predictors of PTG. Most extensive findings were reported by Cann et al. (2011) investigating relations between different coping strategies and types of rumination. Results indicated that only intrusive rumination predicted venting and mental disengagement (coping strategies) while deliberate rumination was not a significant predictor. Unfortunately, they did not include self-blame as a coping strategy but typically venting and mental disengagement are assigned to the same avoidance coping category as self-blame. Chi et al. (2022) found that deliberate rumination was positively associated with avoidance coping in people with HIV. Existing studies indicate mixed findings about relations between types of rumination and coping strategies, giving more attention to deliberate than intrusive rumination. Also, we could not find any study investigating relations between self-blame and types of rumination. However, Kamijo and Yukawa (2018) argue that feelings of regret and guilt motivate one to find meaning and can contribute to deliberate rumination. Moreover, the model of PTG (Tedeschi et al., 2018) indicates that coping helps the transition from intrusive to deliberate rumination. Therefore, it can be assumed that in the context of IPV self-blame plays a role in this transition.

Some studies indicate that the time since the traumatic event is an important factor contributing to PTG (Doane, 2010; Ulloa et al., 2016; Morgan and Desmarais, 2017). However, Prati and Pietrantoni (2009) conducted meta-analysis and did not find significant effect of time to PTG. Tedeschi et al. (2018) argue that for different people paths po PTG might differ and as some people may experience positive changes very early after the trauma, for other it may take years. Studies with victims and survivors of IPV support this by indicating that some positive changes can be experienced while still being in violent relationships (Young, 2007), but Cobb et al. (2006) highlight that the most significant PTG can be experienced after ending the violence. Results of the longitudinal investigation of PTG in IPV survivors showed that PTG increased for women who experienced IPV less than 2 years ago, and for those who experienced IPV more than 2 years ago PTG tend to be stable at relatively higher levels (Bakaitytė et al., 2022). These studies indicate that the time since the violence can be an important factor contributing to PTG in victims and survivors of IPV.

Although numerous studies are investigating PTG and confirming some aspects of the theory (e.g., Ulloa et al., 2016; Kramer et al., 2020; Lafarge et al., 2020), researchers are often concentrated on separate parts of the model and conduct studies with different or mixed trauma survivors (e.g., Cann et al., 2011; Lee et al., 2020). However, distinct types of trauma can have diverse impacts on PTG (Zoellner and Maercker, 2006; Lowe et al., 2020). For example, some authors argue that interpersonal traumas are more damaging to a core belief system than traumas by natural causes or accidents, therefore, potentially leading to more PTG (Ulloa et al., 2016). Others indicate that as interpersonal traumas are caused by others it is more difficult for survivors to make sense and meaning of them and this hinders growth (Meyerson et al., 2011). Moreover, coping can also differ by type of trauma (Bonanno and Burton, 2013) and this can also have an impact on the process of PTG. All these arguments highlight the importance to investigate PTG in homogenous types of trauma (Platte et al., 2022) or specific traumas such as IPV. This kind of investigation can give more focused and context-sensitive insights into the process of PTG.

Considering the need to investigate PTG in specific types of trauma and test theoretical assumptions of the cognitive processing part of the model of PTG as a whole, the purpose of the current study was to test the theoretical pathway from the centrality of event to PTG including rumination (intrusive and deliberate) and self-blame in women victims and survivors of IPV. We hypothesized that: (1) centrality of event will be positively associated with intrusive rumination; (2) intrusive rumination will be positively related to deliberate rumination; (3) self-blame will mediate the relation between intrusive and deliberate rumination; (4) intrusive and deliberate rumination will mediate the relation between centrality of event and PTG; (5) deliberate rumination will be positively associated with PTG.

Materials and methods

Participants

This study was a part of a larger research project on PTG of women victims and survivors of IPV in Lithuania. Thirty-seven experienced interviewers (only women) collected data from different regions of Lithuania. Interviewers went to the homes of potential study participants using the snowball method and information from the local social services. To identify victims and survivors IPV, questions about different

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forms of abuse were administered first. A participant was considered a victim or survivor of IPV if indicated at least one physical or sexual, or at least three psychological or economic violence incidents from their current or former partner. Stricter inclusion criteria for psychological and economic violence were selected considering the more nuanced nature of these types of abuse and some items possibly reflecting one-time conflicts occurring in the family (e.g., "Ignored, did not speak, did not answer questions," "Demanded to tell me how and where I spend my money"). Participants completed self-reported questionnaires on paper at their homes if indicated that they feel safe doing so. The study was approved by the Ethics committee at Mykolas Romeris University.

The total sample consisted of 200 Lithuanian women (ages 18–69, $M = 44.79$, $SD = 12.94$) with a history of IPV. Almost two-thirds of participants had higher education (professional, college, or university degree), and 77.5% were employed. At the time of the study, 36.5% of participants were living with a partner, 33% were single, 19.5% had a partner but were not living together, 10.5% engaged in episodic relationships, and .5% did not indicate their relationship status. The IPV-related sample characteristics are presented in Table 1.

TABLE 1 IPV-related characteristics.

	n **(%)**
Forms of IPV in the sample	
Psychological violence	200 (100.0)
Economical violence	168 (84.0)
Physical violence	175 (87.5)
Sexual violence	130 (65.0)
Perpetrator(s)	
Current partner	54 (27.0)
Divorcing partner	34 (17.0)
One ex-partner	100 (50.0)
Multiple ex-partners	15 (7.5)
Time since the last violence incident	
Less than a week	9 (4.5)
More than a week	12 (6.0)
More than a month	27 (13.5)
More than a half year	28 (14.0)
More than a year	15 (7.5)
More than 2 years	30 (15.0)
More than 5 years	37 (18.5)
More than 10 years	22 (11.0)
More than 20 years	20 (10.0)
Received psychological help	
Yes	37 (18.5)
No	152 (76.0)
No response	11 (5.5)

Participants of the study could indicate more than one type of experienced IPV and more than one type of perpetrator(s).

Measures

Posttraumatic growth was measured with the Short Form of Posttraumatic Growth Inventory (PTGI-SF; Cann et al., 2010) which consists of 10 items (e.g., "I changed my priorities about what is important in life"). Participants rated each item on a 6-point Likert-type scale ranging from 0 (I did not experience this change) to 5 (I experienced this change to a very great degree). The Cronbach's alpha of the scale was .95.

Centrality of event was measured with the Centrality of Events Scale (CES; Berntsen and Rubin, 2006) which consists of seven items (e.g., "This event was a turning point in my life"). Participants rated each item on a 5-point Likert-type scale ranging from 1 (Totally disagree) to 5 (Totally agree). The Cronbach's alpha of the scale was .89.

Intrusive and deliberate ruminations were measured with Event Related Rumination Inventory (ERRI; Cann et al., 2011). The measure consists of two subscales (10 items each) corresponding to intrusive (e.g., "I thought about the event when I did not mean to") and deliberate (e.g., "I thought about whether I could find meaning from my experience") rumination. For this study, we used five items for each scale. According to reported factor loadings of the scales (see Cann et al., 2011), all items were similar. Thus, we selected items that best fitted the sample and were not similar to other used measures (as this study was part of a larger study). Participants rated each item on a 4-point Likert-type scale ranging from 0 (Not at all) to 3 (Often). The Cronbach's alphas of the scales were .92 for intrusive, and .86 for deliberate rumination.

Self-blame was measured with the Brief COPE Inventory (BCI; Carver, 1997). This inventory consists of 28 items corresponding to 14 coping strategies (two items each). For this study, we used only self-blame items (e.g., "I've been blaming myself for things that happened"). Participants rated each item on a 4-point Likert-type scale ranging from 1 (I have not been doing this at all) to 4 (I've been doing this a lot).

Single item questions measured additional variables such as age, education, relationship status, relationship status with the perpetrator (s), the time since the last violence incident, and received psychological help.

Statistical procedures

Participants' demographic data were summarized using descriptive statistics. Cronbach's alpha was used to report the reliability of the scales. The relationship between variables was tested using Pearson correlations. r values around .10 are considered small, .30 medium, and .50 or higher large (Cohen, 1988). All significance tests were two-sided with a 5% nominal level of significance. These analyses were conducted using SPSS v. 26 software package.

Path analysis was used to examine the pathways from the centrality of event to PTG. This technique allows a series of

structural regression equations to be analyzed simultaneously while evaluating how well the overall model fits the data. We developed a general model to test the proposed theoretical model described by Tedeschi et al. (2018). The path analysis used centrality of event, deliberate and intrusive rumination as independent variables, self-blame as a mediator between intrusive and deliberate rumination, and PTG as a dependent variable. Also, deliberate and intrusive rumination were used as mediators for the path from the centrality of event to PTG. It is known from our previous studies (e.g., Bakaitytė et al., 2021) that time after the event is related to PTG in IPV survivors, and intrusive rumination is usually expected to decrease with time (Tedeschi et al., 2018). For this reason, we also controlled for time since the last violence incident in PTG and intrusive rumination. We analyzed the model using Mplus statistical software (Version 8.5, Muthén and Muthén, 2017).

According to Hayes and Scharkow (2013), bias-corrected confidence intervals were used to provide more accurate weightings between Type I and Type II errors and a more precise assessment of indirect effects. Consequently, 5,000 bootstrap samples and 95% bias-corrected confidence intervals (CI) were used to determine the significance of indirect effects. An indirect effect is deemed statistically significant if the value of 0 is not included in the bias-corrected CI. The goodness of fit of the path models was assessed by examining the root mean squared error of approximation (RMSEA) and the standardized root mean squared residual (SRMR) (close to or smaller than .08), the comparative fit index (CFI) (close to or larger than .90), and the Tucker–Lewis index (TLI) (close to or larger than .90). These analyses were conducted using Mplus Version 8.2 (Muthén and Muthén, 2017).

As some items had missing values, we conducted a normed $\chi 2$ ($\chi 2$/df ratio) test to determine whether the data were missing at random. According to Bollen (1989), a value less than 2.0 indicates that data is missing at random and that the maximum likelihood techniques are appropriate for use. The normed $\chi 2$ value in this study was 1.49. Using full information maximum likelihood (FIML, Full Information Maximum Likelihood default in Mplus), analyses were conducted using all available data from the total sample ($N = 200$).

Results

Preliminary analysis

Correlation analysis (Table 2) revealed that PTG was positively related to centrality of event and deliberate rumination, and not related to intrusive rumination and self-blame. Centrality of event was positively related to all study variables. Intrusive rumination was positively correlated with deliberate rumination, and both types of rumination were positively correlated with self-blame.

Path analysis

The constructed model fit the data well $\chi 2\ (390) = 736.071$, $p < .001$, CFI = .920, TLI = .911, RMSEA = .067 [.059, .074], and SRMR =.063. All possible paths were added to the analysis, and time since the last violence incident was added as a control variable for intrusive rumination and PTG.

Results indicated that centrality of event was directly related to intrusive rumination, deliberate rumination, and PTG (Figure 1), showing that the more central IPV experience was to women, the more PTG, intrusive and deliberate rumination they experienced. The sequential indirect effect from centrality of event to PTG through intrusive and deliberate rumination was also significant ($B = .032$, 95% CI [.009, .071]), indicating that the relation between centrality of event and PTG is also related to higher levels of intrusive and deliberate rumination. Intrusive rumination was associated with deliberate rumination both directly and indirectly *via* self-blame ($B = .073$, 95% CI [.006, .213]), indicating that higher levels of intrusive rumination were associated with higher deliberate rumination, but this relation also goes through higher levels of self-blame. Deliberate rumination was positively associated with PTG, meaning that deliberate thinking about IPV experience led women to greater PTG. Time since the last violence incident was positively associated with PTG, and negatively with intrusive rumination, showing that the more time has passed from IPV experience, less intrusive rumination and more PTG women experience. The overall model explained almost 31% of PTG variance ($R^2 = .308$, SE = .062, $p < .001$).

TABLE 2 Correlations among study variables, and descriptive statistics.

	1	2	3	4	5
1. Posttraumatic growth	–				
2. Centrality of event	.44**	–			
3. Intrusive rumination	.09	.35**	–		
4. Deliberate rumination	.26**	.41**	.50**	–	
5. Self-blame	.09	.21**	.31**	.37**	–
M	2.88	3.22	1.24	1.19	1.91
SD	1.35	.85	.74	.74	.78

**$p < .01$.

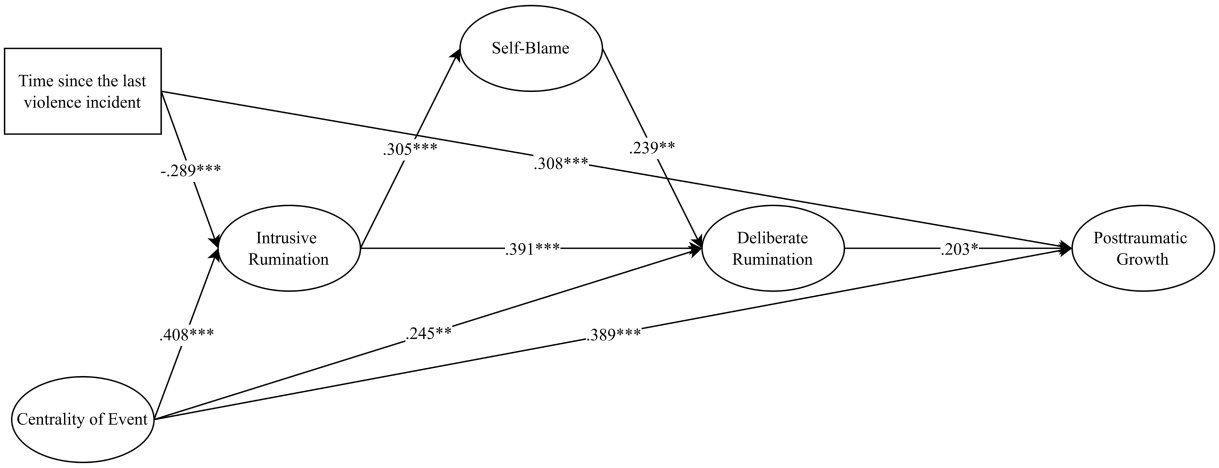

FIGURE 1
Structural equation model predicting post-traumatic growth. Only significant paths are indicated. Statistics are standardized regression coefficients. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Discussion

The current study aimed to test the theoretical pathway from the centrality of event to PTG including rumination (intrusive and deliberate) and self-blame in women victims and survivors of IPV. The overall results supported the main assumptions of the model of PTG (Tedeschi et al., 2018), indicating the path from centrality of event to PTG directly and indirectly through intrusive and deliberate rumination, and self-blame. However, found indirect effects raised some considerations, which are discussed in detail below.

In the current study, centrality of event was directly related to PTG, and this relation goes in line with studies not only with IPV (Bakaitytė et al., 2022) but also with other traumatic event survivors (Boals et al., 2010; Groleau et al., 2013; Lancaster et al., 2013). These results confirm one of the fundamental assumptions that "growth occurs when trauma assumes a central place in the life story" (Tedeschi and Calhoun, 1995, p. 85). As expected, centrality of event was also positively related to intrusive rumination, indicating that the more central the IPV experience becomes, the more women engaged in this type of rumination. This relation also supports theoretical assumptions indicating that traumatic experiences that are central to a person's identity can initiate cognitive processing of trauma which starts from intrusive rumination (Tedeschi et al., 2018). Interestingly, centrality of event was also directly associated with deliberate rumination. Brooks et al. (2017), although investigated different directions (intrusive to deliberate rumination through centrality of event), also found the same positive association. These results indicate that centrality of event is the crucial factor affecting not only the beginning of the process of PTG but all major factors in it.

The sequential indirect effect was small yet significant, indicating that intrusive and deliberate rumination also work as mediators in the relation between centrality of event and PTG. This shows that the more women perceived their IPV experience as central the more intrusive rumination they experienced. Consequently, higher intrusive rumination was associated with higher deliberate rumination leading to more PTG. Similar results were found by Kramer et al. (2020) who instead of intrusive rumination investigated PTSD. The indirect path from centrality of event to PTG gives support for assumptions that intrusive thinking about IPV experience, although not related to PTG directly, transitions to more deliberate rumination in this way leading to PTG, as described in the model of PTG. However, the small indirect effect indicates the possibility that other factors noted in the model of PTG are involved in these relations, such as social support, disclosure, self-analysis (Tedeschi et al., 2018).

We found that self-blame indirectly affects the relation between intrusive and deliberate rumination, indicating that the transition from intrusive to deliberate rumination partly goes through self-blame. Self-blame is common among IPV survivors (Karakurt et al., 2014; Pereira et al., 2020) and originates in society which attributes the blame to victims rather than perpetrators (Kennedy and Prock, 2018). Ulloa et al. (2016) argue that, in cases of interpersonal violence, self-blame also reflects some control attributed to oneself. In this sense, self-blame works as a coping mechanism letting women sustain beliefs that they have control over what happens to them, which is very important in the context of IPV. In a violent relationship, the perpetrator puts his efforts to control the victim through violent and controlling behaviors, making the victim feel powerless and helpless (Filson et al., 2010). Thus, regaining control is an important task for survivors. Considering this, it can be assumed that self-blame contributes to regaining control and fosters more deliberate rumination eventually leading to PTG. However, as we did not measure

actual perceived control, this assumption should be tested in future studies.

The positive effect of self-blame in the relation between intrusive and deliberate rumination could also indicate illusionary aspects of the PTG process. According to Zoellner and Maercker (2006), the link between PTG and coping efforts oriented toward avoidance rather than acceptance of reality represents an illusory side of PTG. The argument is that PTG has two sides - constructive, self-transcending, and self-deceptive, illusory (Maercker and Zoellner, 2004; Zoellner and Maercker, 2006). The PTG described by Tedeschi and Calhoun reflects the constructive side - struggle with traumatic experiences leads to personal transformation and positive changes. The illusory side reflects efforts to calm down by convincing oneself that something good came out of suffering. Authors emphasize that in the short run illusory efforts could indicate self-enhancing cognitions that help to reduce stress and if accompanied by deliberate thinking could eventually lead to actual growth (Maercker and Zoellner, 2004). However, the results of our study indicate the positive associations between self-blame and intrusive and deliberate rumination but not between self-blame and PTG which makes arguments about illusory PTG less plausible in the current context.

In this study, we asked participants to indicate what they have been doing to cope with the IPV experience, and we cannot distinguish if self-blame was a long-lasting, continuing coping strategy or a strategy that was used for some time and then changed to another. Considering this and the arguments of Zoellner and Mearcker, it is possible that women who blame themselves because of their IPV experience report PTG because they want to believe that, however horrible, this experience had some meaning and they gained something positive out of it, which is indicative of the illusory side of PTG. However, it is also possible that self-blame was part of the journey of coping with the IPV experience that involved many other factors which eventually helped them to achieve real positive changes. Based on the available data, it is not possible to indicate which explanation is true.

In conclusion, the current study confirmed some of the theoretical assumptions of the process of PTG and revealed problematic areas of its investigation. Results indicated that centrality of event is an important factor not only directly associated with PTG but also indirectly *via* intrusive and deliberate rumination. This indirect effect gave support to the argument that cognitive processing of IPV experience starting from intrusive rumination transitions to more deliberate rumination eventually leading to PTG. The investigation of this transition through the coping strategy of self-blame pointed out widely discussed debates about the real and illusory sides of PTG. However, this study shed some light on how coping should be investigated in the future to make more precise conclusions. Overall, the results of this study highlight the importance of a further and more in-depth examination of the process of PTG.

Limitations and future directions

This study has some strengths and limitations. First, this is a cross-sectional study, and no causal assumptions could be made. Also, although Lithuania is currently increasingly WEIRD (western, educated, industrialized, rich, and democratic), the results of this study to some extent might be specific to the Northern European context. Moreover, we did not asked participants about their ethnicity as 5/6 of Lithuania's population account for ethnic Lithuanians (Statistics Lithuania, 2020) and there is no accepted practice to ask participants about their ethnicity if research questions are not related to that. However, future studies should consider including an ethnic background as a possibly important factor associated with PTG in victims and survivors of IPV. Another limitation is that the current study asked participants to indicate what they have been doing to cope with IPV experience, and the responses do not represent their current coping strategies. It is possible that women blamed themselves to cope at first, but later they used different strategies, or some other factors influenced their self-blame, so results involving self-blame should be viewed with caution. Future studies investigating PTG of victims and survivors of IPV should include more IPV-related factors in the analysis. Such factors include current relationship status with the perpetrator, stalking, or continuing psychological abuse after leaving the abuser (especially when having children together) might be the factors that affect not only recovery processes but also the process of PTG. Moreover, the general practice in PTG research to use coping categories that include different strategies might not be as informative and even misleading (Bonanno and Burton, 2013), for this reason, the investigation of separate coping strategies in the process of PTG might be more useful. Considering the dynamic nature of coping strategies, it is important to investigate these strategies longitudinally to see how they change and how this affects PTG. This could give more answers about illusory and real positive changes. Also, studies have shown that other factors, such as personality traits (Shakespeare-Finch et al., 2005), emotion regulation skills (Larsen and Berenbaum, 2015), or perceived control (Frazier et al., 2004) are related to PTG experience and coping strategies, especially self-blame. Thus, inclusion of these factors in future studies may provide more insight into what interventions might be appropriate for different women who have experienced IPV. Finally, the assumptions about illusionary PTG indicate that cognitive processing in the PTG process is complex, involving many different environmental and intrapersonal factors that need further investigation including more in-depth qualitative and longitudinal studies.

The strengths of the current study involve a relatively big sample of victims and survivors of IPV that is difficult to recruit. Also, this is one of the few studies investigating the cognitive processing part of the model of PTG as a whole, and to our

knowledge, this is the first study investigating the path to PTG in IPV survivors. The results of this study highlight the importance to consider factors specific to the traumatic context while investigating PTG and draw attention to the complexity of the process of PTG that need further investigation.

Final remarks

The current study involves self-blame as a coping mechanism of women survivors of IPV and the results including this strategy can give the false impression that self-blame leading to positive changes after experiencing IPV is a positive thing. As indicated in the discussion, self-blame as a coping strategy in a way protects victims' belief system for a short time but in no way it is a positive or desirable path to PTG. The origins of self-blame lie in society's tendency to stigmatize and blame the victim rather than the abuser and current results represent this sad reality that IPV survivors not only have to undergo the consequences of IPV but also must endure feelings of self-blame which society is the culprit. Therefore, with the results of our study, we are in no way attributing self-blame as a positive factor. On the contrary, we are informing that it is there, affecting these women, and there are a lot of questions that need to be answered.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by the Committee of Psychological Research Ethics, Institute of Psychology, Mykolas Romeris University. The participants provided their written informed consent to participate in this study.

Author contributions

AB and RŽ prepared materials for data collection. AB conceptualized the study and wrote the first draft of the manuscript. AB and AP-M designed the study and conducted the statistical analysis. All authors reviewed the manuscript, made revisions, and approved the submitted version.

Funding

This work was supported by a grant from the Research Council of Lithuania, [P-MIP-17-132] and is part of the I+D+i project PID2020-116658GB-I00PSI, financed by MCIN/AEI/10.13039/501100011033/.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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frontiers | Frontiers in Psychology

TYPE Brief Research Report
PUBLISHED 02 November 2022
DOI 10.3389/fpsyg.2022.993609

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 13 July 2022
ACCEPTED 06 October 2022
PUBLISHED 02 November 2022

CITATION
Chen ZJ, Bechara AO, Cowden RG and Worthington EL Jr (2022) Perceived posttraumatic growth after interpersonal trauma and subsequent well-being among young Colombian adults: A longitudinal analysis. *Front. Psychol.* 13:993609. doi: 10.3389/fpsyg.2022.993609

Perceived posttraumatic growth after interpersonal trauma and subsequent well-being among young Colombian adults: A longitudinal analysis

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Research has shown that people sometimes report self-perceived growth as a result of dealing with a potentially traumatic event, but relatively few methodologically rigorous studies have examined whether perceived posttraumatic growth is associated with improved subsequent well-being across a wide range of outcomes. In this three-wave longitudinal study of Colombian emerging adults (n=636), we examined the associations of perceived posttraumatic growth with 17 well-being outcomes across domains of psychological well-being (i.e., self-rated mental health, meaning in life, sense of purpose, happiness, life satisfaction), psychological distress (i.e., anxiety symptoms, depression symptoms, subjective suffering), social well-being (i.e., content with relationships, satisfying relationships, loneliness), physical well-being (i.e., self-rated physical health, sleep quality), and character strengths (i.e., state hope, trait forgivingness, orientation to promote good, delayed gratification). Using an outcome-wide analytic design that adjusted for a range of covariates assessed in Wave 1, we found that overall perceived posttraumatic growth assessed in Wave 2 was robustly associated with improvements in one or more facet of each well-being domain (15/17 outcomes in total) assessed approximately six months later in Wave 3. Our findings suggest that perceived posttraumatic growth may contribute to individual well-being over the longer-term.

KEYWORDS

psychological trauma, posttraumatic growth, health, well-being, longitudinal studies, Colombia

Introduction

When people experience a potentially traumatic event, some develop trauma symptoms and others experience more short-term disruption in their lives but respond resiliently (Bonanno, 2005). Others experience posttraumatic growth (PTG; Tedeschi and Calhoun, 2004). PTG is positive change experienced as a result of the struggle with a major life crisis or traumatic event. PTG has been theorized to occur in five general areas (Tedeschi et al., 2017). First, some people who endure a life crisis feel that new opportunities have arisen from it. Second, relationships can be modified for the better and feelings of connection might be forged with others who have suffered similarly. Third, individuals can feel that their own strength has been proven or even increased. Fourth, some people come to believe that they can appreciate life more fully. Finally, some people feel a sense of deepening spirituality, even if their assumptive world might have been modified substantially.

Research has supported PTG in many areas, and that body of research has been summarized in numerous authored books (e.g., Calhoun and Tedeschi, 2013; Tedeschi et al., 2018) and edited volumes (e.g., Calhoun and Tedeschi, 2006). As research on PTG has gained worldwide visibility, it is possible that people experiencing traumas, or what Bonanno (2005) calls potentially traumatic events, might perceive that they have experienced PTG. Yet their perceptions might not be scientifically accurate, in that some people who make such attributions of PTG might not show *actual* positive changes in functioning (e.g., Frazier et al., 2009). For example, the attribution of having experienced PTG might reflect positive reinterpretation coping (or other types of secondary control) in response to experiencing a potentially traumatic event (e.g., benefit finding), even though actual post-event improvements in functioning have not transpired (Boals et al., 2022). These conceptual considerations highlight the importance of examining how perceived PTG relates to subsequent functioning.

Besides conceptual nuances, there are methodological challenges to establishing a clear understanding of the relationship between perceived PTG and actual functioning. As has been identified repeatedly in reviews and commentaries (e.g., Infurna and Jayawickreme, 2019; Jayawickreme et al., 2021), most of the existing research on perceived PTG is cross-sectional. Alongside other potential drawbacks to cross-sectional research on perceived PTG (e.g., self-reported change may not accurately reflect true change), with cross-sectional designs it is often impossible to rule out reverse causality. For example, in the case of a positive correlation between perceived PTG and satisfaction with life (e.g., Johnson and Boals, 2015), one is unable to determine whether perceived PTG leads people to experience greater life satisfaction or whether those who feel more satisfied with their lives tend to report greater perceived PTG.

Even when longitudinal studies have been conducted, perceived PTG is often examined in relation to a single or small set of outcomes, particularly psychological ones (Infurna and Jayawickreme, 2019). Assessing a broader range of outcomes could contribute to developing a more holistic and integrative understanding of how perceived PTG might be related to well-being. Moreover, much of the existing empirical literature on perceived PTG is from samples of people living in Western, Educated, Industrialized, Rich, and Democratic (WEIRD) societies, and concerns have been raised about the extent to which evidence from the current literature generalizes to people from other cultural contexts (Jayawickreme et al., 2021). Hence, further research is necessary to strengthen evidence about perceived PTG in cultures that are underrepresented in the psychological literature, particularly those in which historical climates of conflict could impact PTG processes and/or linkages between PTG and well-being (Bechara et al., 2021). Taken together, there is a need for additional longitudinal studies that establish a clear temporal order between perceived PTG and a wide range of well-being outcomes in less WEIRD contexts.

The current study

In light of the abovementioned gaps in the existing literature, the present study uses three waves of data to examine associations of perceived PTG with a range of subsequent well-being outcomes among a sample of Colombian emerging adults experiencing distress following an interpersonal transgression in which they were hurt by another person. Our primary analysis involved estimating potential causal effects of overall perceived PTG (using the multidimensional Posttraumatic Growth Inventory-Short Form [PTGI-SF]; Cann et al., 2010) assessed in Wave 2 on 17 indicators of well-being across five domains of functioning (i.e., psychological well-being, psychological distress, social well-being, physical well-being, character strengths) assessed in Wave 3, adjusting for various potential confounders assessed in Wave 1. We expected that perceived PTG would generally be related to improved well-being approximately six months later, with some variation in the magnitude of associations across the outcomes. In a secondary analysis, we explored potential variation in associations across dimensions of perceived PTG by repeating the primary analysis for each of the five dimensions of perceived PTG assessed via the PTGI-SF.

Materials and methods

Study sample

Data for this study were taken from a three-wave longitudinal research project on interpersonal forgiveness and well-being among students ($N = 2{,}878$) attending a university located at Monteria, Colombia. Ethical approval was granted by Universidad del Sinú in Colombia. The Wave 1 assessment was completed from August 23 to September 9, 2021, with follow-up assessments completed approximately two months (Wave 2: October 25 to

November 6, 2021) and six months later (Wave 3: February 7 to February 21, 2022). Except for sociodemographic and transgression-related characteristics that were only assessed in Wave 1, all variables were measured in each wave.

The analytic sample for this study comprised a subset of participants who met a multipronged set of criteria in Wave 1. We began by selecting participants for possible inclusion if they reported experiencing a potentially traumatic event in the form of an interpersonal transgression (Wade et al., 2014). Those who were transgressed against also had to meet cut-offs on two indices—self-rated transgression severity and subjective suffering—that we used to establish whether they were experiencing distress in the aftermath of the interpersonal transgression. Specifically, we included participants in the analytic sample who (1) reported that the transgression was at least slightly severe (a rating of ≥4/5 on a five-point response scale) and (2) endorsed at least a moderate degree of subjective suffering (a score of ≥4/10; Cowden et al., 2022b) on a six-item version of the Personal Suffering Assessment (VanderWeele, 2019). Together, these secondary criteria served as a proxy for experiencing interpersonal trauma. Of the $N = 2{,}878$ participants who completed the Wave 1 assessment, there were $n = 636$ participants who fulfilled all three criteria. These participants formed the analytic sample for this study.

The mean age of the analytic sample was 20.93 years ($SD = 3.81$), the majority of whom were female (72.80%), unmarried (82.39%), lived in a household in which at least one person earned a minimum wage (54.25%), and identified as religious (70.44%). Many types of interpersonal transgressions were reported (see Supplemental Table S1), the most common of which was verbal/emotional abuse (34.28%).

Measures

Exposure

The exposure variable, perceived PTG, was taken from Wave 2. Participants completed the 10-item PTGI-SF (Cann et al., 2010). The items are evenly distributed across five subscales, including 'relating to others,' 'new opportunities,' 'personal strength,' 'spiritual change,' and 'appreciation of life.' In this study, we averaged responses to all items for an overall perceived PTG score. To obtain a more nuanced understanding of how the different dimensions of perceived PTG related to outcomes of interest, we also used the five subscales individually. The PTGI-SF items, response options, and estimated internal consistency of scores for overall perceived PTG and each dimension of perceived PTG can be found in Supplemental Table S2.

Outcomes

All outcome variables were assessed in Wave 3. We examined 17 outcomes across different domains of well-being, including psychological well-being (i.e., self-rated mental health, meaning in life, sense of purpose, happiness, life satisfaction), psychological distress (i.e., anxiety symptoms, depression symptoms, subjective suffering), social well-being (i.e., content with relationships, satisfying relationships, loneliness), physical well-being (i.e., self-rated physical health, sleep quality), and character strengths (i.e., state hope, trait forgivingness, orientation to promote good, delayed gratification). Details about the measures that were used to assess the outcomes, including the specific items, response options, and estimated internal consistency of scores (for multi-item measures), can be found in Supplemental Table S2.

Covariates

We controlled for several covariates assessed in Wave 1, including sex (female vs. male), household income (less than minimum wage vs. minimum wage or higher), marital status (unmarried vs. married), religious status (not religious vs. religious), frequency of religious service attendance (continuous), war survivor status (not a war survivor vs. war survivor), and financial/material stability (continuous) assessed using an average of two items from the Secure Flourishing Index (VanderWeele, 2017).

Data analysis

All analyses were conducted using the *lavaan* package in R 4.1.3. A full-information maximum likelihood estimator was used to account for missing values. We followed the analytic template for outcome-wide longitudinal designs with observational data, which is a rigorous analytic approach for estimating potential causal effects of a single exposure on a wide range of subsequent outcomes (VanderWeele et al., 2020).

In our primary analysis, we performed a series of linear regressions in which continuous scores of each outcome assessed in Wave 3 were regressed on continuous scores of overall perceived PTG reported in Wave 2 (one outcome at a time). All models adjusted for each of the covariates, prior values of each outcome, and the prior value of overall perceived PTG assessed in Wave 1. By controlling for covariates assessed prior to the exposure variable, we avoid adjusting for covariates that may be on the pathway (i.e., mediators) from the exposure variable to one or more outcomes. Adjusting for prior values of the exposure and outcome variables can help to reduce concerns about reverse causation and further contribute to diminishing bias due to unmeasured confounding (VanderWeele et al., 2020). We standardized all outcomes (mean = 0, standard deviation = 1) to allow for effect sizes to be compared across the outcomes. As a secondary analysis, we repeated the primary analysis for each of the five dimensions of perceived PTG. Those models adjusted for the same set of covariates included in the primary analysis, prior values of all outcomes, and prior values of all five dimensions of perceived PTG assessed in Wave 1.

For both sets of analyses, we report the statistical significance ($p < 0.05$) of effect estimates both before and after applying Bonferroni corrections. Consistent with previous studies (e.g., Cowden et al., 2022a), we focus our interpretation on the unadjusted results because recommendations and practices of correcting for multiple testing vary and are constantly evolving. Based on the analytic approach used in the primary and secondary

analyses, the results can be interpreted as the estimated effect of change in perceived PTG from Wave 1 to Wave 2 (or *incident* perceived PTG) on the change in each outcome from Wave 1 to Wave 3.

Results

The results of the primary and secondary analyses are reported in Table 1. There was evidence of association between overall perceived PTG and almost all (15/17) of the outcomes. Robust associations were found with subsequent improvements in one or more outcomes on each of the well-being domains, including increases in the psychological well-being outcomes of self-rated mental health, meaning in life, sense of purpose, and life satisfaction ($\beta s = 0.17$ to 0.24, $ps \leq 0.001$), a decrease in the psychological distress outcome of subjective suffering ($\beta = -0.16$, $p = 0.002$), increases in the social well-being outcomes of content with relationships and satisfying relationships ($\beta s = 0.16$ to 0.23, $ps \leq 0.002$), and increases in all physical health outcomes ($\beta s = 0.19$ to 0.21, $ps \leq 0.001$) and all character strengths outcomes ($\beta s = 0.23$ to 0.25, $ps \leq 0.001$). Overall perceived PTG evidenced more modest associations with subsequent anxiety and depression symptoms ($\beta s = -0.13$ to -0.12, $ps \leq 0.022$). Associations with outcomes of happiness ($\beta = 0.09$, $p = 0.073$) and loneliness ($\beta = -0.08$, $p = 0.091$) were more negligible.

In the secondary analysis, the pattern of associations for the dimensions of PTG were largely consistent with those that emerged for overall perceived PTG. Specifically, 10/15 outcomes that were predicted by overall perceived PTG also showed evidence of association with all five dimensions of perceived PTG. However, there were some differences compared to the general trend that was found for the associations involving overall perceived PTG. For example, overall perceived PTG was robustly associated with life satisfaction, subjective suffering, and satisfying relationships, but one or more dimensions of perceived PTG (e.g., 'spiritual change') evidenced a more negligible association with each of these outcomes. In contrast, happiness and loneliness were modestly associated with at least one dimension of perceived PTG (e.g., 'relating to others'), even though overall perceived PTG evidenced a more negligible association with both of these outcomes. Only the 'relating to others' dimension was associated with all 17 outcomes, with slightly fewer associations found for 'personal strength' (16/17), 'new opportunities' (15/17), 'appreciation of life' (13/17), and 'spiritual change' (10/17).

Discussion

In this study of young college-attending adults in Colombia, we used three waves of longitudinal data to examine associations of perceived PTG with 17 well-being outcomes assessed approximately six months later. Two key findings emerged. First, overall perceived PTG was associated with improvements in most well-being outcomes that we examined. There was some variability in the magnitude of effect sizes across the outcomes, with consistently stronger associations found across outcomes on some domains (i.e., character strengths) compared to others (i.e., psychological distress). Second, all dimensions of perceived PTG were associated with improvements in multiple well-being outcomes, although some dimensions (e.g., 'relating to others') were more consistently associated with the outcomes than others (e.g., 'spiritual change'). Overall, our findings resonate with research that suggests positive changes in narrative identity (in this instance perceived PTG) have the potential to predict improvements in well-being (Adler et al., 2016).

Whereas much of the previous empirical literature on perceived PTG has focused on a single or narrow set of outcomes (Infurna and Jayawickreme, 2019), the current study provides insight into potential effects of perceived PTG on a wide range of outcomes across different domains of functioning. Although our findings suggest that perceived PTG is associated with improvements in many facets of well-being, effect sizes varied across the outcomes. For example, associations for overall perceived PTG ranged from very small (e.g., lower subsequent loneliness) to medium (e.g., higher subsequent state hope) in effect size (Funder and Ozer, 2019). Hence, perceived PTG may not have uniform implications for different facets of well-being, highlighting the importance of applying a more integrative and multidimensional approach to examining well-being in studies of perceived PTG.

Our secondary analysis indicated that the dimensions of perceived PTG varied in their associations with the well-being outcomes. For example, the dimension of 'relating to others' was associated with improvements in all subsequent outcomes. In contrast, 'spiritual change' showed little evidence of association with nearly half of the outcomes. Such findings align with previous research that has reported distinct impacts of different dimensions of perceived PTG (e.g., Frazier et al., 2009), indicating that some dimensions of perceived PTG may have more widespread implications for well-being than others. We also found that some outcomes were predicted by all five dimensions of perceived PTG (e.g., mental health, content with relationships, state hope), whereas others (including a number of outcomes for which overall perceived PTG showed evidence of association) were predicted by some dimensions of perceived PTG but not others (e.g., happiness, anxiety symptoms, loneliness). This pattern of findings suggests that some facets of well-being might be more ubiquitously impacted by multiple dimensions of perceived PTG compared to others. Potential variability in associations between different dimensions of perceived PTG and facets of well-being could be important for mental health professionals to consider as they provide support to clients they work with.

There are methodological limitations of this study. First, this study's findings are based on university students in Colombia. Both limitations—students and Colombians—inhibit larger generalization. Second, the analytic sample included participants who reported being transgressed against by another person.

TABLE 1 Associations of perceived posttraumatic growth (Wave 2) with subsequent outcome variables (Wave 3).

Outcomes	Overall perceived posttraumatic growth β [95% CI]	Perceived posttraumatic growth dimensions				
		Relating to others β [95% CI]	New opportunities β [95% CI]	Personal strength β [95% CI]	Spiritual change β [95% CI]	Appreciation of life β [95% CI]
Psychological well-being						
Mental health	0.19** [0.10, 0.29]	0.16** [0.07, 0.25]	0.16** [0.07, 0.26]	0.19** [0.10, 0.29]	0.16** [0.06, 0.26]	0.11* [0.02, 0.20]
Meaning in life	0.24** [0.15, 0.34]	0.19** [0.10, 0.28]	0.22** [0.13, 0.31]	0.25** [0.16, 0.34]	0.18** [0.08, 0.28]	0.16** [0.07, 0.25]
Sense of purpose	0.23** [0.13, 0.32]	0.18** [0.09, 0.27]	0.21** [0.12, 0.30]	0.21** [0.12, 0.30]	0.13* [0.03, 0.23]	0.14** [0.05, 0.23]
Happiness	0.09 [−0.01, 0.19]	0.11* [0.01, 0.20]	0.07 [−0.03, 0.17]	0.09 [−0.01, 0.19]	0.02 [−0.09, 0.12]	0.09 [−0.01, 0.18]
Life satisfaction	0.17** [0.07, 0.27]	0.14** [0.05, 0.24]	0.16** [0.06, 0.26]	0.18** [0.08, 0.27]	0.09 [−0.02, 0.19]	0.13* [0.04, 0.22]
Psychological distress						
Anxiety symptoms	−0.12* [−0.22, −0.02]	−0.11* [−0.20, −0.02]	−0.12* [−0.22, −0.03]	−0.16** [−0.25, −0.06]	−0.01 [−0.11, 0.09]	−0.11* [−0.20, −0.02]
Depression symptoms	−0.13* [−0.23, −0.03]	−0.12* [−0.21, −0.02]	−0.15** [−0.25, −0.05]	−0.16** [−0.25, −0.06]	−0.03 [−0.13, 0.07]	−0.11* [−0.20, −0.02]
Subjective suffering	−0.16** [−0.26, −0.06]	−0.14* [−0.23, −0.04]	−0.16** [−0.26, −0.06]	−0.21** [−0.30, −0.11]	−0.08 [−0.19, 0.02]	−0.08 [−0.18, 0.02]
Social well-being						
Content with relationships	0.23** [0.13, 0.32]	0.18** [0.09, 0.28]	0.22** [0.13, 0.32]	0.28** [0.19, 0.37]	0.11* [0.01, 0.22]	0.13* [0.03, 0.22]
Satisfying relationships	0.16** [0.06, 0.25]	0.15** [0.06, 0.25]	0.14* [0.04, 0.24]	0.20** [0.10, 0.29]	0.03 [−0.07, 0.14]	0.08 [−0.01, 0.18]
Loneliness	−0.08 [−0.18, 0.01]	−0.12* [−0.22, −0.03]	−0.09 [−0.18, 0.01]	−0.12* [−0.21, −0.02]	−0.05 [−0.15, 0.05]	−0.01 [−0.11, 0.08]
Physical well-being						
Physical health	0.21** [0.12, 0.31]	0.18** [0.09, 0.27]	0.17** [0.07, 0.26]	0.22** [0.13, 0.32]	0.20** [0.10, 0.30]	0.11* [0.02, 0.20]
Sleep quality	0.19** [0.09, 0.29]	0.23** [0.14, 0.32]	0.19** [0.10, 0.29]	0.20** [0.10, 0.30]	0.13* [0.02, 0.23]	0.12* [0.02, 0.21]
Character strengths						
State hope	0.25** [0.15, 0.35]	0.19** [0.10, 0.28]	0.21** [0.12, 0.31]	0.26** [0.17, 0.36]	0.13* [0.03, 0.24]	0.16** [0.07, 0.26]
Trait forgivingness	0.23** [0.13, 0.32]	0.20** [0.11, 0.29]	0.22** [0.12, 0.31]	0.24** [0.15, 0.33]	0.14* [0.04, 0.24]	0.13* [0.04, 0.22]
Orientation to promote good	0.23** [0.14, 0.32]	0.19** [0.10, 0.28]	0.23** [0.14, 0.33]	0.23** [0.14, 0.32]	0.12* [0.02, 0.23]	0.15** [0.05, 0.24]
Delayed gratification	0.24** [0.14, 0.33]	0.21** [0.12, 0.30]	0.22** [0.12, 0.31]	0.26** [0.16, 0.35]	0.12* [0.01, 0.22]	0.15** [0.05, 0.24]

Note: β, standardized estimate; CI, confidence interval. $n = 636$ for all analyses. In separate models, ordinary least squares regressions were used to regress each outcome assessed in Wave 3 on overall perceived posttraumatic growth (and each dimension of perceived posttraumatic growth) assessed in Wave 2. All models adjusted for sex, age, household income, marital status, religious status, frequency of religious service attendance, war survivor status, financial/material stability, and prior values of all outcomes assessed in Wave 1. Models with overall perceived posttraumatic growth as the exposure also adjusted for the prior value of overall perceived posttraumatic growth assessed in Wave 1. Models with one of the five perceived posttraumatic growth dimensions as the exposure also adjusted for prior values of all five dimensions of perceived posttraumatic growth assessed in Wave 1. *$p < 0.05$, **$p < 0.003$ (the p-value cut-off for Bonferroni correction of multiple tests for each outcome: $0.05/17 = 0.003$).

10.3389/fpsyg.2022.993609

Further study is needed to determine whether our findings replicate in Colombians (and other samples from less WEIRD societies) who have experienced other forms of potentially traumatic events (e.g., natural disasters, serious illness). Third, we relied exclusively on self-report measures, which may be subject to measurement error. Fourth, we applied a rigorous analytic approach that attempted to address concerns about confounding and reverse causation, but with observational data there is always a possibility that some combination of unmeasured confounding and statistical uncertainty might explain away the associations that were observed.

Conclusion

In this relatively brief longitudinal study with Colombian emerging adults, we documented evidence indicating that perceived PTG is related to improvements in multiple facets of well-being. These findings provide some encouragement that perceived PTG could have longer-term benefits for individual well-being, and suggest that mental health professionals involved in treating clients who report a positive change in functioning in the aftermath of being transgressed against might be able to rely (to an extent) on their self-assessments during treatment. Although our findings extend the existing body of evidence on perceived PTG to a less WEIRD context that has experienced a long history of civil conflict, more research is needed to address the ongoing debate about the implications of perceived vs. actual PTG for individual well-being.

Data availability statement

The data presented in this article will be made available after the embargo period. Requests to access the data should be directed to job.chen@uncc.edu.

Ethics statement

Institutional approval to conduct this study was provided by the ethical review board at Universidad del Sinú in Colombia. The participants provided their written informed consent to participate in this study.

Author contributions

ZC contributed to conceptualization, data analysis, and writing. AB contributed to conceptualization, data collection, and writing. RC contributed to conceptualization and writing. EW contributed to conceptualization and writing.

Funding

This study was made possible through the support of a grant from Templeton World Charity Foundation, Inc. (grant number TWCF0390) and funding provided by Universidad del Sinú. The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of Templeton World Charity Foundation, Inc.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.993609/full#supplementary-material

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 07 December 2022
DOI 10.3389/fpsyg.2022.996041

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 16 July 2022
ACCEPTED 06 October 2022
PUBLISHED 07 December 2022

CITATION
Moore M, Palmer JK, Cerel J and Ruocco K (2022) Growth and Hope after loss: How TAPS facilitates posttraumatic growth in those grieving military deaths. *Front. Psychol.* 13:996041. doi: 10.3389/fpsyg.2022.996041

Growth and Hope after loss: How TAPS facilitates posttraumatic growth in those grieving military deaths

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We examined posttraumatic growth for 691 participants of the Tragedy Assistance Program for Survivors (TAPS). Peer mentors of bereaved individuals experienced greater posttraumatic growth (PTG) and reported higher psychological health than those who were non-peer mentors. Active involvement in TAPS and resilience consistently and positively predicted all types of PTG. These prediction models were far stronger (R^2, AIC) for the suicide-bereaved sample than those bereaved by other causes, and *post-hoc* analyses suggest suicide-bereaved benefitted more than those bereaved by other causes from active participation in TAPS.

KEYWORDS

suicide, suicide bereavement, military, military families, peer support, peer mentor

Introduction

Even in times of peace, premature death among active-duty service members remains a constant threat. Each of these deaths is a devastating event for the individuals left behind and may signal increased mental health conditions, such as depression or posttraumatic stress disorder, and place them at risk for complex bereavement disorder (Cozza et al., 2016, 2020). In the broader field of trauma psychology, posttraumatic growth (PTG) or positive changes experienced by survivors of these traumatic events has received recent attention (Tedeschi and Calhoun, 2004), especially among those who are bereaved from military deaths (Moore et al., 2015).

Since 2006, 16,652 active-duty military service members have died while serving in the US armed forces, including 3,863 deaths by suicide. The remaining were combat, accident, illness, and injury-related deaths (Congressional Research Service, 2018). These deaths result in thousands of bereaved. Most military service personnel who die have families. In the Army, Navy, and Air Force, the greatest number of Active-Duty members are married, whereas in the Marine Corps, the greatest number of members have never been married. The Air Force has the highest percentage of married members (54.6%). About two-thirds of Department of Defense (DoD) force dependents are children (62.8%) and about

one-third of military dependents are spouses (36.8%; Department of Defense, 2019). Although the study of bereavement in the civilian population is robust, there is little empirical research on the impact of the death of a service member on military families.

Death by suicide remains problematic for all who experience it (Cerel et al., 2014). More than 45,000 Americans die by suicide in the United States every year (Drapeau and McIntosh, 2021) and speculation remains that rates will increase in the aftermath of the COVID-19 global pandemic (Reger et al., 2020). Suicide rates in the US military continue to be the highest since the Defense Department began collecting data in 2001 (Department of Defense, 2019). For every death by suicide, there are 135 people exposed to the death and about 48 individuals who are impacted by that death (Cerel et al., 2017; Cerel et al., 2018). Impact is predicted by perception of closeness to the decedent, not blood kin or first-degree family relationship. Those who perceive themselves as being "close" to the individual who has died by suicide are at higher risk for depression, anxiety, suicidal ideation, and suicide attempt (Cerel et al., 2016; Pitman et al., 2016; Cerel et al., 2018; Maple et al., 2018). Given this new conceptualization of exposure and impact, military "battle buddies" may be significantly impacted by the death of another military member based on their feelings of closeness to the individual who died. Regardless of the cause of death and the potential relationships impacted, the wake of grief left behind in any of these military deaths is significant.

Calhoun and Tedeschi (2006) pioneered the concept of posttraumatic growth (PTG), a construct of positive psychological change that occurs as the result of one's struggle with a traumatic event. What increases the likelihood of PTG is one's cognitive engagement with the traumatic event in its aftermath or one's ability to reflectively engage or "ruminate" over elements of the event in order to repair and restructure one's understanding of the world. This approach distinguishes between an earlier, involuntary style of rumination, brooding, and a later, voluntary deliberate rumination, reflection. While the first kind of rumination may be associated with early sense-making of an untoward event, the second kind of rumination may be conceptualized as a form of cognitive processing in the aftermath of a crisis that leads to recognition that changes experienced are deeply profound and building of a kind of wisdom. This can manifest itself in several ways. PTG is conceptualized as having five domains or factors within the overall construct, including Relating to Others, New Possibilities, Personal Strength, Spiritual Change, and a deeper Appreciation of Life (Tedeschi and Calhoun, 2004).

Posttraumatic growth (PTG) has been demonstrated to occur for a variety of populations exposed to many different kinds of traumatic events (Nelson, 2011). Military service provides ample opportunity for exposure to traumatic events and, as a result, the occasion to investigate growth within the context of those events (Tedeschi and McNally, 2011). In a study of Vietnam POWs, PTG domains of appreciation of life and personal strength were strongly related to the POWs' duration of captivity and their own personal characteristic of optimism (Feder et al., 2008). A longitudinal study of a nationally representative sample of military veterans found that 59.4% reported "moderate" PTG in relation to their worst traumatic event. The maintenance or increase of PTG in these veterans relied upon their active engagement in life and development of meaning and purpose, as well as altruism, and gratitude (Tsai et al., 2015).

Peer support models provide an outlet for the development of these constructs of meaning and purpose. They have long been cornerstones of recovery programs for mental illness and addiction, demonstrating significant benefits to those with serious mental health issues over and beyond the benefits of traditional care (Chinman et al., 2014). There is evidence that peer support aids in grief recovery among a broad range of individuals who have experienced sudden and traumatic deaths. To date, there are 32 studies that have investigated the benefits of peer support for bereaved survivors (Bartone et al., 2019), although little is known about why or how successful peer support works. In an examination of best practices of bereavement peer support, several key elements emerged as ingredients of a successful program with particular emphasis on the close matching of peer supporter and the person seeking support in their shared experience of loss (Bartone et al., 2019). Davidson et al. (2012) also found that other benefits of peer support were related to the hope generated through positive self-disclosure and role-modeling, as well as the trust, understanding, and empathy between the peer supporter and the recipient. The term "peer mentor" is also used and tends to describe programs of a longer-term nature, but where there is also a reciprocal effect of the "giving and receiving help founded on key principles of respect, shared responsibility, and mutual agreement of what is helpful" (Mead et al., 2001, p. 135), given the shared "lived experience" of the well-matched peer supporter or peer mentor and recipient.

The elements of what makes for successful peer support or peer mentoring echo some of the basic principles of the facilitation of PTG with an "expert companion" (Tedeschi and Calhoun, 2004). This includes the recognition of the trauma response as a precursor to growth, modeling emotion regulation, constructive self-disclosure, and creation of a coherent trauma narrative with domains of posttraumatic growth (Calhoun and Tedeschi, 2013). If done well, the peer supporter-recipient relationship is one of shared "shattering" of the assumptive worldview and an "existential reevaluation" producing wisdom, life satisfaction, and purpose in life (Calhoun et al., 2010). This matching appears to be critical to the success of a peer support or peer mentor program.

Peer support and peer mentoring programs have been demonstrated to be particularly valuable among suicide-bereaved individuals (Barlow et al., 2010; Bartone et al., 2019). Given the stigma of suicide, suicide peer support may have a counterbalancing effect on the damaging experience of social avoidance or inappropriate comments by those who are confused by the rules for social interaction with the bereaved (Jordan, 2011, p. 287). The grief process of suicide-bereaved has been proposed to be different than that of those bereaved by other types of death (Jordan, 2011). Suicide-bereaved individuals have demonstrated

serious health consequences as a result of their exposure to suicide and impact of such a death, as previously articulated. They are likely to feel isolated and stigmatized (Mitchell et al., 2003). They may experience an intense "shattering" of their assumptive worldview (Janoff-Bulman, 2006), an opportunity for reconstruction of their life narrative (Neimeyer, 2006), and greater struggle cognitively with the death and rumination on the "meaningfulness" of the traumatic event (Calhoun and Tedeschi, 2006). However, one longitudinal study of suicide-bereaved individuals (Levi-Belz, 2019) found that self-disclosure and social support play important roles in facilitating PTG among these unique trauma survivors. While the experiences of suicide-bereaved are traumatizing and distressing, peer support or mentoring among suicide-bereaved may provide ample opportunity to produce PTG.

Few studies have examined PTG among bereaved military families or explored the impact of peer support or peer mentoring on the suicide-bereaved and the reciprocal effect on the peer supporter or mentor The question is not does growth exist, but how do we facilitate it among trauma survivors? The present study proposes to examine one model program's ability to facilitate PTG among its recipients and to also examine the effects of their peer mentor program on both the peer mentor and the participant of the program.

The Tragedy Assistance Program for Survivors (TAPS) is a national nonprofit 501c3 organization that was formed in 1994 to provide ongoing emotional help to all who are grieving the death of a loved one from all causes of death in military service. Over 90,000 bereaved adults and children have been helped by TAPS since its inception. This includes 12,000 suicide-bereaved military family members. The rest of those served included bereaved from other sudden and traumatic causes (SAT) causes of death, including combat and training accidents.

Every year, 10,000 adults and 3,640 children participate in programs, retreats, and regional seminars geared toward individuals who have lost a military loved one. TAPS conducts twice-monthly regional events, as well as retreats tailored to grieving parents, children, and spouses of these fallen war heroes. TAPS Regional Seminars feature activities, workshops, small group discussions, memorial celebrations, and special events. The signature National Military Survivor Seminar and Good Grief Camp held over Memorial Day Weekend has been conducted for 26 years to provide a weekend of understanding, hope, and courage within the context of the nation's Capital and the beautiful monuments that highlight their loved one's service. Since 2009, as suicide rates in the US Armed Forces dramatically increased (Reimann and Mazuchowski, 2018), TAPS has created specific programming for those grieving the suicide loss of a military member. Suicide-bereaved individuals represent a significant portion of those who are served with about 1,000 suicide-bereaved individuals attending the suicide-specific event annually and represent about 30% of all TAPS programs. The National Military Suicide Survivor Seminar and Good Grief Camp for Young Survivors were specifically designed to meet the unique needs of the suicide-bereaved. The TAPS Suicide Postvention Model (Ruocco et al., 2021) was articulated and described in October 2019 at the National Military Suicide Survivor Seminar. The TAPS Suicide Postvention Model follows the TAPS' peer-based model of care, integrating suicide-specific programing around emotional distress, as well as best practices in grief and trauma. By connecting programming, peers, services, and resources that specifically addressed their needs in an organized way, suicide-bereaved are able to appreciate the changes in them that can be identified as posttraumatic growth.

The TAPS Suicide Postvention Model dovetails with the PTG Facilitation Program proposed by Tedeschi and McNally (2011). The PTG Facilitation Program includes five distinct phases: psychoeducation, management of distress, constructive self-disclosure, coherent life narrative development, and articulation of revised or new principles by which to live their life, buffer against future events, and provide meaning and purpose (Tedeschi and McNally, 2011, p. 147–148). TAPS provides "expert companionship" throughout their programming, which is a hallmark of a successful PTG Facilitation Program (Tedeschi and McNally, 2011, p. 149). Expert companions, in the form of peer mentors, are critical to this process and may provide the suicide-bereaved and those bereaved by other causes with the ability to translate these new principles into their everyday lives, helping them to take an active role in this process, integrate them into their new identity, including new possibilities and pathways, providing meaning and purpose, for their life.

The heart of TAPS' service is the peer mentor network. TAPS provides long-term, peer-based emotional support, crisis response and intervention, casualty casework assistance, and grief and trauma resources and information. There are over 30 individual contacts made with bereaved participants by peer mentor specialists each year, including but not limited to telephone conversations, remembering birthdays with cards, and providing information and magazines. Every day, there are 17 new bereaved participants who join TAPS and then rolled into the support of the network of peer mentor specialists. These peer mentor specialists were once TAPS participants but have at least 2 years from their bereavement experience and have received specialized training.

Our hypotheses were:

1. Peer mentors will report higher posttraumatic growth.
2. Peer mentors will report better psychological health.
3. A meaningful life positively predicts posttraumatic growth. We operationalized a meaningful life as actively participating in an organization (TAPS) designed to help other-bereaved persons and specifically hypothesize that active involvement in TAPS predicts posttraumatic growth.
4. This active involvement in TAPS will also predict better psychological health.
5. Suicide-bereaved respondents will experience greater posttraumatic growth.
6. Consistent with much prior research, resilience will positively predict posttraumatic growth.

Materials and methods

Participants

From March 2017 to August 2017, recipients of TAPS services received an invitation through email to participate in the research and to complete the survey questions online *via* Survey Monkey. This included both suicide-bereaved and non-suicide-bereaved participants in TAPS. Other participants were contacted directly at TAPS' National Military Survivor Seminar and Good Grief Camp for Young Survivors during Memorial Day Weekend 2017.

Participants could either reply to survey questions *via* a link in the email or *via* computers set up at booths during the 2017 Memorial Day conference. The survey included questions measuring posttraumatic growth, resilience, and several measures of psychological well-being, such as posttraumatic stress disorder, depression, and anxiety.

Six hundred ninety-one participated. The average age of the survey respondent was 52 years 9 months (SD = 11.8, range 20 to 86). Four hundred eighty-one (85%) were female, 83 (15%) were male, one was non-binary, and 126 did not answer this question. Four hundred sixty-seven (66.1%) identified as Caucasian/white. Thirty-six (5.2%) identified as African American, 29 (4.2%) as Hispanic, 15 (2.2%) as Native American, five as Asian, and four as multi-race.

Peer mentors

Ninety-five (21%) identified as peer mentors and 365 (79%) indicated they were not. Most peer mentors had served as a peer mentor for about three years, with the average being 3.4 years and the range being from brand new to 20 years. About one-fourth of these reported not having mentored anyone, though these were mostly newly trained peer mentors. Of those who had mentored, most (87%) had mentored between one and seven. One respondent reported having mentored "about 70" over two decades and another reported having mentored "about 25."

Recipient of peer mentor services

Two hundred forty-two (43%) indicated they had received peer mentor services, while 315 (57%) indicated they had not. One hundred sixty-one (39%) indicated they had received help from "unofficial mentors" while 256 (61%) said they had not.

Years since loved one's death

On average, 7 years had transpired since the death of the respondent's loved one. The range was from 49 years to less than 1 year, although 95% of the deaths had occurred within the previous 15 years.

Closeness to the decedent

Eighty-seven percent indicated they were "very close" to the decedent and 94% indicated they were either "close" or "very close" to the decedent.

Effect of the death

Eighty-one percent indicated that the death "had a significant or devastating effect on me that I still feel." A further 15.6% indicated that the death "disrupted my life in a significant or devastating way, but I no longer feel that way."

Cause of the death

One hundred eighty-two (41%) indicated that the loved one died by suicide, 94 (21%) in combat, 81 (18%) of "other" causes, 66 (15%) in an accident, and 17 (4%) of natural causes.

Active in TAPS

Two hundred fifty-four (46.2%) indicated they were minimally involved in TAPS, 138 (25.1%) were moderately involved. One hundred and twenty-eight (23.3%) were "not at all" involved, and 30 (4.3%) were highly involved. Related to this, 389 of 431 (90%) said they did not provide "other services" to TAPS.

Closeness of TAPS relationships

One question asked respondents "How many TAPS individuals, including peer mentors, mentees, etc., have you become close to?" The question was open-ended, making estimation of an exact average difficult, but based on the pattern of responses it appears the average number is about five.

Satisfaction with TAPS services

Seventy percent (380 of 544) of respondents indicated they were "highly satisfied" with TAPS services, 18 percent (99) indicated they were "satisfied," 8 % (43) were "somewhat satisfied," and 4 % (22) were not satisfied.

Related to this, 64 percent (335 of 521) answered that there were things they could do now that they were not able to do before becoming involved with TAPS. Another question related to this was "Is there anything you were not able to receive help with?" Sixty-seven percent (273 of 408) said "no" and the "yes" answers varied considerably, including things not under TAPS control. These answers are presented later in this document. Forty percent (158 of 392 responding) found TAPS Magazine "extremely

helpful," 32.7% found the magazine very helpful, 22% found it somewhat helpful; 5% did not find it helpful.

Measures

Posttraumatic Growth was measured using the Posttraumatic Growth Inventory (PTGI; Tedeschi and Calhoun, 1996), a 21-item instrument for assessing positive outcomes in people who have experienced traumatic events. There is an overall PTG score and five domain scores culled from five subscales: personal strength, relating to others, new possibilities, appreciation for life, and spiritual growth. The items of the scale are a series of positively worded statements and participants are asked to use the statements to indicate the degree to which change occurred in their life as a result of their crisis. Participants respond to each of the 21 items on a six-point Likert-type scale, ranging from 0 (*I did not experience this change as a result of my experience*) to 5 (*I experienced this change to a very great degree*). Posttraumatic Depreciation was assessed *via* the 21-item measure (PTD-21) developed by Baker et al., 2008. This measure consists of negatively worded items otherwise identical to those of the PTG-21, and assesses of the opposite of growth, depreciation. The five factors of the PTD-21 are likewise identical to those of the PTG-21.

The Resilience Scale (RS-14; Wagnild, 2009) is a shortened, authorized version of the 25-item Resilience Scale (Wagnild and Young, 1993) that assesses adults' trait of resilience on a 7-point Likert-type scale. The internal consistency of the RS-14 has been found to range from 0.76 to 0.91. Test–retest reliability has been reported range between 0.67 and 0.84.

Participation in TAPS was measured by one four-point item, "How active are you in TAPS?" Endpoints ranged from zero (*Not at all*) to four (*Highly active*).

Posttraumatic Stress Disorder Checklist. The Posttraumatic Stress Disorder Checklist (PCL; Weathers et al., 1993) is a 17-item measure designed to assess the symptoms of PTSD as described in the Diagnostic and Statistical Manual of Mental Disorders (4th ed. [DSM–IV]; American Psychiatric Association, 2000). The PCL uses a 5-point Likert-type response format with options ranging from 1 (*not at all*) to 5 (*extremely*) and scores on the PCL range from 17 to 85, with higher scores indicating more endorsed symptoms of PTSD symptomology.

The exposure and impact of suicide were measured by the Suicide Exposure Experience Screener (SEES; Maple et al., 2022) is a brief screener assessing experience of exposure to suicide with psychological distress. The screener has two items: one item to assess participants' reported closeness to the person who died by suicide and the second item to assess participants' reported impact of this death on them. Closeness is assessed on a 5-point Likert scale ranging from 1 (*Not close*) to 5 (*Very close*) in response to the question: "How close would you describe your relationship with the person who died?" Impact is assessed on a 5-point Likert scale ranging from 1 (*Had little effect on my life*) to 5 (*Had significant/devastating effect on me that I still feel*) in response to the question: "What effect did this death have on your life?" It has been demonstrated to have high reliability (r_{sp} =0.72 to.83) and concurrent validity.

Suicidality was measured using the Suicide Behaviors Questionnaire Revised (SBQ-R; Osman et al., 2001), a 4-item self-report instrument that taps four dimensions of suicidality (coefficient alphas 0.76–0.88).

Depression was measured by the Patient Health Questionnaire (PHQ-9), a multipurpose instrument for "screening, diagnosing, monitoring, and measuring the severity of depression" (Kroenke et al., 2001). The diagnostic validity of the 9-item PHQ-9 was established in studies involving 8 primary care and 7 obstetrical clinics. PHQ-9 scores >10 had a sensitivity of 88% and a specificity of 88% for Major Depressive Disorder. Reliability and validity of the tool have indicated it has sound psychometric properties. Internal consistency of the PHQ-9 has been shown to be high. A study involving two different patient populations produced Cronbach alphas of 0.86 and 0.89 (Kroenke et al., 2001).

Anxiety was measured using the Spitzer et al. (2006) measure of Generalized Anxiety Disorder (GAD-7). The GAD-7 represents an anxiety measure based on seven items which are scored from zero to three. The whole scale score can range from 0 to 21 and cutoff scores for mild, moderate, and severe anxiety symptoms are 5, 10, and 15, respectively. At the cutoff score of 10 both sensitivity as well as specificity exceed 0.8, so that the operating characteristic of the scale, based on using a structured psychiatric interview as the criterion, is satisfactory. Internal consistency of the GAD-7 was estimated at 0.92 and convergent validity was established by means of correlations with two other anxiety measures. I.

Results

Reliabilities for the PTG dependent variables ranged from 0.71 (appreciation for life) to 0.93 (overall PTG) and ranged from 0.93 (resilience) to 0.96 (PTSD) for the predictors (See Table 1). Descriptive statistics and intercorrelations are presented in Table 1.

Effects of peer mentorship on growth and health

We used MANOVA to test the effects of peer mentorship on PTG (Hypothesis one). The multivariate test for the five PTG subscales was significant for both peer mentorship (Wilks $\Lambda = 0.930$, $p < 0.001$) and cause of death (Wilks $\Lambda = 0.941$, $p < 0.001$). Follow-up univariate ANOVAs for each of the PTG dimensions produced significant main effects of peer mentorship and new possibilities [$F(1,378) = 14.4$, $p < 0.001$, d = 0.50], peer mentorship and personal strength [$F(1,378) = 15.1$, $p < 0.01$, d = 0.34], and cause of death and spiritual [$F(1,378) = 4.05$, $p < 0.05$, d = 0.21]. For these, being a peer mentor resulted in higher growth

10.3389/fpsyg.2022.996041

TABLE 1 Descriptive statistics and correlations.

	1	2	3	4	5	6	7	8	9	10	11	12	Mean	SD
1. PTG	0.93												2.57	1.13
2. PTG-R	0.87*	0.86											2.37	1.27
3. PTG-N	0.85***	0.62***	0.81										2.40	1.33
4. PTG-P	0.84***	0.60***	0.70***	0.81									2.69	1.40
5. PTG-A	0.82***	0.61***	0.66***	0.71*	0.71								3.13	1.35
6. PTG-S	0.63***	0.48***	0.42***	0.44***	0.43	0.79							2.53	1.87
7. Res	0.36***	0.27***	0.35***	0.37***	0.29***	0.13**	0.93						5.36	1.10
8. Active	0.29***	0.25***	0.33***	0.25***	0.20***	0.08	0.18***	–					1.15	0.83
9. Years	0.09*	0.01	0.13**	0.14**	0.07	0.05	0.10*	0.02	–				6.70	5.28
10. PTSD	−0.18***	−0.20***	−0.17***	−0.17***	−0.13*	−0.02	−0.65***	−0.13**	0.11*	0.96	–		2.17	1.01
11. Age	−0.02	0.00	−0.05	−0.09	0.05	0.12*	0.06	−0.10*	0.09	0.20***			53.67	11.59
12. Close	0.03	0.05	0.00	0.09	−0.11*	0.01	−0.02	−0.03	0.04	0.07	0.03	–	4.80	0.63

Coefficient Alpha in main diagonal; PTG-R, Relating to Others; PTG-N, New Possibilities; PTG-P, Personal Strength; PTG-A, Appreciate Life; PTG-S, Spiritual; Res, Resilience; Active, Active in TAPS; Years, Years since the death; PTSD, Posttraumatic Stress; Close, Closeness to Decedent.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

and those whose loved ones died by suicide grew more spiritually. No interactions were significant.

For hypothesis two, we computed separate 2 × 2 ANOVAs on PTSD, PHQ, GAD, and SBQ by peer mentorship and cause of death. Peer mentorship was significant for PTSD [$F(1, 330) = 9.5$, $p < 0.01$, d = 0.48], PHQ [$F(1, 333) = 4.26$, $p < 0.05$, d = 0.34], GAD [$F(1, 338) = 5.74$, $p < 0.01$, d = 0.40], and for SBQ [$F(1, 325) = 4.46$, $p < 0.05$, d = 0.33]. For these, peer mentorship resulted in better health outcomes (e.g., less suicidal, less anxious). The cause of death was not significant, and no interactions were significant.

Predicting growth

To test hypotheses three, four, and six, we regressed overall PTG and each of the PTG domains onto resilience and participation in TAPS. Also included as variables of interest were PTSD, years since the death, respondent age, and level of closeness with the decedent. These regression results were done separately for suicide-bereaved and other-bereaved and are presented in Table 2.

Suicide-bereaved

Resilience positively and significantly predicted PTG overall and for all PTG domains. In fact, the beta weights for resilience were consistently stronger than those of any other. Being active in TAPS significantly predicted growth for overall PTG and for four of five domains, though not for spiritual growth. Posttraumatic stress symptoms also significantly predicted growth for four of five domains, though not for relating to others. Years since the death and closeness to the decedent positively predicted personal strength and years since the death positively predicted appreciation for life, while suicidality, and age negatively predicted appreciation for life.

Just over 30 percent of the variance in overall growth was accounted for by the predictors. Between 5% (spiritual) and 37% (personal strength) of the domain variances were accounted for.

Other-bereaved

Both resilience and being active in TAPS predicted overall PTG for other-bereaved and the new possibilities domain. However, only resilience predicted for personal strength and appreciation for life and none predicted relating to others. Age positively predicted the spiritual growth domain.

About 10% of overall PTG was accounted for by the predictors, and for domains, this ranged from about 3% (relating to others) to 28% (new possibilities).

Suicide vs. other-bereaved

To test hypothesis five, we computed *t*-tests comparing suicide- and other-bereaved on the PTG variables. The overall PTG difference was non-significant ($p > 0.05$), but relating to others [$t(372) = 1.73$, $p < 0.05$, d = 0.18] and spiritual [$t(372) = 1.88$, $p < 0.05$, d = 0.20] were in the expected direction, with growth being higher for the suicide-bereaved group.

To further investigate possible reasons for differences between the suicide- and other-bereaved regression models, we computed *post-hoc t*-tests of the following additional items: "Were you seeking help when TAPS contacted you?" (*1 = yes/0 = no*), "how satisfied are you with TAPS services?" (*1 = not at all, 4 = highly*), and "Are there things you are able to do now that you were not before you became involved with TAPS?" (*1 = yes/0 = no*). After Bonferroni adjustment all three were

TABLE 2 Regressions.

Dependent	Predictor	β		r_y(x-x)	
		Died by Suicide	Died by Other Causes	Died by Suicide	Died by Other Causes
Overall PTG	Resilience	**0.526*****	**0.292*****	0.368	0.215
$\hat{R}_1^2 = 0.304$	Active in TAPS	**0.264*****	**0.155***	0.251	0.150
	PTSD	**0.278****	0.051	0.189	0.036
$\hat{R}_2^2 = -0.096$	Years Since Death	0.135	0.047	0.130	0.046
$AIC_1 = -3.2$	Closeness	0.093	0.023	0.088	0.022
$AIC_1 = 37.3$	Age	−0.070	0.034	−0.066	0.032
Relate to Others	Resilience	**0.355*****	0.152	0.249	0.112
$\hat{R}_1^2 = 0.179$	Active in TAPS	**0.271*****	0.129	0.258	0.125
	PTSD	0.069	0.009	0.047	0.007
$\hat{R}_2^2 = 0.33$	Years Since Death	0.043	−0.040	0.041	−0.039
$AIC_1 = 47.1$	Closeness	0.028	−0.014	0.026	−0.013
$AIC_1 = 88.2$	Age	−0.042	0.095	−0.040	0.090
New	Resilience	**0.523*****	**0.331*****	0.367	0.243
Possibilities	Active in TAPS	**0.285*****	**0.250*****	0.272	0.242
$\hat{R}_1^2 = 2.77$	PTSD	**0.282****	0.090	0.191	0.064
	Years Since Death	0.144	0.098	0.138	0.096
$\hat{R}_2^2 = 0.159$	Closeness	0.071	0.004	0.068	0.004
$AIC_1 = 40.1$	Age	−0.023	−0.008	−0.022	−0.008
$AIC_1 = 99.6$					
Personal	Resilience	**0.631*****	**0.311*****	0.442	0.229
Strength	Active in TAPS	**0.156***	0.127	0.148	0.123
$\hat{R}_1^2 = 0.367$	PTSD	**0.318****	0.019	0.216	0.014
	Years Since Death	**0.198****	0.038	0.190	0.037
$\hat{R}_2^2 = 0.100$	Closeness	**0.156***	0.081	0.148	0.079
$AIC_1 = 60.8$	Age	−0.113	−0.063	−0.107	−0.059
$AIC_1 = 123$					
Appreciate	Resilience	**0.305****	**0.284****	0.214	0.209
Life	Active in TAPS	**0.192***	0.097	0.183	0.094
$\hat{R}_1^2 = 0.216$	PTSD	**0.222***	0.083	0.151	0.058
	Years Since Death	**0.188***	0.050	0.180	0.048
$\hat{R}_2^2 = 0.066$	Closeness	0.005	0.042	0.005	0.040
$AIC_1 = 74.5$	Age	**−0.157***	−0.065	−0.149	−0.061
$AIC_1 = 120$					
Spiritual	Resilience	**0.254***	0.167	0.178	0.123
	Active in TAPS	0.089	−0.045	0.084	−0.043
$\hat{R}_1^2 = 0.48$	PTSD	**0.363****	0.020	0.246	0.014
$\hat{R}_2^2 = 0.56$	Years Since Death	−0.004	0.103	−0.003	0.125
$AIC_1 = 190$	Closeness	0.132	0.003	0.125	0.002
$AIC_2 = 263$	Age	0.094	**0.183***	0.089	0.173

$\hat{R}_1^2$ = Adjusted R^2 Suicide ; $\hat{R}_2^2$ = Adjusted R^2 Other Causes ; AIC_1, Akaike Information Suicide; AIC_2, Akaike Information Criterion Other Causes df, 7,135 for Died by Suicide Group; 7,196 for Died by Other Causes Group.

Bold values indicates that these are statistically significant.

*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

significant. Those in the suicide-bereaved group were more likely to have been seeking help [t(367) = 2.65, $p < 0.05$, d = 0.28], more satisfied with TAPS' services [t(363) = 3.17, $p < 0.01$, d = 0.35], and were more likely to report that there were things they could do now that they could not before [t(356) = 2.6, $p < 0.05$, d = 0.28].

Discussion

Results overall support the hypotheses. Active involvement in the TAPS organization and an individual's resilience positively and significantly predicted overall PTG for both the suicide-bereaved and

for those bereaved by other causes. For the suicide-bereaved, active involvement and resilience predicted four of five specific PTG domains. For those TAPS participants who were bereaved by other causes, being active in TAPS predicted the domain of new possibilities, whereas resilience predicted four of five domains. The TAPS Suicide Postvention Model for the suicide-bereaved provides structured events and unstructured support that affords its participants with the elements necessary for meaning reconstruction of their specific and traumatic loss. This supports assertions made by Neimeyer and other social constructionist theorists (Neimeyer, 2006; Neimeyer et al., 2014) that PTG is possible when done so in an environment of safety and the loss survivor is able to "construct" their understanding of the traumatic event within the context of expert companionship or peer mentors. What seems related to the likelihood of PTG is one's mental engagement with the loved one's death and one's ability to reflectively engage or "ruminate" over elements of the event in order to repair and restructure their understanding of the event and their own reconstructed world within the context of a shattered "assumptive world" view (Janoff-Bulman, 2006).

The hypothesis that suicide-bereaved participants will experience greater posttraumatic growth received some support. PTG domains of relating to others and spiritual were higher for the suicide-bereaved group. The most noticeable difference between the suicide-bereaved and other-bereaved groups was the differences in growth reflected by the prediction models. The regression models were far stronger for the suicide-bereaved group relative to the other-bereaved group. More variance was accounted for in the dependent variables and more predictors were significant. Confirming the model differences, the Akaike information criteria for suicide-bereaved regression models were consistently and strongly better (lower values) than those for the other-bereaved group (See Table 2). Regression models for suicide-bereaved fit better. This occurred despite the larger sample size for the other-bereaved group and may be explained by this study's finding of significant differences between those who are exposed to a suicide death and those who are not exposed to a suicide death.

Reconstruction of one's understanding of their core beliefs about themself and their life, their "assumptive world," may be especially true of the suicide-bereaved. Independent of groups such as TAPS, suicide-bereaved individuals may experience levels of social stigma and isolation (Mitchell et al., 2003), making it difficult for them to safely engage the necessary ruminative processes combined with expert companionship to produce PTG. Lowering of distress and feeling connected and cared for may assist in one's ability to effectively ruminate on the traumatic event, leading to recognition that changes experienced within them are deeply profound and building of a kind of wisdom. While TAPS' programming may be effective at addressing this need for social support, providing the necessary psychoeducation to manage distress and help the bereaved approach the necessary work of ruminating the trauma, expert companions or peer mentors may enhance and greatly facilitate the process.

The hypothesis that all peer mentors, both suicide-bereaved and non-suicide-bereaved, scored better across all mental health indicators, was supported. These outcomes are emblematic of the phenomenon inherent in the benefit of giving back to one's community. There is something valuable to the health and well-being of the peer mentor by volunteering their time to help those TAPS recipients who are newly bereaved. They are finding purpose and meaning, but they are also tangibly seeing results in their health indicators. This does not imply that the peer mentors are without distress. Suicidality, PTSD symptoms, depression, and anxiety are all present, but, overall, their well-being is better than that of the others. The concept of "altruism born of suffering" (ABS, Staub and Vollhardt, 2006) is tangibly demonstrated by the TAPS peer mentor program. These are individuals who have been TAPS participants and recipients of services previously and are now generously giving back to help those bereaved individuals who are now standing in the very "shoes" of their own traumatic walk. As Holocaust survivor and psychiatrist Viktor Frankl (2006) describes, "life is potentially meaningful under any conditions, even those which are most miserable" (p. 137). According to Frankl, who wrote *Man's Search for Meaning* in the aftermath of his experiences at the Nazi concentration camps, it was the uncertainty surrounding how long prisoners would be in camps that were the most depressing part. Because of this, prisoners were not able to aim for the ultimate goal in life and ceased living for the future. This doomed them, just as it dooms those who survive traumas, such as losing a loved one to suicide. Living by looking toward the future guards against decay, as does finding meaning and purpose in our lives. TAPS peer mentor program may provide both meaning and purpose to those who are the peer mentors, as well as a future-oriented perspective that preserves their own PTG's longevity.

TAPS services appear to provide a sense of connection and belongingness for military families, meaning in their loss, and a new sense of purpose. The TAPS Suicide Postvention Model represents what is supported in the research literature about programs that facilitate PTG. These programs provide psychoeducation, management of emotional distress, constructive self-disclosure, and development of coherent narratives, leading to articulation of new life narratives and done within the context of expert companionship utilizing peer support (Tedeschi et al., 2018).

Knowing that growth after traumatic loss is possible provides hope to the individual who has experienced the loss, but also gives them tools for rebuilding their lives by giving them a real understanding of how they have been changed as a result of this trauma. Facilitating posttraumatic growth is becoming an important therapeutic approach that both professionals and organizations serving those who have experienced traumatic loss may employ (Tedeschi and McNally, 2011; Calhoun and Tedeschi, 2013). As TAPS appears to foster this kind of growth in bereaved military families, it provides a perfect venue to learn how some families who have been through the worst are able to come out of this traumatic life experience in a way that their lives are forever changed, but more resilient and robust than they might have otherwise been.

Admittedly, our measure of active involvement in TAPS was broad. TAPS participants can be involved in the organization in

many ways, including formally mentoring others who are also bereaved, informally supporting other members, and volunteering for a wide variety of positions and events at the biannual conference, among others. Future research should examine the various ways one can become involved and attain meaning for their lives and whether some types result in more growth than others.

Although the regression model suggested PTSD positively predicts PTG, the zero-order correlations suggest a positive relationship. Clearly, the regression results were influenced by the multicollinearity between PTSD and other predictors. In other words, after resilience and being active in TAPS were entered into the equation, the remaining shared variance between PTSD and PTG was positive. Whereas some amount of trauma must occur for any growth to take place, it is entirely possible that amount or type of trauma may moderate this. Future research should investigate the relationship between PTSD symptoms and PTG. Some have suggested the relationship to be negative (Butler et al., 2005) and others have suggested a linear relationship (Hall et al., 2010), and others have a more complex curvilinear relationship (Dekel et al., 2012). In this study, growth was experienced within the context of trauma. They are not separate dimensions, but co-occurring, especially as a certain amount of trauma is necessary for growth to occur. The shattering of the "assumptive world view," the traumatic symptoms created, and the cognitive dissonance created by this traumatic experience actually lays the groundwork for the possibility of growth.

Suicide-bereaved may find a profound sense of belonging, being understood, and freedom to approach their painful emotions through this experience of participation in TAPS. It is the safety of TAPS, the lowering of the distress associated with being with peers, which allows for the internalization of the programming and other important learning that occurs in this environment. Bereaved may begin to privately reflectively ruminate, a critical step in the facilitation of PTG, and appreciate the changes that have occurred within them as the result of their traumatic experience. The context of support, expertise, and validation of peer mentors and activities that help them explore this new interpretation of their traumatic experience gives them space to create new narratives, new goals, new hopes, and aspirations. These are not illusory or "finding" of benefit, but profound changes that signal growth. The main limitation of the study is that it is based on self-report, which could introduce some response bias. It is not clear how a larger nationally representative sample might yield different results. This is a very unique sample, military suicide-bereaved and military bereaved by other causes. The pattern of findings for different samples might not be the same.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by Eastern Kentucky University Institutional Research Board. The patients/participants provided their written informed consent to participate in this study.

Author contributions

MM and JP provided substantial contributions to the conception and design of the work and the acquisition, analysis, and interpretation of data, as well as drafting the work. JC and KR provided substantial contributions to the conception, design, and execution of the work. All authors contributed to the article and approved the submitted version.

Funding

The research conducted was supported by funds from the Tragedy Assistance Program for Survivors (TAPS).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 09 December 2022
DOI 10.3389/fpsyg.2022.995981

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 16 July 2022
ACCEPTED 14 November 2022
PUBLISHED 09 December 2022

CITATION
Almeida M, Ramos C, Maciel L, Basto-Pereira M and Leal I (2022) Meaning in life, meaning-making and posttraumatic growth in cancer patients: Systematic review and meta-analysis. *Front. Psychol.* 13:995981. doi: 10.3389/fpsyg.2022.995981

Meaning in life, meaning-making and posttraumatic growth in cancer patients: Systematic review and meta-analysis

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Introduction: The purpose of this systematic review and meta-analysis is to assess the association between meaning in life (MiL), meaning-making and posttraumatic growth (PTG) in the context of cancer.

Methods: A systematic search was conducted in eighteen electronic databases. The screening and selection process followed the PRISMA guidelines. For the purpose of the meta-analysis, the correlation coefficients between meaning in life and posttraumatic growth were extracted from the included studies. The effect size (*r*) was calculated using the restricted maximum-likelihood estimator, a random-effects model. Heterogeneity was assessed through the *Q* statistic, I^2 index and forest plot, while publication bias was analyzed with the use of the funnel plot and Egger's test.

Results: 889 records were considered according to the inclusion criteria. A total of nine articles, published between 2006 and 2021, were included in the systematic review. More than half were published in the last five years. The sample was mostly diagnosed with breast cancer. The meta-analysis included five articles (N=844) and the results indicate a significant moderate correlation between meaning in life and posttraumatic growth (r=0.43, 95% IC [0.36, 0.50]).

Discussion: In conclusion, there is a clear association between meaning in life and posttraumatic growth in cancer patients. Future research should explore this relationship further, in order to better assist and guide meaning centered interventions that can potentiate a positive adjustment and possibly growth from the cancer experience.

KEYWORDS

meta-analysis, meaning, posttraumatic growth, psycho-oncology, cancer, systematic review, cancer survivorship

Introduction

Cancer is one of the leading causes of death in most countries (Bray et al., 2021). The World Health Organization (WHO) estimated that there were approximately 19.3 million new cases and nearly 10 million deaths of cancer in 2020 (World Health Organization, 2021). Cancer is a long process that goes through different stages, from the diagnosis and treatment to survivorship, with a variety of implications in the lives of cancer patients

(Holland, 2002, 2003). For that reason, these patients are particularly at risk of experiencing psychological distress related to feelings of anxiety, depression, fear or guilt (Costa et al., 2016). There is therefore a higher risk for cancer patients to develop mental disorders (Singer et al., 2010), which impact their quality of life and can increase cancer-specific mortality by 53% (Kuhnt et al., 2016; Zhu et al., 2017). Due to its prevalence, the research on the psychological outcomes of cancer has predominantly focused on anxiety and depression (e.g., Singer et al., 2010, 2013; Kuhnt et al., 2016; Zhu et al., 2017; Michel et al., 2019). However, over the years the focus has started to shift to coping mechanisms and positive emotional outcomes (Johansson et al., 2011), such as psychological adjustment, benefit-finding and posttraumatic-growth (Costa et al., 2016; Singer, 2018).

Posttraumatic growth

Posttraumatic growth (PTG) is the psychological growth that arises from the struggle with stressful life event (Tedeschi and Calhoun, 1995). In the book *Trauma and Transformation*, Tedeschi and Calhoun (1995) describe how psychological growth derives from a change in perspective that results "in a more profound understanding of the self and world" (p. 87). The change is considered to be transformative, seeing has it occurs at a cognitive and emotional level, which in turn leads to changes in behavior (Tedeschi et al., 2018).

PTG is a long-term change triggered by a traumatic event, considered as a highly stressful life-changing experience (Tedeschi et al., 2018), such as an illness like cancer (Tedeschi and Calhoun, 2004). The struggle that comes from trying to cope and overcome these kind of experiences, is what initiates the process of PTG (Tedeschi and Calhoun, 1995). The Model of PTG describes this process where after a highly stressful and possibly traumatic event there can be a disruption of a person's core beliefs, causing emotional distress which leads to intrusive rumination. Once these intrusive thoughts are transformed into constructive and deliberate thoughts, an acceptance of the changed world will be possible as the meaning attributed to the event will facilitate its integration in a person's life narrative. The combination of challenged core beliefs, rumination and distress is what promotes the experience of PTG (Tedeschi et al., 2018). There are five possible domains where change may occur due to this process: personal strength, relating to others, new possibilities, appreciation of life and spiritual and existential change (Tedeschi and Calhoun, 2004).

In cancer patients, PTG has been consistently related to a better quality of life (Liu et al., 2020; Kim and Son, 2021) and to lower levels of depression and anxiety (Thakur et al., 2022). Considering that the changes of PTG can be seen as some of the best outcomes of the cancer experience due to their impact on the lives of cancer survivors, empirical research has thoroughly examined its correlates and predictors (Shand et al., 2015; Casellas-Grau et al., 2017; Turner et al., 2018). According to the literature, one of the correlates and predictors of PTG seems to be in fact meaning in life (Casellas-Grau et al., 2017). Additionally, as stated by Tedeschi et al. (2017), existential concerns, such as spirituality and questions regarding life's meaning, are a part of the process of change experienced after a highly stressful life-changing experience.

Meaning in life

Meaning is an integrant part of the human existence (Steger, 2012b). People need a sense of meaning in their lives (Frankl, 1946), in order to understand their existence and to feel that it is significant and purposeful (Steger and Kashdan, 2007). Since Frankl inaugurated the psychological study on the meaning in life (Baumeister and Vohs, 2002), a growing body of literature has explored the importance and role of meaning in people's life. However, despite the increasing interest, the concept of meaning in life (MiL) is still reason for discussion and debate (Heintzelman and King, 2014). Research on the MiL originated in a variety of definitions and theoretical models (Martela and Steger, 2016), which in turn has resulted in the development of several instruments.

MiL is a multidimensional construct composed of three components: purpose, significance and comprehension or coherence (Steger, 2018). Purpose, the motivational component, refers to a set of core goals and aims that give a sense of direction to life (George and Park, 2013; Martela and Steger, 2016; Steger, 2018). Significance is the evaluative and affective component of meaning. It involves the value, worth and importance a person attributes to their life's, giving it meaning (Martela and Steger, 2016). In other words, it is the feeling of a significant and relevant existence, that is ultimately considered to be *worth living* (George and Park, 2016). The third and cognitive component is termed as comprehension or coherence (Martela and Steger, 2016). It refers to the ability to make sense of life and the world through "a web of connections, understandings, and interpretations that help us comprehend our experience" (Steger, 2012b, p. 165). MiL is therefore a set of subjective judgments people make of their lives. It involves having a sense of significance and feeling that their own lives matter, perceiving life as comprehensible and coherent, and having a sense of purpose (King et al., 2006; Steger, 2012a, 2018).

Meaning is considered to be one of the key components for a good mental health (Fusar-Poli et al., 2020) and psychological well-being (Fischer et al., 2021). In cancer patients, the diagnosis and treatment can evoke concerns regarding MiL, as the idea of one's mortality comes into mind (Carreno and Eisenbeck, 2022). When people perceived their life's as meaningful, they experience less distress (Winger et al., 2016), facilitating their adjustment to the illness. This might be explained by the fact that MiL influences a cancer patients' perception of their illness (Krok and Telka, 2017), consequently impacting the use of coping strategies (Miao and Gan, 2020), which in turn affects the psychological outcomes and emotional experience crucial for a positive or negative

adjustment. Empirical research has shown that higher levels of MiL correlate to lower levels of depression and anxiety (Vehling et al., 2011; Elekes, 2017; Testoni et al., 2018; Gravier et al., 2020) and distress (Jaarsma et al., 2007; Winger et al., 2016).

Receiving a diagnosis of cancer frequently triggers a process of search for meaning (Park et al., 2008). This process is described by the meaning-making model, where it is shown the role of meaning in coping and adjusting to stressful events (Park, 2010). According to this model there are two types of meaning – global meaning and situational meaning – and when faced with an adversity, such as the diagnosis of cancer, there may occur a meaning discrepancy caused by the difficulty in incorporating the illness (situational meaning) into one's overall MiL (global meaning; Park and Folkman, 1997). The discrepancy provokes distress, which will trigger meaning-making (MM) efforts to restore or rebuilt the meaning systems (Park, 2010).

Some authors do not properly distinct the concept of MM from PTG, since both share common points and similar paths in the trajectory of cancer (Casellas-Grau et al., 2017). However, MM can be considered as the search for meaning in face with adversity (Steger, 2018), while PTG is the positive personal transformation that derives from the struggle with a highly stressful event.

Considering the role that both MiL and PTG have on the adjustment and outcomes of the cancer experience, it might be relevant to understand how they interact in these patients in particular. In fact, MiL has been one of the variables that has shown to be positively correlated and related to PTG in different contexts and samples, including cancer patients. However, despite the variety of systematic reviews that assess both of these variables independently, to our knowledge there is no systematic review or meta-analysis that summarizes and analyzes the relationship between MiL and MM to PTG in the cancer population. A recent systematic review suggested that MiL and PTG could be associated in cancer patients (Casellas-Grau et al., 2017). However, there was no clear distinction in the differences between these two concepts, which lead for instance to the analysis of articles that considered both concepts to be synonyms. Only by making a clear distinction between MiL an PTG, will it be possible to truly understand how these concepts relate, which can benefit and guide the development of interventions for cancer patients.

Systematic reviews and meta-analysis inform the readers of relevant studies and their results, while also providing the necessary data to assist and guide policies and clinical practice. The goal of a systematic review with a meta-analysis is to combine and synthesize the empirical research on a particular topic in order to answer a specific question (Littell et al., 2008). "How are meaning in life and meaning-making related to PTG in cancer patients?" is the main question that this systematic review aims to answer. In addition to revealing the existent research on the relationship between MiL, MM and PTG in cancer, the objectives of this paper are to: a) analyze the similarities and differences between studies and to b) examine how MiL, MM and PTG impact the lives of cancer patients. The objective specific to the meta-analysis is to assess how strong is the association between MiL and PTG in cancer patients.

Materials and methods

The systematic review and meta-analysis protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO) and published on December 16, 2021 with the registration number CRD42021287048.

Eligibility criteria

The inclusion and exclusion criteria were delineated before the development of the search strategy, according to the objectives of this paper. The type of studies that were considered for inclusion were quantitative, comparative, correlational, cross-sectional, longitudinal studies or randomized controlled trials. Mixed-method studies were included only if they performed a quantitative analysis of the main variables. In the meta-analysis only were included cross-sectional studies. All the articles had to be published in a peer-reviewed journal and contain at least an English or Portuguese abstract. If there wasn't an English version of the article, the author(s) were contacted to request additional information.

Empirical studies that examined the primary outcomes of this review, PTG and MiL and/or MM in adult cancer patients as either a primary or secondary outcome were considered for inclusion. *Posttraumatic Growth* are the positive psychological changes experienced as a result of a traumatic or challenging experience (Tedeschi and Calhoun, 1995, 2004). To measure PTG the studies should apply a validated instrument, such as the Posttraumatic Growth Inventory (PTGI), Perceived Benefits Scale (PBS), or the Benefit Finding Scale (BFS). *Meaning in Life* is a feeling of significance and importance of one's life. It involves perceiving life as comprehensible and with purpose (Steger, 2018). There are several validated instruments that assess MiL (Brandstätter et al., 2012), the most recent studies apply the Meaning in Life Questionnaire (MILQ). *Meaning-Making* is a model, developed by Park and Folkman (1997), that describes the role that meaning has in a person's adjustment to stressful life events. So far, no instrument was developed to assess specifically the process of MM. Regarding the illness, there were no restrictions on the type of cancer, the cancer stage, time since diagnosis or the cancer treatment. In order to be included in the meta-analysis, studies had to present statistical data allowing the calculation of the effect size. If the published study did not present the necessary information, the author(s) were contacted to request the data.

The exclusion criteria included reviews, meta-analysis, theoretical articles, study protocols, books and chapters of books. Qualitative articles, validation of instruments and interventions, or medical articles were excluded. Studies were also excluded if

they did not use an adult sample or if the main variables of this review (PTG and MiL or MM) were not included and assessed with a valid instrument.

Search strategy

The search for studies was conducted on the 29th of November and the 10th of December of 2021, without restriction on date of publication. The electronic databases (Academic Search Complete, Complementary Index, MEDLINE, APA PsycINFO, ScienceDirect, Psychology and Behavioral Sciences Collection, Supplemental Index, Directory of Open Access Journals, APA PsycArticles, ERIC, Business Source Complete, Criminal Justice Abstracts, Library Information Science & Technology Abst, Scopus, SciELO, RCAAP, PubMed, Bon and Web of Science) were searched for relevant articles published in peer-reviewed journals. A comprehensive search strategy was used, with the combination of the following keywords: cancer or oncological disease or neoplasm or tumor or tumor and PTG or post-traumatic growth or benefit finding or positive life changes or stress-related growth or perceived benefits or existential growth AND meaning* or existential meaning or purpose or meaning-making or meaning making or search* for meaning. The detailed strategy applied in the different databases is available in the Supplementary Table S1. More apprehensive search databases such as Google Scholar were also browsed. In order to find additional studies, the gray literature was searched as the references of the included articles that explored PTG and MiL or MM were also analyzed.

Study selection

The articles extracted from the electronic databases were analyzed in accordance with the inclusion criteria. The articles screening and selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Page et al., 2021). As recommended, the titles were screened at an initial stage, followed by the analyses of the abstracts, and finally the full text of the articles that met the criteria were obtained and reviewed. A double-screening was performed independently by two reviewers. In the final stage, the reviewers analyzed the full text articles and selected the studies for inclusion. The selected articles were then assessed for their quality by two reviewers independently. The quality assessment followed the criteria for risk of bias assessment of (Shepherd, 2005) for non-intervention studies, later reviewed and adapted by Dancet et al. (2010). Considering that one of the criteria is only applicable for qualitative studies, only six of the seven criteria were applied. Accordingly, each study was attributed a score between zero and six, receiving one point for each of the criteria met and documented (Dancet et al., 2010). In order to ensure the quality of the studies, the minimum score for inclusion was four out of six. Disagreement between reviewers were solved on a consensus-based principle or by the decision of a third independent reviewer. Figure 1 shows the process of study selection.

Data extraction

Two reviewers independently extracted the necessary data from eligible studies, using a predefined sheet. The study characteristics extracted from the studies were the following: bibliographic information (authors, year of publication and country); sample characteristics (sample size, age, gender, race, relationship status, education); data collection (hospital, data bases and/or social network); study design; cancer characteristics (type of cancer, time since diagnosis); outcomes assessed; measures to assess main outcomes (MiL, MM, and PTG) and the results involving the main outcomes. For the purpose of the meta-analysis, the correlation coefficients and corresponding sample sizes were extracted. Missing characteristics or results were coded as 'Not Reported'. Disagreement between reviewers were solved on a consensus-based principle.

To ensure the independence of study results, sample characteristics such as country and recruitment source of included studies were closely analyzed. If there were studies that made use of the same sample pool, the study with a larger sample size was preferred. When one study measured the same outcome with different instruments, the most commonly used instrument across studies or the one closest to the concept definition was favored.

Data analysis

Analysis was conducted using the statistical software JAMOVI (version 2.3, The Jamovi Project, 2022). Considering the objective of this review and that all the variables were continuous, the correlation coefficient (r) was used as an effect size metric. Correlations were converted to the Fisher's Z scale, which was then converted back to correlations for result presentation (Borenstein and Hedges, 2019). Correlation r demonstrates the strength and direction of the association between two continuous variables, from −1.0 to 1.0 (Littell et al., 2008). The random-effects model used to estimate the mean effect was the restricted maximum-likelihood estimator (Borenstein et al., 2010). A random-effects model considers that the effect sizes are independent and can vary due to differences in the participants (e.g., age, socioeconomical status, health) or across studies (e.g., study design, treatment conditions) Borenstein et al., 2007; Cheung, 2019). The restricted maximum-likelihood estimator is recommended for meta-analysis with a small number of studies, such as our review (Thompson and Sharp, 1999).

Heterogeneity was assessed through the Q statistic and the I^2 index. The Q test assesses the presence or absence of heterogeneity

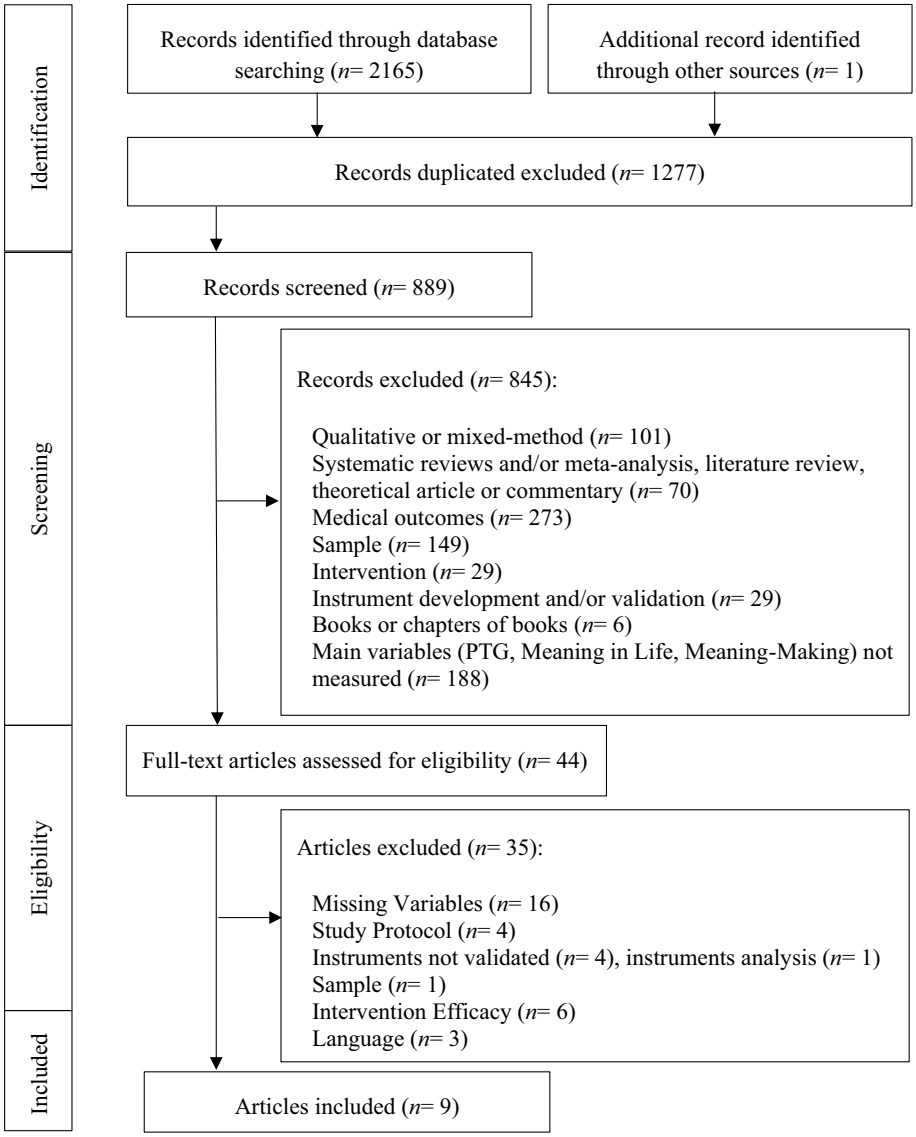

FIGURE 1
Flow diagram displaying the study selection process based on the PRISMA guidelines.

between studies, whereas the I^2 index represents the proportion of the total variance due to between-studies variability (Huedo-Medina et al., 2006; Borenstein, 2019). A non-significant Q test can indicate that the estimated effect sizes differ due to sampling error alone. However, this statistic has a low sensibility to detect heterogeneity when there is a small number of studies. For that reason, the I^2 index was used to support the Q test (Huedo-Medina et al., 2006). An I^2 index around 25, 50, and 75% represents a low, medium and high level of heterogeneity, respectively (Higgins, 2003). Additionally, a forest plot was used in order to assess the heterogeneity between studies, as well as the weight of each study to the overall effect.

Publication bias was assessed trough the visual inspection of the funnel plot and confirmed with Egger's regression test. In the funnel plot when there is publication bias, the distribution of effect sizes will be asymmetrical (e.g., effect sizes clustered in one side of the funnel). However, examination of the funnel plot can be subjective, particularly when there is a small number of studies (Littell et al., 2008). For that reason and to confirm the visual inspection of the funnel plot, Egger's regression was used. The Egger's test measures the magnitude and direction of asymmetry, if the test is statistically significant it indicates the presence of publication bias (Vevea et al., 2019).

Results

Description of included studies

The literature and additional hand search resulted in 889 potentially relevant articles (after removing duplicates). Following

the screening of titles and abstracts, 845 studies were excluded for the following reasons: qualitative or mixed-method, systematic reviews and/or meta-analysis, literature review, theoretical article or commentary, medical outcomes, sample, intervention, instrument development and/or validation, books or chapters of books, and missing variables/outcomes. The remaining 44 eligible articles were reviewed based on a full-text analysis, which resulted in the exclusion of an additional 35 studies (Figure 1; references of excluded articles and reasons for exclusion can be requested from the correspondence author). The data extraction regarding the characteristics of the included studies, including the sociodemographic and clinical characteristics of the sample was summarized in Table 1.

Study characteristics

Most of the studies were conducted in Europe ($n = 4$). The remaining studies were conducted in the United States of America ($n = 2$), Asia (Iran, $n = 2$) and Australia ($n = 1$). The studies from the United States shared the same sample. The first study was published in 2006. However, more than half of the studies were published in the last 5 years ($n = 5$).

Regarding the study design, six studies were cross-sectional, one was longitudinal (Loeffler et al., 2018) and two studies applied both a cross-sectional and a longitudinal design (Park et al., 2008; George and Park, 2013). One of the studies with a cross-sectional and longitudinal design (George and Park, 2013), reported only cross-sectional correlations between the MiL and PTG. Due to the fact that only one study had a longitudinal design, the meta-analysis was conducted only with cross-sectional studies.

Data collection was predominantly achieved with the collaboration of hospitals and cancer centers where patients were recently diagnosed and treated for cancer ($n = 7$). The two remaining studies recruited the sample through social networking, by sharing the study in social media and cancer groups.

Sample characteristics

A total of 1,172 cancer patients were included in the meta-analysis. Approximately 80% of the participants were diagnosed with breast cancer. Regarding sociodemographic characteristic 74% of the participants were female, with a mean age of 53 years old ($SD = 5.05$). Most participants of included studies were in a relationship (71%, $n = 1{,}303$, $k = 8$) and had a college degree (45%, $n = 1{,}148$, $k = 7$). Further characteristics are present in Table 1 for consultation.

Outcome measures

PTG was more commonly assessed through the Posttraumatic Growth Inventory (PTGI, $n = 6$). Other measures used for PTG were the Perceived Benefits Scale ($n = 2$), the Benefit Finding Scale ($n = 1$), and the Stress Related Growth Scale ($n = 1$).

Regarding MiL, there are a number of instruments that measure the concept, the most recent articles applied the Meaning in Life Questionnaire ($n = 3$). The authors also applied the Perceived Personal Meaning Scale ($n = 2$), the Personal Meaning Profile ($n = 1$) and the Personal Meaning Index ($n = 1$) to measure MiL. Regarding meaning-making, there has not been developed and validated an instrument to measure the process. The authors chose therefore to apply the positive reframing coping subscale of Brief COPE.

Concerning the correlation between variables, two studies did not establish a direct correlation between MiL and PTG (Loeffler et al., 2018; Shand et al., 2018). On the other hand, some studies, through regression analysis, showed a direct ($n = 3$) or indirect ($n = 1$) relationship between MiL and PTG. Other outcomes were also considered for their possible connection to MiL and PTG, such as life satisfaction ($n = 3$), anxiety and depression ($n = 2$). Additionally, researchers showed a tendency to assess the association between PTG and social support ($n = 3$), and between MiL and religion or spirituality ($n = 4$).

Literature overview

Table 1 shows the main results involving MiL, MM, and PTG obtained by the 9 studies included. The majority of the studies, except for two, assess the correlation between either MiL or MM to PTG. Four of them go beyond by assessing the direct or indirect relationship between these variables.

All studies found a positive significant correlation between MiL and PTG. Two studies found a direct significant effect of MiL in PTG (Aflakseir et al., 2018; Moghadam et al., 2021). Moghadam et al. (2021) shows that the relationship between MiL and PTG is positive for the presence of meaning in life ($\beta = 0.16$, $p = 0.001$), but negative for the search for meaning ($\beta = -0.12$, $p = 0.001$). Additionally, Mostarac and Brajković (2022) suggest that the search for meaning explains approximately 20% of PTG, while Aflakseir et al. (2018) refers that MiL and social support together explain 34% of PTG.

In regard to the relationship between MM, only one study assessed its effects on PTG. Park et al. (2008) found a direct effect of MM on PTG, more specifically, they found this effect to be positive when cross-sectional ($\beta = 0.44$, $p \leq 0.05$) but negative with a longitudinal design ($\beta = -0.26$, $p \leq 0.05$). Nevertheless, MM at Time 1 and MM at Time 2 when combined explained 33% of the variance of PTG.

Religion and spirituality

MiL and PTG were assessed by some studies for their association with other variables, such as religion and spirituality. These studies pointed to a positive correlation between PTG, MiL, and MM and religion and spirituality.

George and Park (2013) suggest that MiL is positively correlated with religion and spirituality, adding that daily spiritual experiences

TABLE 1 Details and results of included articles.

Study (Authors, date)	Country	*N* Age *M* (*SD*) Gender (%)	Cancer	Time since diagnosis	Data collection	Study design	PTG scale	Meaning scale	Results
Kallay (2006)	Romania	36 55.66* 64% Female	breast, colorectal, and prostate	4 to 5 months	Cancer Institute	Cross-Sectional	SRGS PTGI	PMP	Personal meaning was positively correlated with SRG ($r = 0.45$, $p \leq 0.001$) and PTG ($r = 0.59$, $p \leq 0.001$) There was a moderate positive relationship between negative affectivity and meaning construction ($r = 0.32$, $p \leq 0.05$) There were significant correlations between most PMP sub-scales and both scales of PTG. One of the highest, significant correlations was between religious meaning making subscale (PMPREL) and PTGI ($r = 0.70$, $p < 0.01$), more specifically, the religious dimension of PTG (PTGIEL; $r = 0.71$, $p < 0.01$)
Park et al. (2008)	EUA	250 T1: 45.2* 69% Female	Breast (47%), prostate (12%), colon/rectal (6%), lymph nodes (5%), cervix/ uterus (4%), others (24%)	NR	Hospital Data Base	Cross-Sectional and Longitudinal T1 = within 2 years since treatment; T2 = 1 year later	PBS	Brief COPE-PR PPMS	Positive Reframing (MM) and Growth were significantly correlated at Time 1 and 2 ($p = 0.01$). MiL Time 1 was positively correlated with Growth Time 2 ($r = 0.20$, $p \leq 0.05$). MM Time 1 was not significantly correlated to Growth Time 2 The cross-sectional model revealed that MM coping was indirectly related to restoration of just-world beliefs through its relationships to growth ($\beta = 0.45$, $p \leq 0.05$) and to MiL ($\beta = 0.16$, $p \leq 0.05$). Growth was related to psychological well-being only indirectly through its relationship to MiL ($\beta = 0.29$, $p \leq 0.05$). MiL was related to psychological well-being directly ($\beta = 0.40$, $p \leq 0.05$) The longitudinal model showed that MM Time 1 was directly related to Growth ($\beta = 0.46$, $p \leq 0.05$) and MiL at Time 1 ($\beta = 0.15$, $p \leq 0.05$) and Growth Time 2 ($\beta = -0.26$, $p \leq 0.05$). Growth at Time 1 was related to MiL Time 1 ($\beta = 0.29$, $p \leq 0.05$) and Time 2 ($\beta = -0.19$, $p \leq 0.05$). At Time 2 MM was related to Growth ($\beta = 0.44$, $p \leq 0.05$) and MiL ($\beta = 0.14$, $p \leq 0.05$) MM at Time 1 and 2 explained 33% of the variance of Growth Time 2. Growth Time 1 and MM Time 2 explained 28% of the variance of MiL Time 2
Thuné-Boyle et al., 2011	United Kingdom	155 56 (13.5) 100% Female	breast	Recent diagnosis	Hospital	Cross-Sectional	BFS	Brief COPE-PR	Religiosity/spirituality, strength of faith, private religious/spiritual practices and personal spiritual involvement were significantly and positively related to positive reframing coping ($r = 0.28$, $p < 0.0005$, $r = 0.28$, $p < 0.001$, $r = 0.30$, $p < 0.0005$, $r = 0.32$, $p < 0.0005$ respectively) and benefit finding at 3 months ($r = 0.37$; $r = 0.41$; $r = 0.32$; $r = 0.38$, $p < 0.0005$ respectively) Seeking emotional support, positive reframing and using humor were all significantly related to higher levels of benefit finding at 3 months ($r = 0.27$, $p < 0.001$; $r = 0.24$, $p < 0.005$; $r = 0.19$, $p < 0.025$ respectively)

(Continued)

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TABLE 1 (Continued)

Study (Authors, date)	Country	*N* Age *M* (*SD*) Gender (%)	Cancer	Time since diagnosis	Data collection	Study design	PTG scale	Meaning scale	Results
George and Park (2013)	EUA	T1 = 250 T2 = 167 T2: 46.34 (6.29) 65% Female	Breast (47%), prostate (12%), colon/rectal (6%), lymph nodes (5%), and cervix/ uterus (4%)	*M* = 3.5 years	Hospital Data Base	Longitudinal T1 = within 1 to 3 years of diagnosis; T2 = 1 year later	PBS	PPMS	MiL was positively correlated to PTG ($r = 0.32$, $p < 0.01$, $n = 152$), positive affect ($r = 0.50$, $p < 0.01$), and life satisfaction ($r = 0.38$, $p < 0.01$). MiL was inversely related to posttraumatic depreciation ($r = -0.31$, $p < 0.01$) and negative affect ($r = -0.21$, $p < 0.01$) Time 1 religiousness ($r = 0.19$, $p \leq 0.05$, $n = 140$) and daily spiritual experiences ($r = 0.17$, $p \leq 0.05$) were positively correlated with Time 2 MiL. Time 2 MiL was significantly predicted by daily spiritual experiences ($\beta = 0.28$, $p \leq 0.05$, $n = 158$)
Loeffler et al. (2018)	Germany	65 60.5 (11.7) 100% Female	Breast	Close to 1 year	Cancer Center	Longitudinal T1 = 1 year after treatment; T2 = 1 year later	PTGI	MILQ-P	Presence of MiL was related to lower levels of anxiety ($r = -0.43$, $p < 0.01$) and depression ($r = -0.64$, $p < 0.01$), a higher level of satisfaction with life ($r = 0.44$, $p < 0.01$) and better health-related functioning in terms of role functioning ($r = 0.31$, $p < 0.01$), emotional distress ($r = 0.34$, $p < 0.01$) and social functioning ($r = 0.27$, $p \leq 0.05$) A higher presence of meaning 1 year after therapy predicted lower levels of depression another year later ($\beta = -0.47$, $p < 0.01$) Most indicators for well-being were not significantly correlated with PTG
Shand et al. (2018)	Australia	108 56.36 (10.36) 100% Female	Ovarian	*M* = 37.64 months	Social Network	Cross-Sectional	PTGI	Brief COPE-MCC	Higher scores on the three PTSD subscales (avoidance, intrusion, and hyperarousal) and lower scores on three PTG subscales (relating to others, personal strength, and appreciation of life) were associated with higher levels of depressive and anxiety symptoms and avoidant coping Higher PTSD symptoms but lower PTG scores were associated with lower levels of optimism, perceived social support, meaning-centered coping, and quality of life Higher intrusive symptoms and PTG were associated with higher levels of anxiety symptoms, and coping through social support and meaning Lower scores on the PTSD intrusion subscale and higher scores on the spiritual changes PTG subscale were associated with higher levels of depressive symptoms, and lower levels of coping through social support Higher scores on PTG domains relating to others and appreciation of life were associated with higher perceived social support through social support coping
Aflakseir et al. (2018)	Iran	196 52 (12.32) 100% Female	Breast	18 months	Clinic	Cross-Sectional	PTGI	PMI	There was a significant correlation between social support ($r = 0.37$, $p < 0.001$), personal meaning ($r = 0.33$, $p < 0.001$), and PTG Social support ($\beta = 0.19$, $p = 0.05$) and meaningfulness ($\beta = 0.26$, $p = 0.03$) significantly predicted PTG The model accounted for 34% of the variance in PTG

(Continued)

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TABLE 1 (Continued)

Study (Authors, date)	Country	*N* Age *M* (*SD*) Gender (%)	Cancer	Time since diagnosis	Data collection	Study design	PTG scale	Meaning scale	Results
Moghadam et al. (2021)	Iran	213 52(16) 100% Female	Breast	6 months to 4 years	Hospitals Data Base	Cross-Sectional	PTGI	MLQ-S MLQ-P	PTG was significantly correlated with search for MiL ($r = -0.18$, $p = 0.01$) and presence of MiL ($r = -0.45$, $p = 0.01$). The presence and search for MiL were also correlated ($r = 0.38$, $p = 0.01$) The proposed model, which included positive reappraisal, mental rumination, social support, coping skills, spirituality and religious coping, explained 90% of the PTG variance Presence of MiL ($\beta = 0.25$, $p = 0.001$) and search for MiL ($\beta = -0.25$, $p = 0.001$) had a significant effect on Positive Re-evaluation. Positive Re-evaluation, in addition to its direct effect on PTG, was a mediator between PTG and core beliefs, positive and negative religious coping, presence and search for MiL, and deliberate rumination Problem-based coping, emotion-based coping, core beliefs, social support, presence of MiL ($\beta = 0.16$, $p = 0.001$), and deliberate rumination had a positive and significant effect on PTG. Intrusive rumination, negative religious coping, and search for MiL ($\beta = -0.12$, $p = 0.001$) had a negative and significant effect on PTG
Mostarac and Brajković (2022)	Croatia	149 49.18* 70% Female	Breasts (38.2%), lymphatic system (22.1%), mouth, pharynx and larynx (17.4%), others (0.2%)	NR	Social Network	Cross-Sectional	PTGI	MILQ	PTG is positively correlated with the presence of MiL ($r = 0.44$, $p < 0.01$), the search for MiL ($r = 0.46$, $p < 0.01$) and life satisfaction ($r = 0.46$, $p < 0.01$). The search for MiL explained about one-fifth of the variability of occurrence of positive changes The presence of MiL and the search for MiL are positively intercorrelated ($r = 0.34$, $p < 0.01$) and positively correlated with life satisfaction ($r = 0.37$, $p < 0.01$; $r = 0.65$, $p < 0.01$, respectively) 46% of the variance in life satisfaction was explained by the PTG and specific mediator (mediator – MLQ-P: Adjusted $r^2 = 46.18$, $F(2, 146) = 62.64$, $p < 0.001$ / mediator – MLQ-S: Adjusted $r^2 = 45.80$, $F(2, 146) = 19.38$, $p < 0.001$) The indirect effect of the PTG on life satisfaction was significant only through the presence of meaning ($\beta = 0.25$, $p \leq 0.05$, standardized SE = 0.07, standardized 95% CI = [0.12, 0.38]). The indirect effect through the presence of meaning in life explained 53.5% of the total effect of the PTG on life satisfaction

*Not reported; PBS, perceived benefits scale; PTG, posttraumatic growth; PTGI, posttraumatic growth inventory; PPMS, perceived personal meaning scale; MiL, meaning in life; MILQ, meaning in life questionnaire; MILQ-P, meaning in life questionnaire – presence; Brief COPE-PR, positive reframing subscale from brief COPE; Brief COPE-MCC, meaning-centered coping subscale from brief COPE; SRG, stress-related growth; SRGS, stress-related growth scale; PMP, personal meaning profile; PMI, personal meaning index; BFS, benefit finding scale.

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have a positive effect on MiL ($\beta = 0.28$, $p \leq 0.05$). Thuné-Boyle et al. (2011) found MM and PTG to be positively correlated to religion/spirituality. Kallay (2006) study on the other hand showed that one of the subscales of the Personal Meaning Profile, related to religious MM, and had a strong correlation with PTG ($r = 0.70$, $p \leq 0.01$). Additionally, according to Moghadam et al. (2021) negative religious coping has a negative significant effect on PTG ($\beta = -0.49$, $p \leq 0.001$).

Social support

Social support is more commonly associated with PTG. Indeed, four studies showed social support to be positively correlated with PTG (Thuné-Boyle et al., 2011; Aflakseir et al., 2018; Shand et al., 2018; Moghadam et al., 2021). Shand et al. (2018) added that certain domains of PTG, relating to others and appreciation of life, were associated with a higher perception of social support. Furthermore, Aflakseir et al. (2018) revealed that social support and MiL can explain 34% of the variance of PTG.

Anxiety and depression

Concerning MiL, higher levels of presence of meaning were not only associated with lower levels of anxiety and depression but predicted lower levels of depression after 1 year ($\beta = -0.47$, $p \leq 0.01$) (Loeffler et al., 2018). PTG also showed to have a negative correlation with anxiety and depressive symptoms, indicating that lower levels of PTG were correlated with higher symptoms of depression and anxiety (Shand et al., 2018).

Life satisfaction

Three studies found a significant positive correlation between MiL and life satisfaction (George and Park, 2013; Loeffler et al., 2018; Mostarac and Brajković, 2022). PTG was also positively correlated with life satisfaction, explaining 46% with MiL as a mediator (Mostarac and Brajković, 2022). Through the presence of meaning, PTG shows an indirect effect on life satisfaction ($\beta = 0.25$, $p \leq 0.05$). In fact, the presence of meaning in life explained more than 50% of the total effect of PTG on life satisfaction (Mostarac and Brajković, 2022).

Quantitative synthesis: Meta-analysis

Considering that only two studies assess the concept of MM, and that the instruments used are not made to specifically measure the concept, only one meta-analysis was conducted between MiL and PTG. Table 2 shows the correlation coefficients extracted from the articles included in the systematic review, as well as the results from the quality assessment.

From the nine studies considered, only five were included in the meta-analysis ($n = 844$). Three studies had lack of data which did not allow to determine the association between the variables (Thuné-Boyle et al., 2011; Loeffler et al., 2018; Shand et al., 2018). Two studies (Park et al., 2008; George and Park, 2013) shared the same sample. And so, to ensure the independence of the sample, the article with the smaller sample size was excluded (George and Park, 2013). Park et al. (2008) included results for two different times, only the first cross-sectional correlation was included. Kallay (2006) used two different instruments to measure PTG – Stress Related Growth Scale and Posttraumatic Growth Inventory. For that reason, the authors decided to include only the correlation with the PTGI, considering that it is the most used instrument for PTG in the included studies. Two articles had correlations between PTG and the presence and search for meaning (Moghadam et al., 2021; Mostarac and Brajković, 2022). Based on the construct of MiL defined in the inclusion criteria, only the data for the presence of meaning was considered.

Effect size

Table 3 shows the results obtained from the meta-analysis, including the main effect size for the correlation between MiL and PTG. MiL was significantly correlated with PTG, revealing a medium effect size ($r = 0.43$, 95% CI [0.36, 0.50], $p \leq 0.001$).

Heterogeneity

The Q test suggested that there was no significant amount of heterogeneity ($Q = 5.056$, $df = 4$, $p = 0.282$), which suggests that the differences observed can be due to sampling error alone. The I^2 was below 25% ($I^2 = 5.23$), indicating a low level of heterogeneity and no

TABLE 2 Meaning in life and meaning-making correlations to posttraumatic growth.

Study (Authors, date)	Study design	MiL correlation coefficient (r)	MM correlation coefficient (r)	N	Quality assessment
Kallay (2006)	Cross-sectional	0.59	-	36	4
Park et al. (2008)	Cross-sectional	0.36	0.46	250	5
Thuné-Boyle et al., 2011	Cross-sectional	NR*	0.24	155	4
George and Park (2013)	Cross-sectional	0.32*	–	152	6
Loeffler et al. (2018)	Longitudinal	NR*	–	65	5
Shand et al. (2018)	Cross-sectional	NR*	–	108	4
Aflakseir et al. (2018)	Cross-sectional	0.33	–	196	5
Moghadam et al. (2021)	Cross-sectional	0.45	–	213	4
Mostarac and Brajković (2022)	Cross-sectional	0.44	–	149	6

NR, not reported; *Not included in meta-analysis.

substantial differences between studies. The forest plot represented in Figure 2 shows the correlation and confidence interval of each study, as well as their impact on the overall effect size represented in the last line. From the size of the black boxes, it is possible to say that the study of Kallay (2006) was the one with the smaller weight. Park et al. (2008) and Moghadam et al. (2021) studies had a bigger impact on the true effect size. The 95% confidence interval shows that the studies point to the same direction of the estimated mean effect.

Publication bias

The visual inspection of the funnel plot did not show an asymmetry, indicating the inexistence of bias due to the variability of the individual studies. Considering the small number of studies and the subjective nature of the funnel plot analysis, the Eggers Regression was used to confirm the absence of publication bias. The Egger's test was not statistically significant (Egger's test = 1.615, $p = 0.106$) confirming the examination of the funnel plot. The absence of publication bias strengthens the internal validity of the meta-analysis.

Discussion

The aim of the present review was to analyze the empirical literature concerning meaning in life and PTG in adult cancer patients. The inclusion of a meta-analysis allowed to further assess the association between these two variables. To our knowledge, this is the first meta-analysis to evaluate the correlation between MiL and PTG, and to summarize the relationship found between these variables. A previous systematic review on psychological and clinical correlates of PTG in cancer patients suggested that meaning was linked PTG (Casellas-Grau et al., 2017). There was, however, no clear distinction and definition of the concept of MiL which resulted in the inclusion of articles that mostly considered PTG and meaning to be either synonyms or part of the same concept. Without a differentiation of these concepts, it is not possible to properly assess the influence and impact that they have on each other. When a study tries to examine the impact of one variable that is perceived as an integrant part of the other, then there is no surprise that they will both be correlated. It is the same as using two different instruments to study one and the same concept.

Meaning is a vital part of the human existence, while PTG is specific to the context of stressful life events. Seeing as they are distinct concepts with different implications, as was presented in the beginning of this article, this meta-analysis ensured that the inclusion criteria made a clear distinction of these concepts. In consequence, the studies were included only if they used separate and validated instruments to assess the concepts of MiL and PTG. It was this that allowed to extract and analyze solely the articles that perceived these variables as different concepts.

Research on psycho-oncology has studied the impact of MiL and PTG as independent variables. The results have pointed to a relationship between these variables and physical and mental health outcomes in cancer patients. However, there seems to be a growing interest in the relationship between these two variables. All the empirical studies included in this analysis revealed a significant positive correlation between MiL and PTG, resulting in an overall moderate effect size. In other words, a higher perception of MiL is associated with higher levels of PTG in cancer patients.

TABLE 3 Mean effect sizes of meaning in life in posttraumatic growth.

	k	ES	95% CI	Z	Q	I^2	Egger's Test
Meaning in Life	5	0.43*	[0.36, 0.50]	11.9*	5.056	5.23%	1.615

k, number of studies; ES, effect size (mean weighted correlation coefficient); CI, confidence interval; Q, test of homogeneity; I^2, proportion between studies variability; Egger's test, Egger's regression test of publication bias. *$p < 0.001$.

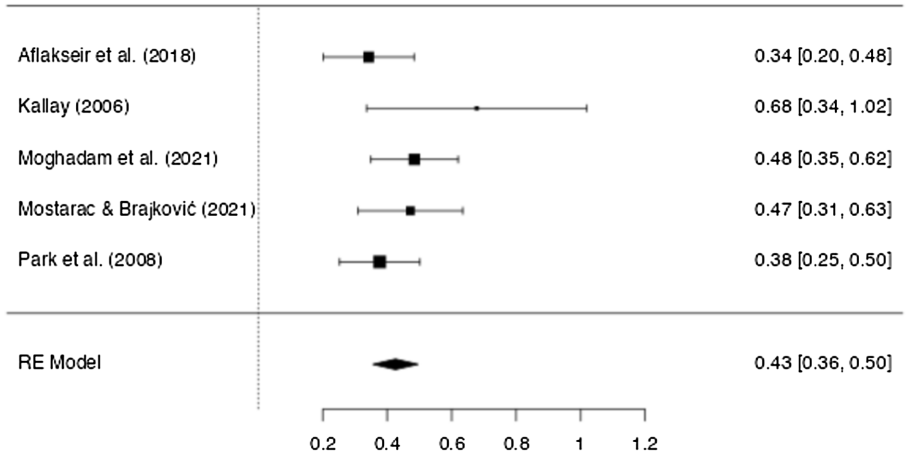

FIGURE 2
Forest plot for heterogeneity assessment (Source: JAMOVI).

The ability to live meaningfully allows people to have a better perception of their life experiences, including their health. It is for this reason that meaning has been associated with better health indicators (Roepke et al., 2014) and increased well-being (Visser et al., 2010; Dezutter et al., 2013; García-Alandete, 2015; Krok, 2015). In cancer patients, MiL has been shown to have a positive impact on their illness perception (Krok and Telka, 2017; Krok et al., 2019), acceptance of cancer (Quinto et al., 2022), and in lowering the distress levels (Winger et al., 2016). The literature has showed that MiL is related to a number of factors that ultimately impact a cancer patient' adjustment and experience. Some of the studies included in this systematic review have also shown a relationship between MiL and religion/spirituality, anxiety, depression and life satisfaction. Two of the included studies showed that not only is spirituality positively correlated (Thuné-Boyle et al., 2011) but also a predictor of higher levels of MiL (George and Park, 2013). Other studies have supported these findings. A study with cancer and heart failure patients found spirituality to have a positive impact on meaning (George and Park, 2017). While another study with advanced cancer patients showed that a higher MiL was associated with lower spiritual pain (Gravier et al., 2020). The relationship between these two variables appears, therefore, to go both ways. Spirituality, as a feeling of transcendence and connection, may facilitate a higher sense of MiL. On the other hand, experiencing MiL can also improve spiritual well-being in times of adversity. Regarding the relationship between MiL and anxiety and depression, Loeffler et al. (2018) found that MiL is a predictor of lower levels of anxiety and depression. This relationship has been evidenced in other studies with cancer patients (e.g., Vehling et al., 2011; Elekes, 2017; Dursun et al., 2022). There may be however a more complex connection between these three variables, specifically concerning the meaning of the illness itself. A longitudinal study with a focus on sources of meaning revealed that while most sources predicted lower levels of anxiety and depression, other meanings, such as 'leaving a legacy', predicted higher levels (Scheffold et al., 2014).

As the studies in this review show, MiL has a correlation to a variety of other variables besides PTG. And these variables can ultimately influence and impact the well-being and psychological adjustment to cancer. However, despite the numerous evidence regarding the relationship between MiL and mental health indicators, the literature would benefit from further examination of the mechanisms behind meaning. For instance, presence and search for MiL appear to have different and even inverse correlation with certain variables (Steger, 2018), such as well-being and cancer acceptance (Dezutter et al., 2013). This was evidenced in Moghadam et al. (2021) study, where search for meaning was negatively correlated with PTG, while the presence of MiL yielded a positive correlation. Some studies however do not show this inverse tendency, as in the study of Mostarac and Brajković (2022), where both presence and search for meaning where positively related to life satisfaction. The incoherence between studies can be due to the complexity of the interaction between presence and search for meaning. More comprehensive studies have suggested that a higher search for meaning can only lead to higher levels of well-being and life satisfaction when there is already a high presence of MiL. However, for a person with a low presence of MiL, the search for meaning can be a stressful experience that leads to a worse well-being, than experiencing a low presence and low search for meaning (Park et al., 2010; Dezutter et al., 2013; Krok and Telka, 2017). As it was stated before, meaning is a part of the human existence, it is how individuals are able to make sense of the world they live in. Without personal meaning, one will feel out of place or void, more commonly named a "meaningless existence." In this case, when a person is faced with an adversity, as a cancer diagnosis, and there is a lack of foundation there will be an increased difficulty in coping and adjusting to the situation. This occurs as the news of cancer highlight the void of meaning, generating distress and consequently leading to symptoms of anxiety and depression. On the other hand, when there is a solid presence of meaning, the diagnosis of cancer can be distressful, but as one searches for meaning in the illness and adjusts this meaning to their overall MiL, the level of distress will subdue. Finding meaning in an adverse experience is the first step to not only adjust to it but possibly grow from it.

Posttraumatic growth is described as the ability to overcome and actually be able to experience a positive change from a highly stressful situation, such as cancer (Tedeschi and Calhoun, 1995; Tedeschi et al., 2018). The ability to grow from an experience can be considered the best outcome which is why in the last two decades the focus of research has shifted from posttraumatic stress to PTG. Numerous studies have explored the correlates and predictors of PTG in cancer patients, in an attempt to develop and guide psychosocial interventions that could lead these patients to a positive outcome. Several systematic reviews and meta-analysis have summarized and analyzed the literature on the subject (e.g., Casellas-Grau et al., 2017; Turner et al., 2018; Li et al., 2020; Yastıbaş and Karaman, 2021). In the present review the included studies found a positive correlation between PTG and spirituality (Kallay, 2006; Thuné-Boyle et al., 2011; Moghadam et al., 2021), social support (Thuné-Boyle et al., 2011; Aflakseir et al., 2018; Shand et al., 2018; Moghadam et al., 2021) and life satisfaction (Mostarac and Brajković, 2022). Other systematic reviews have also shown that higher levels of PTG are related to higher levels of positive outcomes, such as optimism, spirituality, positive affect and hope (Casellas-Grau et al., 2017; Turner et al., 2018; Yastıbaş and Karaman, 2021). Additionally, Casellas-Grau et al. (2017) systematic review revealed that most articles find a negative correlation between PTG and symptoms of depression and anxiety. This supports the findings of Shand et al. (2018), which suggest that PTG can ease depressive and anxious symptoms, so prevalent in the cancer population. Regarding the predictors of PTG, the most frequent in the literature is social support (Turner et al., 2018; Yastıbaş and Karaman, 2021), which explains why so many of the included studies in this review also revealed a positive correlation between these two variables.

As the scientific literature started to assess and see a relationship between MiL and PTG, the research begun to explore this relationship further in a variety of contexts, including cancer patients. The studies included in this review all pointed to a positive correlation between MiL and PTG in cancer patients. Three studies also showed a direct relationship between MiL and PTG (Aflakseir et al., 2018; Moghadam et al., 2021; Mostarac and Brajković, 2022). This suggests that MiL may play a role in facilitating and promoting PTG in cancer patients. Despite the fact that experiencing an adverse situation can be unsettling, and meaning can get called into question, it is the struggle to find meaning in cancer and to adjust to it that can promote personal change, in a variety of domains. Other studies have been able to find the same correlations across a variety of contexts and samples, such as survivors of natural disasters (e.g., Boullion et al., 2020; Weber et al., 2020; Dursun et al., 2022) or witnesses of extremely violent events (e.g., Aliche et al., 2019; Seol et al., 2021). In addition to cancer patients, the research on the relationship between MiL and PTG has also focused on similar experiences, like individuals with chronic illness (e.g., Zeligman et al., 2018; Wang et al., 2021).

There is undoubtedly a positive relationship between MiL and PTG. Higher levels of meaning, in people who have undergone a traumatic experience or an adverse situation, are associated with higher levels of PTG. There is still much to uncover regarding the relationship between these two variables, more specifically, how they relate and influence one another. In the context of an illness, it is also important to explore the possible differences caused by personal and illness characteristics (e.g., age, gender, illness stage and related symptoms).

Nevertheless, the research can only meaningfully impact the clinical practice if a consensus arises regarding the definition and distinction of these concepts. The scientific literature is particularly inconsistent in the conceptualization of MiL. Some use meaning as a synonym for spirituality, and some even see meaning as an equivalent of PTG. There is however a difference between experiencing MiL, finding meaning in an adverse situation or experiencing personal change caused by stressful situation. The model of meaning-making (Park and Folkman, 1997) seems to have brought confusion to the distinction between MiL and PTG. However, MiL, MM and PTG are all distinct concepts and should be seen as such. While MiL relates to the presence of meaning in one's life, which includes a sense of purpose and a feeling of coherence and importance of life, MM is a process of search for meaning (Steger, 2018). Defined by Park and Folkman (1997), MM describes how a person can attempt to search for a meaning in a traumatic event that she can incorporate into her global MiL. On the other hand, PTG refers to the psychological processes that lead to an individual's growth as a result from the struggle with a highly challenging circumstance (Tedeschi et al., 2018). In the process of PTG, it is during deliberate rumination that meaning can play a more active role by providing a meaning to the event that will facilitate its integration in the life narrative of the cancer patient. Additionally, having a strong sense of MiL previous to the diagnosis may also provide the necessary support and strength to only adjust to the cancer experience and find meaning in it, but also favor the development of personal growth.

Without a consensus or the awareness of these distinctions, we will keep seeing studies assess these concepts with different perspectives and measures, which will prevent us from truly grasping the impact and relationship between meaning and PTG in cancer patients or other populations. It is in fact the discrepancies between studies that represent the reason behind most of the limitations of this systematic review and meta-analysis.

Limitations and future research

A meta-analysis can be performed as long as there are two studies (Valentine et al., 2010). Despite this, the inclusion of a small number of studies limits the strength and further analysis of the relationship between MiL, PTG and its correlates. Considering the heterogeneity of the cancer population it would be relevant to determine if there are significant differences when adding other factors to the analysis, such as age, gender, cancer type, stage or time since diagnosis. These individual differences and cancer characteristics were not taken into account due to the small number of studies. Regardless, these factors can influence either one of the variables, as it has been shown in the correlation found between time since diagnosis and PTG (Cordova et al., 2001; Danhauer et al., 2013; Cormio et al., 2017). It would be interesting to understand if and how individual, cultural and cancer differences have an influence on both MiL and PTG.

The divergences in the conceptualization of MiL also brought some limitations, especially when concerning the instruments used to assess meaning. Some studies applied the Functional Assessment of Chronic Illness Therapy – Spiritual Well-being scale (FACIT-SP), a scale that includes meaning but assesses predominantly spirituality. These studies had to be excluded seeing as they considered meaning to either be a synonym or a component of spirituality (e.g., Park and Cho, 2017; Bi et al., 2021). The included studies applied different instruments to assess MiL, which can be a threat to the validity of the results obtained by the meta-analysis. Three out of five studies used the Meaning in Life Questionnaire (MILQ) to assess MiL. Additionally, these are also the most recent articles, which points to a tendency for the use of this instrument. Therefore, in the future the use of the MILQ would benefit the research of MiL.

Meaning-making is a complex process that involves a variety of components. But unlike PTG, there is no validated instrument that measures the entirety of the process or its outcomes (meanings made). For that reason, there are fewer studies that assess this variable. The two studies that measured MM and PTG were not considered for meta-analysis, due to the lack of a valid instrument for the concept. Taking into consideration that MM is a process, rather than an outcome, a longitudinal approach would be more fitting for future research. Additionally, it should be considered the possibility of the development of an instrument to measure the cognitive processes that underlie MM.

Clinical implications

Meaning is undoubtedly related to PTG in cancer patients. Both MiL and PTG have shown a positive impact in several psychological outcomes, such as anxiety, depression and life satisfaction. Cancer patients have a higher risk of developing psychological disorders, specifically those related with anxiety and depression (Caruso et al., 2017). As our findings have showed MiL can have a positive or negative role in the adjustment to the illness, facilitating or not PTG. All the included studies indicated that higher levels of MiL are associated to also higher levels of PTG. On the other hand, literature has shown that the absence of meaning can not only be distressful but lead to worse health outcomes. The ability to detect patients struggling with meaning can be the key to assist these patients adjustment to cancer, by suggesting psychology support or specialized meaning-centered interventions. The existing distress protocols do not include existential problems, such as trouble in finding the meaning of cancer. Seeing as a lack of meaning can jeopardize the emotional well-being, it would be relevant to give these patients the opportunity to express such personal concerns when there are higher levels of distress. Regarding psychotherapeutic interventions centered on meaning for cancer patients, these would benefit from considering the correlates and predictors of PTG, in order to better assist them to achieve personal growth. Meaning-centered interventions are mostly applied to advance or terminal cancer patients (Breitbart, 2002; Mok et al., 2012; Guerrero-Torrelles et al., 2017; Kang et al., 2019). The struggles with meaning, however, can emerge in all cancer patients, even those that are not in advanced stage. Meaning-centered interventions in these patients could facilitate a better adjustment to the illness, as well as to life after cancer. For that reason, further studies on the impact of meaning throughout the different stages of cancer, that also include an analysis to the illness and individual differences (e.g., type of cancer, age, gender), may benefit the application of these interventions in all the cancer patients that show an interest and need for support in the future. Additionally, considering the role of meaning in a cancer patient experience and their potential growth, it would be relevant to develop an intervention that, in addition to its focus on meaning, incorporated the processes of PTG in order to facilitate personal growth. This intervention could explore an individual's pre-existing MiL and make use of their personal resources to assist and guide the search for meaning in cancer, while taking into consideration the sociodemographic and psychosocial characteristics and cognitive processes described by the model of PTG. This way, the more existential concerns of the patient could be addressed while providing room for the development of growth.

Data availability statement

The original contributions presented in the study are included in the article/Supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

MA conceived and designed the study, collected and analyzed the data, and drafted the manuscript. CR analyzed the data, supervised the overall process, and revised the manuscript. LM and MB-P consulted and assisted in the meta-analysis procedure. IL supervised the study. All authors contributed to the review and writing of the final manuscript.

Funding

This work is funded with national funds from FCT – Fundação para a Ciência e Tecnologia, I.P., in the context of the project UID/04810/2020.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.995981/full#supplementary-material

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frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 22 December 2022
DOI 10.3389/fpsyg.2022.1048295

OPEN ACCESS

EDITED BY
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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 19 September 2022
ACCEPTED 25 November 2022
PUBLISHED 22 December 2022

CITATION
Kaye-Tzadok A and Icekson T (2022) A phenomenological exploration of work-related post-traumatic growth among high-functioning adults maltreated as children.
Front. Psychol. 13:1048295.
doi: 10.3389/fpsyg.2022.1048295

A phenomenological exploration of work-related post-traumatic growth among high-functioning adults maltreated as children

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Introduction: Childhood maltreatment is a highly prevalent traumatic experience, and its adverse psychological and behavioral consequences are well-documented. Notwithstanding these adverse outcomes, many individuals who suffered from traumatic experiences report post-traumatic growth, i.e., transformative positive changes resulting from their struggle to cope. Post-traumatic growth has been extensively explored among adult survivors of childhood maltreatment, with findings indicating both the previously recognized domains (personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change) as well as abuse-specific domains of growth (e.g., increased ability to protect themselves from abuse). However, little attention has been given to vocational aspects of post-traumatic growth among survivors, despite the central role and importance of work in adulthood. Exploration of post-traumatic growth at work has focused on certain vocational traumatic experiences, such as those which occur in the military, or through secondary trauma. This exploratory qualitative study focuses on the question: What is the lived experience of work-related post-traumatic growth among high-functioning adult survivors of CM?

Method: Twenty in-depth interviews were held with high-functioning working adults who were maltreated as children. Phenomenological analysis was applied to the retrospective data reported in these interviews.

Result: Rich descriptions of work-related positive psychological changes were provided by all participants. Analysis revealed that survivors' post-traumatic growth corresponded with all five previously recognized domains of growth: changes in self, relating to others, openness to new possibilities, finding meaning to the abuse, and appreciation of life. It also revealed that work is perceived as a form of resistance (a subtheme of changes in self), and that finding meaning entails three emerging subthemes: being a survivor and a role model, giving others what was needed and never received, and making a better world.

Discussion: While the vocational lives of survivors of childhood maltreatment have rarely been examined through the lens of post-traumatic growth, our results show this lens to be highly valuable. Work-related post-traumatic growth has relevance not only regarding vocational traumas occurring in adulthood as has been previously studied, but also in the context of childhood traumas. Moreover, our research broadens the understanding of the possible domains of work-related growth.

KEYWORDS

post-traumatic growth, childhood maltreatment, meaning-making, work, adult survivors

Introduction

Childhood maltreatment is a highly prevalent traumatic experience, and its adverse psychological and behavioral consequences are well-documented (Fergusson et al., 2013; Carr et al., 2013; Gardner et al., 2019). Notwithstanding these adverse outcomes, a recent review has shown that nearly 50% of individuals who suffered from traumatic experiences report moderate to high levels of post-traumatic growth (PTG), i.e., transformative positive changes resulting from the struggle to heal from trauma (Wu et al., 2019). Such changes are mostly categorized by the following domains: personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change (Calhoun and Tedeschi, 2001).

PTG has been extensively explored among adult survivors of childhood maltreatment, with reference to both the previously recognized domains (personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change) as well as abuse-specific domains of growth, such as an increased ability to protect themselves from abuse (McMillen et al., 1995; Kaye-Tzadok et al., 2016; Schaefer et al., 2018; Lahav et al., 2020; Tranter et al., 2021). However, little attention has been given to work-related aspects of PTG among survivors, despite the central role of work and its importance in adulthood. Prior exploration of PTG at work has focused mainly on two major types of traumatic experiences (Maitlis, 2020): first, traumatic experiences occurring at work, such as in military service or among firefighters and second, PTG resulting from coping with secondary trauma, such as among helping professionals. The current study offers an opportunity to extend and complement the literature regarding work-related PTG. Building on the growth domains originally suggested by Tedeschi and Calhoun (1996), this exploratory qualitative study focuses on the question: What is the lived experience of work-related post-traumatic growth among high-functioning adult survivors of CM?

Literature review

Childhood maltreatment

Child maltreatment (CM) is an alarmingly prevalent public health issue and social problem. Using data derived from self-report studies carried out in several countries across the globe, estimated prevalence rates are 36% emotional abuse, 23% physical abuse, 16%–18% neglect, and 13% sexual abuse, suggesting CM is widespread (e.g., Stoltenborgh et al., 2015). CM is defined by the World Health Organization (2020) as:

> Abuse and neglect that occurs to children under 18 years of age, which includes all types of physical and/or emotional ill treatment, sexual abuse, neglect … and which results in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust or power.

The deleterious effects of CM on children's health and well-being over the course of their lives have been empirically supported (e.g., Norman et al., 2012; Jardim et al., 2018). CM has been found to be related to greater educational difficulties and hardship at school (Dovran et al., 2019), as well as to lower quality of life (Weber et al., 2016). CM is also associated with an increased risk for a variety of mental health problems such as depression, substance abuse, suicide attempts, and high-risk sexual behaviors in adulthood (Gilbert et al., 2009; Mandelli et al., 2015; Liu et al., 2017; Klumparendt et al., 2019), post-traumatic stress (Dovran et al., 2016), as well as post-traumatic stress disorder (PTSD; Vranceanu et al., 2007; Shakespeare-Finch and de Dassel, 2009). It has been shown that of all the adversities and traumas children are exposed to, CM is among the strongest predictors of PTSD (McLaughlin et al., 2017). Some of these findings can be explained by the enduring negative effects which CM has on brain development (Teicher, 2002). Taken together, these findings demonstrate the potential adverse impact of CM on psychological functioning and well-being in later life.

Alongside the impact on mental health and psychological well-being, several studies suggest that CM is related to poorer economic outcomes and to vocational vulnerability (e.g., Currie and Widom, 2010; Thielen et al., 2016). A review of the existing literature has shown that CM is related to reduced income, higher unemployment, lower level of job skill, and fewer assets in adulthood (Bunting et al., 2018). CM leading to greater financial strain during adulthood has also been found in a longitudinal study (Henry et al., 2018). Thus, CM appears to be linked to work-related vulnerability in adulthood.

Notwithstanding the potentially devastating outcomes of CM, over 25 years of research has documented the possibility of positive changes that can occur following such events, commonly referred to as post-traumatic growth (e.g., Schaefer et al., 2018).

Post-traumatic growth

A commonly used definition of post-traumatic growth (PTG) is provided by Tedeschi and Calhoun (2004), p.1: "Significant beneficial change in cognitive and emotional life beyond previous levels of adaptation, psychological functioning, or life awareness." This positive psychological change occurs after facing traumatic life events (Calhoun and Tedeschi, 2001). The "growth" component of this construct refers to one's subjective perception of the benefits gained from coping with the trauma and its aftermath (Zoellner and Maercker, 2006). Three categories of positive psychological change are usually reported by trauma survivors: changes in self-perception, changes in relationships with others, and changes in philosophy of life (Tedeschi and Calhoun, 1996). Following the development and widespread use of a self-report instrument, the Post-traumatic Growth Inventory (PTGI;

Tedeschi and Calhoun, 1996), many researchers have conceptualized growth in five domains: personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change. The first three of these (personal strength, relating to others, and appreciation of life) align with the original domains; openness to new possibilities refers to newfound interests, paths, or activities that can unfold following a trauma; and spiritual change reflects an engagement with religious, spiritual, or existential matters (Maitlis, 2020).

PTG is experienced along a continuum, with some degree of growth reported by between 30 and 80% of people who have experienced trauma (Linley and Joseph, 2004). In fact, a recent review has shown that nearly 50% of individuals who suffered from traumatic experiences report moderate to high levels of post-traumatic growth (Wu et al., 2019).

PTG has been reported at the individual level after the experience of a wide range of life challenges and traumatic events, including natural disasters such as earthquakes (Muldoon et al., 2017), hurricanes (Hafstad et al., 2011), medical illness such as cancer (Ochoa Arnedo et al., 2019), or living with HIV (Rzeszutek and Gruszczyńska, 2018). Other precipitating occurrences include bereavement (Michael et al., 2013), or violence-related traumas such as sexual assault (Shakespeare-Finch and Armstrong, 2010), domestic and family violence (D'Amore et al., 2021), terror (Eze et al., 2020), as well as war and conflict (Zalta et al., 2017).

While PTG appears to be somewhat common, it is important to note that it does not eradicate the suffering, nor the damage caused by trauma. Rather, it may be a positive byproduct of the struggle to overcome the pain and hurt caused by the trauma. Survivors who report PTG do not necessarily feel less distressed (Tedeschi and Calhoun, 2004). In fact, many report that, alongside their ability to recognize psychological benefits from dealing with trauma, they are still suffering from its aftermath. Indeed, studies have shown that PTG can co-occur with psychological distress, such as Complicated Grief (Bellet et al., 2018), depression and anxiety (Li et al., 2021), and PTSD (e.g., Zhou et al., 2018). This may be especially true in relation to childhood traumas, such as CM, in which adverse consequences are well-documented (e.g., Gilbert et al., 2009; Mandelli et al., 2015; Liu et al., 2017; Klumparendt et al., 2019).

Post-traumatic growth after CM

As described above, child maltreatment has been found to elevate the risk of suffering from a multitude of detrimental consequences. However, such a childhood trauma may also bring about PTG. Indeed, positive changes have been reported by women who were sexually abused as children (McMillen et al., 1995; Lev-Wiesel et al., 2004; Hartley et al., 2016; Lahav et al., 2020), survivors of various types of CM (Hall et al., 2009), and adult survivors of institutional childhood abuse (Sheridan and Carr, 2020). Studies also show that PTG may take place throughout different developmental stages in the lives of survivors, such as in adolescence (e.g., Glad et al., 2013) or during young adulthood (Schaefer et al., 2018; Jankovic et al., 2022).

In a study of adults who were emotionally, physically, and/or sexually abused as children, almost all participants reported positive change in self-perception, about two-thirds reported positive change in their world philosophy, while only 20% reported positive change in their relationships (Woodward and Joseph, 2003). Alongside the previously recognized dimensions of PTG (personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change), survivors of childhood sexual abuse have reported more categories of growth that are related more specifically to CM, such as increased ability to protect their children from abuse; increased ability to protect themselves from abuse and exploitation; and increased knowledge about sexual abuse (McMillen et al., 1995).

Post-traumatic growth as a meaning-making process

Despite its development after traumatic events, it should be emphasized that growth does not directly result from trauma. It evolves from the psychological struggles survivors encounter as they attempt to adapt to the traumatic event and to the distress and disruption it causes (Tedeschi and Calhoun, 2004; Muldoon et al., 2017). According to the theory of shattered assumptions, distress following child maltreatment emerges from the shattering of benevolent assumptions children initially held of themselves, others, and the world (Tedeschi et al., 1998; Janoff-Bulman, 2010). The destruction of such assumptions is accompanied by deep distress. Theorists in the field of PTG have argued that the extreme distress drives the process of re-evaluating one's sense of self, others, and the world. Such a process represents a major discontinuity in personal identity, but also an opportunity to integrate and re-evaluate the self in light of the trauma (Tedeschi and Calhoun, 1995; Joseph and Linley, 2006).

Attaching meaning to the struggle with the aftermath of CM has been considered an important ingredient in one's recovery (e.g., van der Westhuizen et al., 2022). Meaning in the context of trauma is explained as the ability to transform one's view of the ordeal into a personal achievement, i.e., experiencing a sense of triumph despite the devastation caused by the trauma (Frankl, 2008). As suggested by the "meaning making model" (Park, 2010) as well as by Taylor (1983) the readjustment process following a traumatic event involves an attempt to find meaning in the experience, leading the individual to consider why the event happened and its personal significance and impact. Similarly, others have observed that successful recovery from trauma is usually supported by an increased awareness of meaning in the narrative which develops post-trauma (Foa and Rothbaum, 1998). In the words of Victor Frankl, a Holocaust survivor, in his *Man's Search for Meaning*, first published in 1946 "In some ways suffering ceases to be suffering at the moment it finds a meaning."

While meaning-making can happen in any life context, one of the main sources of meaning in modern lives is work. Today, in Western societies, in which individuals have some degree of choice regarding their occupation or workplace, work serves as a main vehicle to make sense of the self and the world (Rosso et al., 2010). Work provides the individual with an opportunity to express core values and personal strengths, to be productive, creative, and valuable and to relate to a significant group or community of other people (Lysova et al., 2018). As such, work may offer individuals in the aftermath of personal trauma an opportunity to better understand and make sense of what happened, to relate positively to others, and to be active in reconstructing their lives as agents of change. Nevertheless, empirical studies on vocational aspects of post-traumatic growth among survivors have remained relatively scarce.

Post-traumatic growth at work

Globally, most adults spend much of their waking hours at work (Jain and Leka, 2019). Moreover, work, like love, has been posited by many, including Freud (1963), as an adaptive vehicle in the face of existential concerns. While work provides many social and economic benefits, it also exposes individuals to occupational stressors. Specifically, working in settings in which individuals encounter trauma (either directly or vicariously) may lead to experiencing distress, and possibly Post Traumatic Stress Disorder, PTSD (Skogstad et al., 2013; Coenen and van der Molen, 2021). However, encountering such traumatic experiences at work may also cultivate positive transformation, such as PTG. In fact, workplace-related PTSD and workplace PTG are not mutually exclusive; rather, they usually co-exist (Cohen and Collens, 2013; Finstad et al., 2021).

Previous research regarding workplace PTG has focused mainly on several distinct types of work-related trauma. First, most studies have explored workplace PTG in job contexts vulnerable to direct trauma exposure, such as military, police, firefighting, and medical settings (Maitlis, 2020; Olson et al., 2020; Finstad et al., 2021). A second branch of studies has explored the impact of vicarious exposure created by working with traumatized populations, including various negative effects as well as PTG (Cohen and Collens, 2013). Recently, studies have also examined PTG in the context of a shared traumatic reality (Baum, 2014), i.e., when professionals experience the same traumatic event or series of events alongside their clients (Finklestein and Laufer, 2021; Dahan et al., 2022).

Notwithstanding the contribution of previous studies on work-related PTG, the existing literature has certain limitations. To the best of our knowledge, the aforementioned studies have explored work-related trauma, i.e., trauma which happens at the workplace itself or that the workers are exposed to there. However, in the light of the reviewed literature, work-related PTG may also occur as a result of a personal trauma, rather than a work related one. Moreover, positive transformative changes at work may result from the struggle to heal from CM and may evolve through meaning-making processes.

Research question

By focusing on the underexamined context of vocational lives of survivors, the current exploratory qualitative study attempts to shed light on the following question: What is the lived experience of work-related post-traumatic growth among high-functioning adult survivors of CM?

Materials and methods

We adopted a phenomenological approach, which focuses on exploring the meaning of phenomena in human experience from the perspective of the individuals themselves (Giorgi, 1975). We aimed to listen closely to the participants' lived experiences and their construction of reality through narration (Holt and Sandberg, 2011; Corbin and Strauss, 2014). A qualitative exploratory study was chosen due to several reasons. First, some scholars claim that it allows for greater in-depth exploration of novel research topics and phenomena than quantitative designs (Wilhelmy and Köhler, 2022). Second, it is particularly useful in areas of research where there is limited empirical evidence or theory to guide subsequent quantitative research (Cassell and Symon, 2011). Third, it allows researchers to ask questions about sensitive topics (Kaplowitz and Hoehn, 2001). Lastly, qualitative research is also used for the purpose of elaborating on theory. Researchers adopting such approach are familiar with the existing literature and design the interview study to build on previous work (Dunwoodie et al., 2022). This study was part of a larger research project exploring the vocational experiences of working adults who were maltreated as children.

Recruitment

Recruitment for the study focused on high functioning, working adults who had been abused or neglected as children. The main rationale for focusing on high-functioning survivors was twofold. First, due to the scarcity of research on work-related PTG among CM survivors, an effort was made to recruit a sample who might report such growth. Second, since many CM survivors cope with adverse consequences, we chose a less vulnerable sample for this early stage in the research. We intentionally targeted survivors who could provide detailed and rich descriptions of their vocational lives. A previous study exploring work experiences of CM survivors was used to determine inclusion and exclusion criteria (Thomas and Hall, 2008). The criteria that we used for inclusion were that the prospective participants identify themselves as survivors of neglect or child abuse; that they be working full time; that they had remained in the same jobs over the past 3 years (employment stability); and that their annual

income from their employment be average or above. The criteria for exclusion from the study were if individuals were currently involved in interpersonal violence; currently exhibiting symptoms of psychosis, severe depression, or suicidal ideation; and currently abusing alcohol or drugs. We screened the prospective participants in a preliminary conversation by phone where they were asked to reply to questions probing these matters. Only those who claimed to be meeting all the inclusion criteria without meeting any of the exclusion criteria were asked to take part in the study.

Because of the topic's sensitivity, convenience sampling was used *via* three primary means of recruitment. Convenience sampling is a type of nonrandom or nonprobability sampling where members of the target population that meet certain practical criteria, such as easy accessibility, availability at a given time, or the willingness to participate are included for the purpose of the study (Etikan et al., 2016). We began by contacting personal and professional contacts, asking them to refer potential participants who might be willing to take part in the study. Such contacts were colleagues from academia and from the field, former graduate students who have completed their studies, personal acquaintances such as people who studied with the author/s towards an academic degree, members of professional forums that the authors belong to, etc. We were able to identify 13 prospective interviewees through this means, of whom 12 agreed to join the project. Our second step was to screen articles in the local and national press and reach out to individuals who had made public their experience of childhood maltreatment. This enabled us to find five more participants for the study. Our third step was to utilize snowball sampling. At the end of an interview, we asked individuals whether they could recommend anyone who was qualified to join the study by meeting its criteria. This strategy enabled us to recruit three additional participants. We built the sample "one at a time," attempting to assure that both binary genders were represented, as well as a variety of professions and occupations, disparate socioeconomic childhood backgrounds, and experiences of different kinds of CM.

Sample size was determined by the saturation principle: data were collected and analyzed until no new themes emerged and the addition of participants did not offer any new insights into the research questions (Corbin and Strauss, 2014; Dunwoodie et al., 2022).

Sample

There were 20 high-functioning adults in our sample, which was composed of 13 women and 7 men between the ages of 28 and 60. Regarding CM, 75% stated that they had experienced emotional abuse, 50% physical abuse, 55% neglect, 35% sexual abuse, and 40% verbal abuse. There were 79% of the participants who stated that they had been the victims of more than one kind of abuse. All the members of our sample described their experiences of CM as prolonged, lasting at least several years, and severe in nature. Due in most cases to maltreatment, slightly more than a third of the participants (37%) were placed in an out-of-home residential care setting during their childhood or adolescence. Although the childhood backgrounds of our participants differed from a socioeconomic standpoint, most had achieved a high level of education and were currently white-collar professionals (e.g., lawyers, therapists, and school principals) with middle to high income and social status. The sample was well educated, as 70% of the interviewees held either a master's or a doctorate degree. Half of the sample were currently in managerial positions. The majority were involved in a committed relationship (79%) and had children of their own (84%). See Supplementary Tables 1, 2 in the Supplementary materials for a more detailed background of the study participants.

Procedure

A time and place for the interview were selected by each of the individual participants. The interviews, which lasted between one and a half and 2 h, were conducted face-to-face, and were structured and in-depth. All participants signed an informed consent agreement, and their confidentiality was ensured throughout the study. The Human Subjects Research Committee of the academic institute where the second author works provided ethical approval. A team of four undergraduate psychology students who were trained research assistants audiotaped each interview and then transcribed it verbatim.

Following the guidelines suggested by Dunwoodie et al. (2022), the interview protocol was developed so that questions were open-ended and broad enough to enable participants to talk freely about their work experiences, and to allow for rich data generation. We started each interview with an invitation to openly describe current work position and vocational history from the time of their first employment. Next participants were invited to share their perspectives regarding work relationships with supervisors and colleagues, their occupational choices, and what their work meant to them. These broad questions were followed by probes to encourage elaboration of responses. Special attention was given throughout the interviews to expressions of self-reflection regarding work-related positive change and growth. After examining current and past vocational experiences, participants were asked to describe their childhood (incidents of CM were reported at this stage), followed by a question on how they saw their vocational future. At the end of the interview, we posed a summary question to the participants on how they viewed a possible connection between CM and their work history. The full interview protocol is described in the Supplementary materials. (We have not explored all the topics mentioned above in the current manuscript.) Demographic details were also collected.

Data analysis

Data analysis was based on guidelines for phenomenological analysis, as suggested by Hycner (1985). After transcribing the

interviews, the authors acquired familiarity with the data by rereading the interviews several times until immersion, allowing them to unfold with as little interpretation as possible.

The next step aimed to develop a sense of the whole, noting general impressions and specific topics of interest, in preparation for delineating units of general meaning. In the following step, the authors independently and systematically retained data from words, phrases, paragraphs, and significant nonverbal communication reflecting work-related PTG processes. In addition, textual units were retained referring to childhood abuse and neglect, enabling categorization of type and extent of maltreatment for each participant. Maltreatment type was categorized according to the conceptualization offered by the ACE (Adverse Childhood Experiences) study (Dube et al., 2001). The overall process resulted in a dataset of general meaning units referring to work-related post-traumatic positive changes, as well as childhood maltreatment.

Next, units of meaning relevant to the research question were delineated, focusing on experiences reflecting specific types of work-related growth. These meaning units were then used to create descriptive categories of basic themes and thus construct an initial framework for further analysis. At this stage, the themes were grouped across the interviews into clusters of similar issues, from which the final main categories of the model emerged. The research team met regularly, addressing each unit of general meaning. In cases of discrepancies, the team contextualized excerpts based upon the original interviews and discussed optional meanings until resolution (Denzin, 2017).

Subsequently, the first author iteratively examined and cross-checked data coding by the second author, and vice versa, to verify units of relevant meaning. Redundancies were pinpointed and removed, and themes were modified as deemed necessary. The next step entailed identifying commonalities, so that units of relevant meaning could be clustered into themes while still preserving individual variation, as variations may indicate the theme's significance (Hycner, 1985). For example, descriptions of occupational strengths and of personal resistance were revealed as two specific categories reflecting the theme of self-related PTG. By the end of this stage of the data analysis, five types of PTG emerged.

Following Sanders' (1982) phenomenological approach of open coding as an inductive process, we did not use *a priori* categories, although we kept in mind Tedeschi and Calhoun's (1996) conceptualization, and eventually matched the types of positive changes which emerged in the study.

Results

Findings revealed rich descriptions of work-related post-traumatic growth, regarding changes in the following domains: (1) Self (developing personal strength and making work a form of resistance); (2) Relating to others—relational growth at work; (3) New possibilities in the aftermath of maltreatment; (4) Finding meaning to the abuse (being a survivor and a role model, giving what was needed and never received, making a better world); and (5) Work-related appreciation of life (see Figure 1). Although the analysis was not limited to the domains suggested by Tedeschi and Calhoun (1996), eventually the themes which emerged seemed to correspond well with these pre-existing domains of PTG (personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change), while subthemes seem to offer some elaboration of the original model. All names of interviewees are pseudonyms.

Changes in self

Developing personal strength

Regarding changes in self, participants recognized and gave voice to the inner strengths that resulted from their struggle to heal from traumatic pasts and described them as highly present in their vocational lives.

Yolanda, 44, who underwent neglect, and both emotional and sexual abuse in childhood, reflected on how she functioned as a school vice principal, working with female adolescent students:

> "The question is, and I sometimes ask myself this, do you have to go through what I went through in order to be smart about these things, or is it possible without it (sad laughter…)? I do not know … It's very funny, but I am almost glad about what happened to me, since looking back… I am a much better person, totally so! I am a thousand times better and I can help a thousand times more, but I had to undergo an awful, painful journey until the age of 21…".

Yolanda, as many other participants, proceeded to talk about the unique abilities and insights she has to offer, as a survivor, to students undergoing challenging traumatic life experiences.

Work as a form of resistance

The strengths and career successes experienced by survivors were often described as forms of resistance to the traumas inflicted by maltreating parents.

For example, Nina, a 50-year-old coach, who works with senior managers in organizations, underwent emotional and verbal abuse in childhood. Nina described that she feels as if both her height (being a very tall woman), as well as her vocational choices, are a form of resistance to her parents' upbringing:

> I tell myself that my DNA objected to everything I heard, and all I was told. I was told to shut up, I was told I was small and insignificant, and that nothing I said matters. And I turned into someone that is listened to by very senior managers in the country, I am their confidante, and they confide in me … It is like this huge objection to this message that I was small and did not know …. You can see that … all the time … I did not believe it. I refused to accept it and to believe it.

Nina suggested that by rejecting the hurtful messages conveyed by her parents, she was able to protect herself and to later develop a positive work identity, countering early familial experiences.

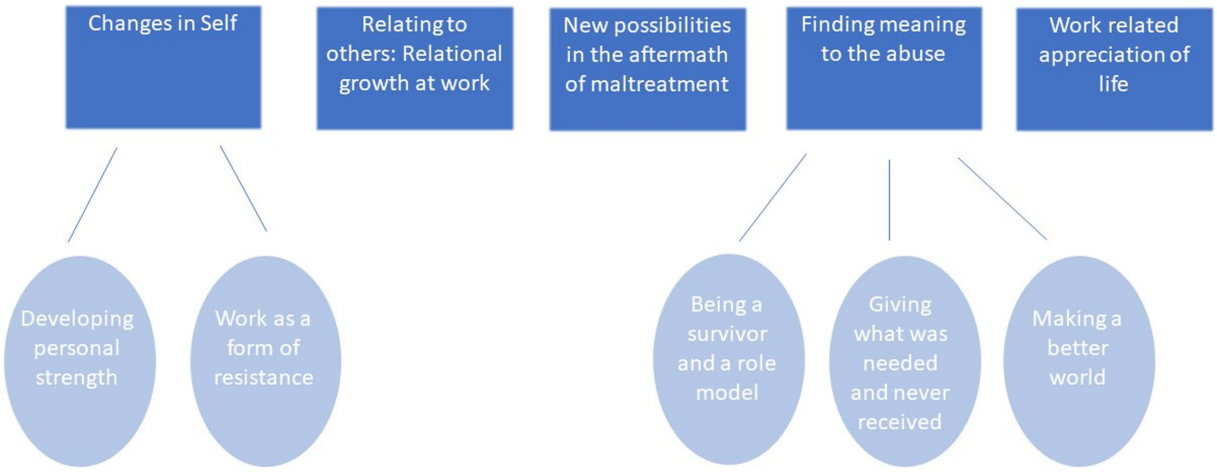

FIGURE 1
Five domains of work-related post-traumatic growth as described by participants.

While Nina savored the experience of being listened to by highly influential managers in her position as a coach, other participants became such managers themselves. Ian, age 37, a municipal politician, who reported childhood emotional and physical abuse and neglect, and has worked in management positions from the beginning of his career stated: "I can explain to you my yearning for leadership … My father told me that I was nothing and locked me in the closet; he said I was worthless, so I set out to prove … that I am worthy." Later in the interview, he added: "I came from death, really, from death, and somewhere along the way when I chose to live, I said that one day I will run this country. I will change things." Hence, Ian connected his work-related strengths and ambitions, especially leadership related ones, to his childhood trauma. For him, turning into a man who has influence over others is the vehicle of resistance to the toxic messages regarding worthlessness his father conveyed to him.

Other participants' resistance was expressed by a dialog with the vocational future predicted to them by abusive parents, sometimes as a form of verbal abuse. Michelle, a life sciences researcher, age 39, who reported childhood neglect, as well as emotional, physical, and sexual abuse, described a painful incident from her childhood, which she considered to be a defining event. After experiencing sexual assault from other boys in her neighborhood, she was offered no support by her abusive parents, but rather, she was blamed and attacked by her own father:

> And then we came home and he pushed me into the shower, with all my clothes on, and he tried to rip my shirt off and started hitting me and said: "I know what you'll be when you grow up, you'll be a prostitute!" and … (Sighs…). That sentence stayed with me for a long time, maybe it is the reason I became a Doctor of Biology, just to prove to him that I didn't [turn out to be a prostitute], and that's it ….

Thus, by creating a meaningful dialog, participants negate the hurtful messages of maltreating parents, and cultivate an alternative self. Instead of being worthless, small, and insignificant, their workplace experiences help to transform them into what they perceived as influential, successful, worthy adults.

Relating to others: Relational growth at work

In the second identified pattern of PTG, participants described how their relationships at work start out as challenging and as possibly reenacting negative childhood experiences. Over time, however, they undergo positive changes in relating to others in the workplace, both supervisors, as well as colleagues.

Tara, age 44, a teacher who underwent childhood neglect stated:

> It is hard for me to acknowledge, I realize, that the fact that I did not have a good relationship with my mother affects my relationship with other people, and especially authority figures. I find myself mad at them and fighting them, because this is what I know, and I am doing a lot of work on myself on this issue. With my previous manager, I had an extremely good relationship … I was 24 years old, and a very young teacher and she really helped me grow, by providing me with both tools and support.

Tara directly linked her relational difficulties with authority figures at work to her relationship with her neglectful mother, but she also recognized that supportive workplace supervisors can help create positive changes in this regard.

Positive changes were described not only in the context of relationships with workplace supervisors, but also regarding relationships with colleagues. For example, Nina compared her relationship with her previous business partner and the current one:

> I feel I have learned a huge lesson about setting boundaries with people, you know. It's this place of emotional extortion that once I did not know what to do with, and at a certain point in time, I had to say goodbye, so today it is about setting boundaries, yes, really setting boundaries.

It is not surprising that setting boundaries arise as a central issue in Nina's experiences, as homes where maltreatment takes place often challenge the ability to set proper relational boundaries. To sum up, the second theme reveals relational growth processes in the workplace, with various figures, both supervisors and colleagues.

New possibilities in the aftermath of maltreatment

In the third domain, participants described how they perceived vocational settings as offering new opportunities for work-related growth.

Mona, age 44, who underwent emotional abuse and neglect, had begun an occupational change a short time prior to the interview. She had been a freelance graphic designer for most of her adult life and had recently shifted to becoming a teacher. This shift offered a new opportunity, which she embraced with ambivalence, as she described:

> For many years I felt damaged, and the opportunity to work with people and to be their teacher, suddenly I must let go of the damaged self, and emotionally I am not there yet. You see, I do not trust myself completely. You know, there are complex things that … affect. I need to, you know … Suddenly I find myself a teacher after so many years that I sat behind the screen and did not need to deal with the world. I was disconnected from the world for almost 15 years ….

Mona fully realized that the new position could help her let go of what she saw as a "damaged self." However, she was uncertain whether she was ready for such positive change to occur.

Ian experienced such an opportunity as an adolescent, on his first job, living away from his maltreating home:

> I started to work at the kibbutz once a week, at the henhouse. That is where I found meaning … and then [after some time] they let me run the place, manage it! So, at 17 or 18, I ran the henhouse for eight months, so you tell yourself-I am worth something. I have something to do, I am valuable!

Had Ian not been removed from his home by Child Protective Services as a child due to maltreatment, he might not have had the opportunity to work at a young age with farm animals and care for their needs. This experience undoubtedly left an impact on him and perhaps directed him to a career in management. Whether in early career stages or in mid-career, both Ian and Mona's words show how their work lives offered new possibilities that helped them address their childhood traumas.

Finding meaning to the abuse

Participants in this study seemed to be especially engaged with a search for meaning, fueled by their childhood maltreatment, to which the workplace managed to provide some answers, as will be portrayed in the subthemes below. Three subthemes will be presented: being a survivor and a role model; giving what was needed and never received; and making a better world.

Being a survivor and a role model

The first work-related positive change in this subtheme stems from the opportunity to serve as a role model to fellow survivors in the workplace. Sophie, age 46, an attorney, underwent emotional and physical abuse, as well as prolonged paternal incest starting at a young age. As an attorney, she helps many clients who share similar backgrounds in terms of maltreatment:

> I want … to set an example, be a role model to so many girls who have been maltreated … So, they will know that I was like them, I was poor and had nothing to eat, and as a student I cleaned and scrubbed soot off of warehouses after fires and that I was raped and that I … I went through the most difficult things and I decided that I will not give in … And I am simply living my dream now and I insist, I want everybody to know where I came from, because when these girls know where I came from …. it works.

Sophie's words demonstrate the opportunity to grow out of her identity as a victim/survivor, into that of a role model to others. Espousing a newfound philosophy of life, which guides their behavior, survivors serve as role models at their jobs. They model what it means to undergo such traumatic experiences, as well as the resilience and growth that can emerge from it.

Giving what was needed and never received

A second subtheme refers to finding meaning through working with children and adolescents who are undergoing similar experiences to the ones undergone by the participants. However, unlike in the previous suggested subtheme, participants are not serving as role models, but providing the help that they themselves would have benefitted from as children, had it been available. Whether the similarity is in feelings or experiences, it seems that the workplace offers participants a way to find meaning

regarding their childhood maltreatment *via* relationships that reduce other people's suffering. In a way, it is about giving to others what they themselves needed but never received.

Naomi, a social worker who grew up in a family of ten children, was sexually abused by her father as well as by a brother. At the time of the interview, she was starting a new position, working with families of maltreated children in their homes. She was asked by the interviewer about her feelings towards her new position and she replied:

> Oh, that is a [good] question. I am very excited about this job because for me, if only there had been a social worker in my home, if only there was someone who saw me up-close, if only I could have been seen …. So, for me going to the homes and seeing the parents as well as the children, it is sort of a gift …

Neal, age 50, a school vice principal, teacher, and therapist who underwent physical abuse and neglect in childhood, shared a similar message:

> I think that what I felt, I guess a lot of adolescents feel this way, but I felt as if I am the loneliest person in the world, I mean I was certain that there is nobody out there like me, none. None of the adults would talk to me, it was this huge, huge sense of loneliness. And I have worked with many children and adolescents and what is common to all of them, from what I see, is that they are yearning for relationships, and they are yearning for adults to listen to them… This is what drives me crazy, it always surprises me and makes me emotional.

Taking it one step further, Sophie, an attorney who specializes in representation of female victims of sexual violence, and who is a survivor of prolonged paternal incest, reflected on her career choice: "I always go to these places. Women, women, prostitution, women, women, women, I wonder why (chuckle). I am drawn to this place, to rescue, rescue the girls, every one of them ……"

She continued to describe her complex emotions and internal dialog with the maltreated girl she used to be:

> I have a few "Sophies" inside me … Inside me there is Sophie the little girl who was maltreated and is stuck at the age of 12, this girl who was hurt, she just … I carry her in my arms, her dead corpse, I carry her everywhere. I have a lot of anger towards that girl, a lot of pity, all sorts of emotions, but it is also a choice that she dies and there will be a new Sophie, because I cannot be her, I cannot be her … I chose to detach …

Finally, Sophie connected her painful history to her daily work by saying: "Every girl like that which I manage to help, … I am helping the girl that was me, I am just helping her, it is in her honor, yes, exactly." Sophie finds meaning in the abuse she suffered by offering help to other girls, help which she felt was not available to her.

Moving from present work experiences to future career plans, Yolanda described how she planned to advance from being vice principal to principal in a high school for girls, a workplace which provided her with an opportunity to offer the students and their families what she was missing when she was growing up:

> I should be a school principal, and especially with adolescent girls. It is definitely because I had such a horrible time during adolescence, so appalling, I was depressed for years and so I know I have something to contribute to these girls, as well as to the adults who are in contact with them, explaining things to them, giving them information…

Yolanda hoped to give to others what she felt she never received, much like Sophie, Neal, Naomi, and other participants in the study. Their wish to give seems to be part of their existential journey and offers them another path to find meaning in the horrors of their childhoods.

Making a better world

A third subtheme refers to finding meaning through work by attempting to make the world better. This search was evident through all the stages of the participants' careers, taking on various forms. Some described having such dreams early on, as adolescents. For example, when having to choose a field of study in high school, Michelle selected biology, a commitment that remained steady during her undergraduate and graduate studies, as well as her *post doc*. Michelle explained her choice: "The fantasy was to save someone. If I cannot save myself, then at least I will save something in the world." Indeed, later in her career, she studied cancer in the hopes of contributing to the discovery of a cure for it.

Describing her adolescence, Nina recalled:

> Look, when I was eighteen, I had this yellow notebook and, in that notebook, I wrote that my vision was to end human suffering. I always laugh when I talk about this in workshops, the aspirations that an eighteen-year-old girl has, probably out of my own suffering, but not only from that … But I really do feel that this vision … I wrote it down, it is there, and it has stayed with me along the way. I mean, I really feel that this is my mission, to always feel that you are making a change, making a difference, that somehow the suffering in the world decreases.

At the age of 44, Mona reflected on her many years of work as a graphic designer:

> I look at my own biography, how during those years [childhood] the world was ugly and unjust. In a way, I am always creating composites. What do I do at my work? I take elements and I make composites. I organize things in an aesthetic manner, and I think this is because of the hole that

> was created inside of me. My sense of aesthetics and art has been very strong from a very young age, so I want the world to be prettier. I keep organizing things to make them prettier and that is what I have been doing throughout the years.

As Michelle and Mona described, the world they experienced as children needed to be fixed, as it was unjust, cruel, ugly, and filled with suffering. The participants appeared to be searching for ways to change this world for the better. Even if this may appear to be a grandiose motivation, it seems that it serves as a way to create meaning out of their own childhood traumas. Later in their careers, such ambitions became concrete career decisions, as described by Sophie, an attorney:

> Each case that I take must fit two criteria. First, whether I can get the client money. And at the same time, it must be a case which will bring about social change. I only take cases in which the ruling can create a systemic widespread change for many people and that is what I do.

Indeed, the impulse of striving to make a better world was inherent in many of the work narratives brought forward by the participants of the study.

Work-related appreciation of life

A fifth theme of positive changes refers to a sense of work-related appreciation of life. This was reflected in the words of Sophie:

> I am 46 years old and I think that this is the time in my life that I am working the hardest I have ever worked… But this is the time in my life where I am not only working the hardest; I am also the happiest and most satisfied. Really. I wake up every morning and I feel the joy of creation.

As similarly described by other participants, Sophie found ways in which her career provided her with numerous growth-related opportunities. It is not surprising that she reported such appreciation of life and gratitude. Work offered participants an opportunity to acknowledge the positive aspects in their lives and paradoxically, to provide a sense of reconciliation with painful childhood experiences.

Discussion

Findings of the study indicate that participants' work-related PTG could be categorized by using the five domains of growth (personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change) suggested by Tedeschi and Calhoun (1996). However, these themes were uniquely linked to the context of their vocational lives, and several subthemes which emerged offer an extension of these domains. Participants directly connected these positive workplace changes to their past as maltreated children. The findings regarding developments in the following domains will be discussed below: changes in self, relating to others, new possibilities, finding meaning to the abuse, and appreciation of life.

Previous studies have documented positive changes regarding self-worth in the aftermath of trauma. In a similar vein, the current study shows that struggling with the consequences of CM, while it poses many difficulties, also leads to developing strengths which later manifest themselves in work settings. This is especially important since trauma usually harms the views regarding the self (Janoff-Bulman, 2010). These findings show that participants grasped the changes they underwent as dialectic in nature: alongside the benefits they perceived, they also reported great suffering and challenges related to self-perception.

Another form of positive changes in self, which emerged from the interviews, was grasping work as a form of resistance to the hurtful and demeaning childhood messages given by parents. Participants described their career choices and activities as a form of opposition to such belittling messages. This growth may be based, first and foremost, on refusing to internalize the toxic messages they received as children. Later, as adults, this subtheme was framed as a continuous dialog with the maltreating parent. In their eyes, this internal dialog takes place throughout their careers. Many of their successes and achievements are experienced as a celebration, which serves to prove the maltreating parent wrong.

In terms of relational change, previous research has shown that adult survivors of CM may struggle with general relational difficulties (e.g., Paradis and Boucher, 2010), as well as relational challenges at work (Lisak and Luster, 1994; Hall, 2000; Ballou et al., 2015). For example, survivors may reenact maladaptive internal schemas (Ballou et al., 2015) or suffer from workplace revictimization (Icekson et al., 2021). However, the work environment may also offer opportunities to experience growth *via* workplace relationships.

Regarding relational growth, while challenges were not infrequent in the narratives of survivors, our findings suggest that participants also experienced positive relational changes throughout their careers, with both colleagues and supervisors. Specifically, the participants told of an improved ability to set boundaries, as well as to benefitting from a caring supervisor. Coping with traumatic events offers survivors an opportunity to reevaluate their relationship with others, to develop new relationships, and to establish more intimacy in existing relationships (e.g., Weiss, 2004; Canevello et al., 2016). While previous studies on survivors of CM have mainly focused on relationships with friends and family members (e.g., Glad et al., 2013; Schaefer et al., 2018), this study extends previous findings through suggesting a path of work-related relational growth. Moreover, since survivors are coping with long-term effects of aversive childhood relationships, the growth-related patterns which were reported correspond with the characteristics of these relationships. Growing up in chaotic and unpredictable homes, in which personal boundaries of the child were not respected, the increased ability to set boundaries is especially

noteworthy. Our findings are in some respects congruent with the findings of McMillen et al. (1995), according to which survivors of CM felt better able to protect themselves from abuse and harm.

Theoretically, such findings may be explained *via* changes in psychological constructs such as attachment style (Bowlby, 1982), or differentiation of self (Bowen, 1985). According to these theories, significant relationships during adulthood (including workplace relationships with supervisors) not only resemble primary internal working models, but also could alter them (e.g., Blustein, 2011; Mikulincer and Shaver, 2020). Though our findings offer an important perspective, they should be considered with caution. The relational growth paths for adult survivors of CM in the workplace, as well as their underlying theoretical mechanisms, have been underexplored and require further scholarly attention. Moreover, this domain of growth has previously been found to be less common among survivors (Woodward and Joseph, 2003), since in many instances the trauma persists in relational issues (e.g., Paradis and Boucher, 2010).

Turning to another domain of change, our participants experienced new opportunities *via* the workplace. The survivors told of exploring new vocational opportunities which opened as a result of the struggle to cope with CM. These new opportunities not only offered them a chance to earn a living, but also to explore their strengths, and to experience themselves as competent, able, and responsible. As has been suggested by Tedeschi and Calhoun (1996, 2004), during the process of struggling with adversity, survivors discover new options and opportunities that were not available to them prior to the trauma.

The opportunities that were pursued by our participants entailed actual, "real-life" career changes, similarly to what has been referred to as "real" growth by Frazier et al. (2001). Such changes correspond with one type of change offered by the Janus-Faced model of PTG (Maercker and Zoellner, 2004). According to this model, PTG entails two components. These components might be found in the same individual or within different individuals. Each of them has a different developmental path and different influences on adjustment. The first is a functional component which represents authentic growth and is related to healthy adaptation. The second is a dysfunctional one which strengthens an illusion and might co-exist with denial. Such dysfunctional aspects of illusory PTG have also been empirically supported (e.g., Lahav et al., 2020). However, the narratives brought forward by our participants appear to tell of the presence of the functional component, as the opportunities opened new paths for them. Indeed, the model suggests that in positive adjustment, the functional component grows over time while the dysfunctional one subsides.

Not surprisingly, survivors' attempts *via* work to give meaning to the abuse they experienced emerged as a substantial part of their narratives. Within this theme, three subthemes emerged: being a survivor and a role model, giving what was needed and never received, and finally, making a better world. This corresponds with the domain of spiritual change, a feature of PTG which reflects an engagement with spiritual, religious, or existential matters (Tedeschi and Calhoun, 1996). Participants in this study seemed to be especially engaged in an existential search, fueled by their childhood maltreatment, to which the workplace managed to give some answers.

It has been previously claimed that recovery after trauma involves the alteration of one's meaning structures (Linley and Joseph, 2004). When trauma disrupts the identity of the self, as it frequently does, it also disrupts associated motivations and meaning in life (Muldoon et al., 2019). According to Tedeschi and Calhoun (2004) meaning-making is a core component of reframing the traumatic experience. Indeed, the positive relationship between PTG and meaning-making is evident in the literature (Janoff-Bulman, 2006; Triplett et al., 2012; Walker-Williams and Fouché, 2017; Zeligman et al., 2019).

Findings from several reviews corroborate that PTG after childhood trauma can be understood as a meaning-making process. In a literature review regarding PTG after sexual violence, findings indicated that survivors reported positive change characterized by engaging in advocacy and activism as a concern for others (Ulloa et al., 2016). Also, a recent systematic review of PTG after sexual traumatization found that utilizing altruistic actions and activism to prevent further sexual victimization facilitated growth among women (Guggisberg et al., 2021). Finally, a recent review of meaning-making by women survivors of childhood sexual abuse found that advocating for and tending to those who have been in similar situations, helps create a post-trauma identity by acknowledging the strengths born from the struggle to cope with CM (van der Westhuizen et al., 2022). Taken together, these reviews indicate that helping others may be a therapeutic vehicle for PTG, corresponding well with the meaning-making journey described by our participants.

The participants in our study seemed to direct their altruism and dedication to others *via* their work lives. Such a perception regarding work corresponds with the view of work as a calling. It has been suggested that the two strongest characteristics of this concept are a powerful sense of the meaningfulness of one's career and the feeling that it is being used to help others in some fashion (Dik and Duffy, 2009). These two dimensions were highly evident in the stories shared by many participants. Some have suggested that the choice of a vocation as a calling is guided by a transcendent force (Hagmaier and Abele, 2012).

Lastly, as participants in the study reflected on their lives, they expressed a sense of work-related appreciation, gratitude, and fulfillment from their careers. Child maltreatment threatens the sense of self and many of our participants told of an ongoing dialog with death and dying. Such proximity with traumatic experiences and the threat of death from a young age undoubtedly creates an existential quest. This may lead to a sense of despair, but also to an ongoing struggle to develop an appreciation of life. Work seemed to offer our participants a means to experience life as positive and valuable, as has been described in the various themes discussed above. Hence it is not surprising that, overall, the sense of work-related appreciation of life is also positively enhanced.

To sum, while the vocational arena may entail many possible struggles for survivors of CM (e.g., Currie and Widom, 2010; Thielen

et al., 2016), the results from this sample of high-functioning adults show, that for some survivors of CM, work can be a source of positive psychological changes, if they are able to not succumb to the challenges involved in it. Participants in the current study not only had impressive and successful careers, but they also gained many opportunities to heal some of their long-lasting psychological wounds.

Limitations and future research

As a qualitative study, several inherent limitations should be noted. The first potential limitation is interviewer bias (Amis and Silk, 2008), which we attempted to minimize by following rigorous phenomenological inquiry guidelines (Tracy, 2010). Second, sample bias may influence the results, and the sample of high-functioning adults may be an overly homogeneous one in terms of current socioeconomic status, education level, as well as openness regarding past CM. Future research should incorporate more varied samples in terms of socioeconomic status, ethnicity, and work status, as well as take into consideration past PTSD, history of treatment, the severity of abuse, and level of education when aiming to explain work-related PTG. Future samples may also offer an opportunity to explore whether certain themes may be more frequent among certain types of professions. Moreover, our findings are based on a relatively small sample, and may be influenced by social desirability or memory bias, especially for those participants who were recruited through acquaintances. Understanding PTG should consider its developmental nature, and thus, we recommend that future studies on work-related PTG employ quantitative methods, as well as longitudinal designs. In addition, further studies should consider the possible influence of demographic, organizational or abuse-related variables on PTG. Additionally, due to the study design, it is not possible to determine whether the positive changes described by participants can be strictly considered PTG, as some of these changes (e.g., learning to attain better boundaries or finding a new vocational path) may be considered part of normative adult development. Extending the methodological approach to studying the vocational lives of workers who are CM survivors and those who are not, could help to discern the concepts suggested in the current study. Therefore, despite their contribution, the current findings should be interpreted with caution.

Conclusion

Over the past 20 years, research has certainly shown the existence of post-traumatic growth (PTG) following life-threatening traumatic experiences. Positive psychological changes have been observed in relation to various types of traumas and have been documented across cultures and populations. However, work-related PTG has been less explored. Previous studies have demonstrated that work-related PTG may be apparent when workers are exposed to traumatic experiences at work, either directly or vicariously. The current study contributes to this line of research, by demonstrating the existence of work-related PTG stemming from trauma occurring in childhood, specifically childhood maltreatment.

All five previously recognized domains are apparent in the narratives of participants, when describing work-related PTG, i.e., personal strength, relating to others, appreciation of life, openness to new possibilities, and spiritual change. Moreover, the vocational experiences described by participants portray a meaning-making journey in their work lives offering resistance to demeaning childhood messages and helping to develop personal strengths. It also offers an opportunity to experience beneficial relationships both with managers and colleagues, as well as opens more opportunities for further personal and professional development. Through their existential journies, survivors derive meaning from being role models, giving others what they themselves have never received, and striving to make a better world. Finally, participants describe greater appreciation of life through their work. To conclude, the workplace seems to be more than a location to make a living for some survivors of CM, but rather an arena that holds many possible answers to their lifelong quest to make peace with their wounded inner children.

Data availability statement

The datasets generated during and/or analyzed during the current study are not publicly available due to ethical standards. Requests to access the datasets should be directed to avitalk@ruppin.ac.il.

Ethics statement

The studies involving human participants were reviewed and approved by Ben-Gurion University of the Negev, Beer-Sheva, Israel. The participants provided their written informed consent to participate in this study.

Author contributions

AK-T and TI recruited and interviewed participants, performed the qualitative analyses, and jointly contributed to the development of the study design, integration of findings, and writing of the manuscript. All authors contributed to the article and approved the submitted version.

Funding

This research was supported by funding from Ruppin Academic Center, Peres Academic Center, and the Haruv Institute. These organizations had no involvement in the study design; in the collection, analysis, and interpretation of data; in the writing

of the report; and in the decision to submit the article for publication.

Acknowledgments

The authors wish to thank Omri Radai, Atalia Rasouly, Roni Levy, and Amit Mazooz for assisting with transcribing the data, and Donna Dalnekoff for her help in editing the manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

Supplementary material

The Supplementary material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.1048295/full#supplementary-material

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frontiers | Frontiers in Psychology

TYPE Conceptual Analysis
PUBLISHED 08 February 2023
DOI 10.3389/fpsyg.2023.1031602

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Psychology for Clinical Settings, a section of the journal Frontiers in Psychology

RECEIVED 30 August 2022
ACCEPTED 09 January 2023
PUBLISHED 08 February 2023

CITATION
Chin D, Smith-Clapham AM and Wyatt GE (2023) Race-based trauma and post-traumatic growth through identity transformation. *Front. Psychol.* 14:1031602. doi: 10.3389/fpsyg.2023.1031602

Race-based trauma and post-traumatic growth through identity transformation

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Race-based trauma has been linked to multiple adverse health and mental health outcomes, including hypertension, post-traumatic stress, anxiety, and depression. While the possibility of post-traumatic growth (PTG) has been investigated following other types of trauma, relatively less work has been done on PTG following race-based trauma. In this article, we present a theoretical framework integrating three areas of research: race-based trauma, PTG, and racial identity narratives. Based on the work on Black and Asian American identity and integrating theory and research on historical trauma and PTG, this framework posits that the transformation of externally imposed narratives into more authentic, internally generated ones can serve as an important influence that sparks PTG after racial trauma. Based on this framework, strategies and tools that enact the cognitive processes of PTG, including writing and storytelling, are suggested as ways to promote post-trauma growth in response to racial trauma.

KEYWORDS

race-based trauma, post-traumatic growth, identity narratives, Black Americans, Asian Americans

Introduction

Race-based trauma is increasingly recognized within psychology as a distinct type of trauma, resulting in post-traumatic stress symptoms (Chin et al., 2020, p. 9), including hyper-vigilance (Carter et al., 2005; Carter and Forsyth, 2010) and dissociation (Polanco-Roman et al., 2016), as well as depression, generalized anxiety, and somatic symptoms (Noh et al., 1999; Belle and Doucet, 2003; Williams et al., 2003, 2018; Alegría et al., 2008). The evidence for adverse health and mental health effects owing to racial discrimination is overwhelming, consistently found among diverse samples of African Americans, Latin Americans, and Asian Americans (Gee et al., 2007, p. 2; Lee and Ahn, 2013; Nadimpalli et al., 2014; Torres and Vallejo, 2015). In addition, race-based trauma, unlike other types of trauma, has the distinction of being a common occurrence in the lives of targeted individuals, yet with potentially damaging consequences (Carter et al., 2016; Polanco-Roman et al., 2016). The accumulation of racial stress predisposes individuals to psychological symptoms and disorders (Gee et al., 2007; Williams et al., 2021). Moreover, racial microaggressions, a subtle and covert form of prejudice or discrimination, have been linked to depression symptoms and negative affect (Torres et al., 2011; Nadal et al., 2014).

With recent geopolitical events instigating a rise in race-based violence in the United States, there is an urgent need for greater attention to racial trauma on the part of researchers and mental health professionals. While hate crimes against African American citizens span the history of the United States, the rise in the open expression of white supremacist ideology has precipitated recent mass shootings targeting African Americans in Buffalo, Milwaukee, and

other U.S. cities (Collins, 2020; Rahman, 2021). The brutal killings of George Floyd, Breonna Taylor, and other Black citizens have triggered mass outcry and protests worldwide (McLaughlin, 2020). Additionally, attacks on Asian Americans rose 149% in 2020, sparked by racial slurs used by political leaders blaming Asians for COVID-19 [Center for the Study of Hate and Extremism (CSUB), 2020; Gover et al., 2020, pp. 649, 653–663]. In addition to the direct damage to the targeted individual's psychological health, racial violence appears to have spillover effects onto the surrounding community. For example, a recent study found that when an unarmed Black citizen is killed by the police, the surrounding population evidenced poorer mental health in the 2 months following the incident, compared to incidents in which an armed Black citizen is killed or an unarmed White citizen is killed (Bor et al., 2018). These spillover effects of racial trauma are also exemplified by the widespread distress evidenced in the Asian American community during the COVID-19 pandemic. As hate crimes on Asian Americans have risen, mental and emotional distress among Asian Americans has increased accordingly (Cheah et al., 2020; Hyun et al., 2021), including among those who did not personally experience an attack (Wu et al., 2020). Furthermore, constant vigilance evoked by race-related threat has been associated with cumulative stress and depression symptoms across diverse minorities groups (Woody et al., 2022). In a survey conducted in 2022, nearly one-third of Black Americans (32%) and one-fifth (21%) of Asian Americans said they worried every day or almost every day that they might be threatened or attacked because of their race or ethnicity, compared to 4% of White Americans, and many more changed their everyday routines to avoid possible attacks (Pew Research Center, 2022). Consistent with the effects of exposure to racism in the context of a society in which racism pervasive, the Diagnostic and Statistical Manual-V (DSM-V) has expanded its diagnostic criteria for Post Traumatic Stress Disorder (PTSD) to include instances in which a person, "witnesses a traumatic event occurring to someone else or learns of a traumatic event that occurred to a close other" (American Psychiatric Association, 2013, p. 271).

Post-traumatic growth (PTG) is a construct that attempts to capture the positive psychological change that may ensue after a traumatic experience (Calhoun and Tedeschi, 1999). While resilience refers to an individual's ability to cope with trauma and return to the pre-trauma state of functioning (Smith et al., 2019, p. 3), PTG describes a profound change within an individual in which a traumatic experience prompts deep questioning, deconstruction, and reconstruction of one's basic schemas about oneself and about life, ultimately resulting in personal growth (Calhoun and Tedeschi, 2004, pp. 99–101). Some manifestations of growth include more meaningful relationships, a greater appreciation for life, an increased sense of personal strength, deeper spirituality, and a recognition of new directions and goals for one's life (Calhoun and Tedeschi, 2004, p. 95; Smith et al., 2019, p. 4). Studies have shown that promoting PTG may be more important for supporting wellbeing after trauma than reducing post-traumatic symptoms (Hamby et al., 2022).

According to the Affective-Cognitive Processing Model of PTG (Joseph et al., 2012), the process that underlies PTG involves repeated appraisals of the traumatic event, with each appraisal instantiating challenges to one's previously existing schemas, which prompts resolutions to the fractured schema until it is reconstructed in a new, meaningful manner. Growth occurs when the individual is able to reflect on the trauma from a relative distance and create meaning from the experience. Empirical research based on this model further elucidates this process, in that two distinct types of rumination in the appraisal process emerged: intrusive rumination, which occurs with volition, and deliberative rumination, which refers to intentional reflection (Tedeschi and Blevins, 2015). Studies have shown that both types may be necessary for PTG, in that intrusive rumination soon after the traumatic experience predicts deliberative rumination (Cann et al., 2011), and that both higher levels of both may predict PTG (Calhoun et al., 2000; Tedeschi and Blevins, 2015).

This model of PTG is also consistent with studies demonstrating that higher levels of trauma may be needed to achieve growth (Jirek and Saunders, 2018). The notion that significant levels of trauma is necessary for PTG is supported by studies showing that higher PTSD symptoms predicted higher PTG (Hyun et al., 2021). However, levels that are too extreme may be inhibiting (Kleim and Ehlers, 2009; Kunst, 2010). That is, when the event is not significant enough for individuals to question and deconstruct their existing schemas, no growth happens. However, if trauma is so extreme as to overwhelm individuals' cognitive capacity to reflect deliberately, they are likely to be "stuck" in intrusive rumination and unable to progress to deliberative rumination and meaning-making (Joseph et al., 2012). Thus, the ideal circumstance for PTG to occur is when the event is significantly traumatic to trigger reflection, yet leaving the individual with enough coping ability and resources to make meaning of the event.

Race-based trauma and post-traumatic growth

While PTG is a reliably demonstrated phenomenon, its relationship to race-based trauma remains less so. Indeed, the very notion of "post" traumatic growth poses a challenge with respect to racial trauma, as such events are likely to be persistent, recurrent, and cumulative rather than one-time, discrete events. The fact that traumagenic events are now understood to encompass observed or vicariously experienced events (American Psychiatric Association, 2013) captures the ubiquitous and open-ended nature of race-based trauma for racial minorities. The demonstrated spillover effects onto the community when an unarmed Black citizen dies at the hands of the police (Bor et al., 2018) and the long list of people who have died that way (Rahman, 2021) support this viewpoint. How, then, can PTG be reconciled with race-based trauma, when it is not "post," and trauma is collective, pervasive, and persistent? Theories on historical trauma, focusing on mass-level collective, multigenerational, and transgenerational trauma such as the colonization and eradication of Indigenous peoples, provide frameworks that have significant overlap with racial trauma (Bryant-Davis and Ocampo, 2005; DeGruy-Leary and Robinson, 2005; Hyatt-Burkhart and Lopez Levers, 2012; Mohatt et al., 2014; Williams-Washington and Mills, 2018; Ortega-Williams et al., 2019). To illustrate, the Spokane/Coeur D'Alene writer Sherman Alexie alludes to the unmitigated transgenerational grief and the erasure of cultural identity that stems from the disappearance of the wild salmon, therein linking historical loss with contemporary suffering:

"After the Grand Coulee Dam murdered our wild salmon, we stopped being Spokane Indians and became a Paraphrase of Spokane Indians/Our identity has been clarified for us/We are the Unsalmon People/We are Unsalmon/We are Un" (Alexie, 2017, p. 160).

The entrenched grief that spans centuries among subjugated and colonized peoples requires a distinct strategy to promote PTG.

Ortega-Williams et al. (2021) postulate several important elements in this process: (a) deliberative rumination; (b) creating redemptive narratives; (c) discovering deeper meaning. As noted earlier, this has much overlap with models of PTG that do not explicitly address historical or racial trauma, particularly in the elements of deliberative rumination and meaning-making. Where they differ may be an emphasis on creating redemptive narratives, that by using storytelling and action, oppressed groups and individuals may reclaim cultural tools, values, and priorities (Ortega-Williams et al., 2021). While this framework applies to contemporary as well as historical trauma, according to the authors, it has been criticized for over-emphasizing the legacy of past violence and insufficiently addressing ongoing exposure to current structural violence (Kirmayer et al., 2014).

Racial identity

Racial/ethnic identity is an aspect of one's self concept derived from a sense of belonging and commitment to a particular racial or ethnic group, and includes self-identification, pride and positive valuation of the group, and taking part in the group's traditions, practices, and values (Phinney, 1990; Ashmore et al., 2004). It has been posited as a protective factor in mental health (Phinney, 1990; Cokley, 2007), associated with fewer depressive symptoms (Tummala-Narra, 2015), less stress (Espinosa et al., 2018), and higher self-esteem (Phinney et al., 2001; Umaña-Taylor et al., 2004), perhaps because individuals would attribute discrimination directed at them not to their personal characteristics but to social injustice (Lee and Ahn, 2013). However, a strong racial identity might also lead one to perceive more discriminatory behavior and to interpret ambiguous incidents as discriminatory (Sellers and Shelton, 2003), as has been found in a meta-analysis which concluded that for Black Americans, a greater sense of racial belonging was associated with more perceived discrimination, indirectly affecting psychological distress (Lee and Ahn, 2013). A recent large-scale study found that high racial identification intensified the negative mental health effects of racial discrimination for American Indians/Alaska Natives, and Latinx individuals, while moderate racial identity served as a buffer for Asian Americans and Black Americans (Woo et al., 2019). Furthermore, other studies have found that those with great racial salience are more able to identify racism when it occurs, which triggers the stress response (Franklin-Jackson and Carter, 2007). Thus, racial identity may be a mediator or moderator through which race-based trauma leads to eventual outcomes, determining whether deterioration, little or no effect, or growth occurs in the aftermath of trauma. As such, racial identity narratives may serve as a lever upon which PTG may be nurtured and developed. In the following section, we explore the concept of identity narratives and describe the narratives externally imposed upon Asian Americans and Black Americans throughout American history, based on the Racial Triangulation Theory of Kim (1999) and their relationship to racial trauma. We then explain how transforming these externally imposed identity narratives into internally generated, more authentic identities can catalyze healing and create PTG.

Identity narratives

Personal narratives are stories constructed by individuals about their lives that give meaning and define who they are (McAdams et al., 2006; McLean, 2008). The resulting identity, termed narrative identity, is the "internalized and evolving story of the self" (McAdams, 2011). There exists a vast literature examining the multitude of issues related to the development and importance of narrative identity; particularly relevant to our purposes here is one involving the authorship of stories, namely, individual vs. society authorship. According to McAdams (2018), narrative identity is constructed through an iterative process of experiencing events, narrating these experiences to others, editing their narratives in response to others' reactions, experiencing new events, and so on. Rarely, if at all, is the authorial process done with complete freedom but rather within a historical and cultural context, with its specific constraints and opportunities (McAdams, 2018). Herein lies the influence of externally imposed narrative identities, especially salient for minoritized individuals, who experience and may internalize the constant exposure to racist narratives about their group over time. Indeed, individuals draw heavily on the "prevailing cultural norms and the images, metaphors, and themes" they encounter in their social contexts (McAdams, 2011).

The racial themes encountered by minoritized groups in America throughout its history have been extensively discussed elsewhere and their full accounting is beyond the scope of this analysis. We endeavor to focus on two examples—Black Americans and Asian Americans—and to highlight the aspect most relevant to our thesis, namely, the externally imposed identity narratives and their role in exacerbating racial trauma or enhancing PTG[1]. Dating back to the early 1600's when the first Black Americans were abducted from Africa and brought to the United States to work as slaves, the myth that Black Americans were inferior relative to Whites has been propagated and perpetuated. This "less than" narrative was, at its most literal, codified in the United States Constitution, wherein Black individuals were considered to be three-fifths of a White individual, and continuing to the present day, encompassing virtually every domain of human ability and enterprise. Much has been written about the blatant stereotyping of Black men as more violent and criminal (Oliver, 2003). More recent identity narratives imposed upon Black Americans include being less intelligent, less articulate, lower-achieving, and possessing lesser leadership ability than other ethnoracial groups (Sue et al., 2007; Herrnstein and Murray, 2010; Robinson-Wood et al., 2015; Taylor et al., 2019).

The history of Asian Americans in the United States dates back to the 1800's, when large numbers were brought in primarily from China as exploited labor to work on the transcontinental railroad and in the mines, and from Japan and the Philippines to work on sugar plantations in Hawaii (Okihiro, 2005). Subjected to lynchings and other forms of racial violence and discrimination, these groups were nevertheless instrumental in the building of American Infrastructure and Society (Choy, 2022). However, in spite of Asian Americans' integral contributions and long histories in this country, the identity imposed upon them to the present day remains one of a foreigner. For example, "where are you from?" Is a question that many Asian Americans, to this day, have been asked more than once, along with, "do you speak English?" (Wu, 2002; Sue et al., 2007). While Black Americans have had to contend with the externally imposed identity narrative of inferiority, Asian Americans have been long viewed

1 In focusing on Black Americans and Asian Americans, we do not mean to imply that the degree of racism toward these groups are equal or their suffering comparable, nor to imply that Latinx, Indigenous Americans, and other groups have not also been targets of racism in the United States.

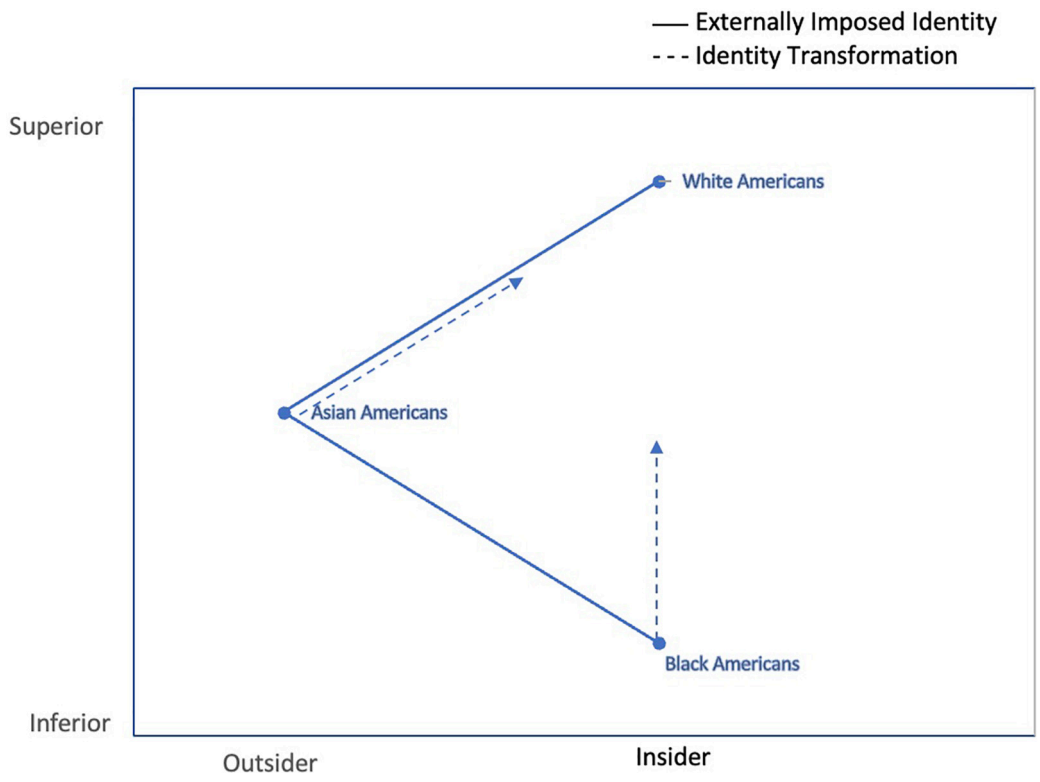

FIGURE 1
Adapted from Kim (1999) Racial Triangulation Theory.

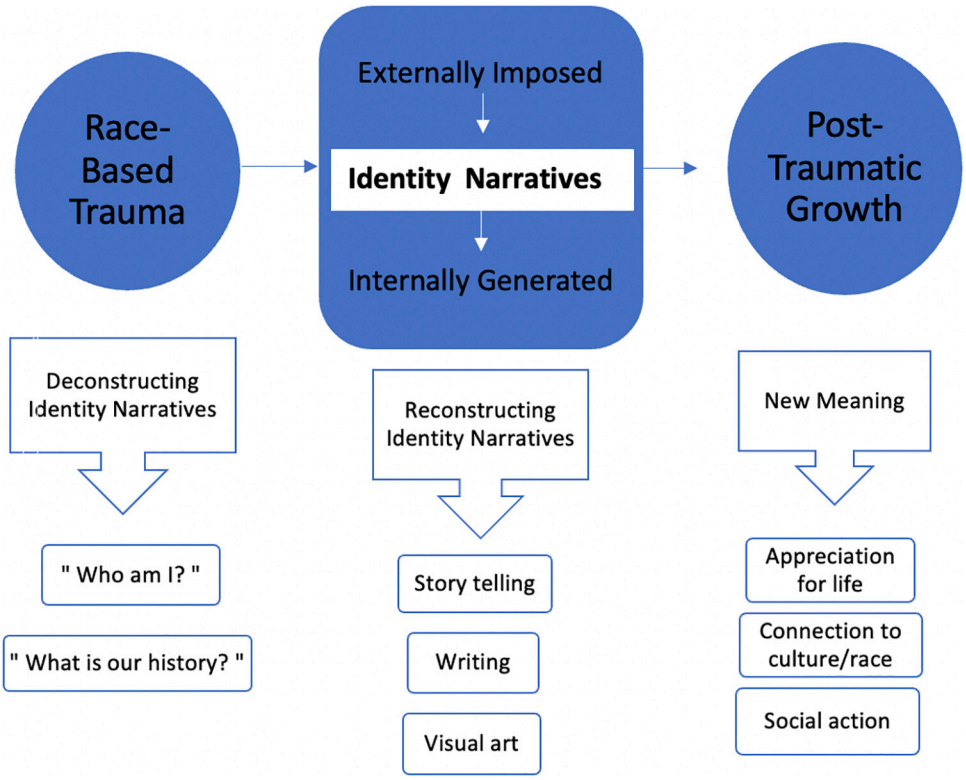

FIGURE 2
Framework for post-traumatic growth following race-based trauma.

as the perpetual foreigner. Research has shown that these identity narratives, when internalized, harm the psychological wellbeing of individuals. For example, when Black youth perceive lower regard from the public, the discrimination they experienced on the previous day were associated with an increase in depressive symptoms (Seaton and Iida, 2019). This finding is consistent with the belief that the broader society views Black Americans in a negative light (Sellers et al., 2006) as well as the internalization of these views (Cross et al., 2017). On a cultural level, these narratives perpetuate racism and race-based violence and discrimination, as they justify racist behavior and inequitable social conditions.

Based on the histories of Black and Asian Americans in the United States, Kim's (1999) Racial Triangulation Theory describes the relative positions of Black Americans and Asian Americans to Whites according to two dimensions: superior/inferior and foreigner/insider (see **Figure 1**). Along these two axes, Black Americans are positioned at the inferior and insider end, Asian Americans are placed in extreme foreigner area and the middle of the superior/inferior axis, while White Americans are high on both superiority and insider status. The positioning of these groups keep both groups "in check," beneath the status of White Americans while pitting one against the other, thus accruing economic and other advantages to White Americans (Kim, 1999). While Kim's theory focuses on Black and Asian Americans, the theory may be reasonably applied to other minoritized groups as well. For example, Latin American groups may be viewed in the middle of both axes, less foreign than Asian Americans and less inferior than Black Americans, though lesser than White American, and Indigenous peoples would plausibly be insiders but inferior to White Americans. While the sociological analysis is explicated elsewhere (e.g., Kim, 1999), the psychological implications are clearly relevant to our proposed framework and supported by empirical research: these externally imposed identities cause abiding psychological harm, in the form of post-traumatic stress, depression, and other disorders. In the face of racial trauma, these identities are triggered and likely to cause further psychological damage. Within our framework, we postulate that the transformation of externally imposed identity narratives into internally generated, integrated, and culturally aligned ones has tremendous potential to heal racial trauma and spark PTG.

Transforming racial identity narratives to foster post-traumatic growth

As shown in **Figure 2**, identity transformation is the mechanism through which race-based trauma can lead to PTG. Consistent with the Affective-Cognitive Processing Model of PTG (Joseph et al., 2012), the experience of being targeted because of one's race may trigger the questioning of one's identity and the deconstructing of that identity. This is also consistent with the idea of an "encounter" in Cross' model of racial identity development (Cross and Vandiver, 2001), which refers to a stimulus that triggers identity exploration, as well as research on adolescent identity development, in which identity is observed to undergo reconfigurations in accordance to shifts in contexts (Hughes et al., 2006). For example, if one has previously lacked a historical awareness of racism, a shift in the social context such as heightened attention to racial attacks, whether directly or indirectly experienced, may trigger a cascade of questions about one's racial position (e.g., "I'm not as safe as I once thought"). In addition, the experience may lead to a new grief and an awareness of identity as located in a specific culture and history (e.g., "what is my group's history?"). This process is fundamentally one of deconstructing of one's narrative identity from that which is externally imposed to one that is internally generated. Vis a vis the Racial Triangulation Theory (**Figure 1**), for Black Americans, the inferiority narrative may be acknowledged as a basis for the racial trauma the individual has experienced and reconstructed toward greater superiority through the active countering of the narrative. For Asian Americans, the transformation process moves the outsider narrative toward the insider using various means, including bolstering knowledge of Asians in American history and engaging in projects that highlight their intertwined history with that of the country. Similarly, for Latin and Indigenous Americans, the rejection of outsider and inferior statuses and the building of an identity congruent with their true cultural history may be a pivotal step toward PTG.

The internalization of inferiority beliefs has been hypothesized as the mechanism by which racial discrimination influences psychological functioning for Black Americans (Jones, 2000). Thus, in that context, identity is the fulcrum by which change can happen, encompassing both temporal (past and present) and social (individual and the collective) perspectives. This process addresses the issue of "post" traumatic growth being an awkward concept as applied to race-based trauma, as racism is insidious and ongoing. While externally imposed identity narratives may continue to evolve in society (e.g., the crude racial stereotypes in the past century replaced by more sophisticated racist narratives), strengthening one's own racial identity internally continues to be an imperative in the context of pervasive racist assaults on one's identity. The focus on racial identity narratives also aligns with the historical trauma framework (Ortega-Williams et al., 2021), which deals with mass-level, intergenerational trauma such as genocide, and which has been criticized for overlooking the effects of present-day racial trauma (Kirmayer et al., 2014), as questions about one's racial identity will likely raise the collective history of the group.

Research on narrative identity focuses on verbal tools to construct and reconstruct narratives (e.g., Adler et al., 2017; McAdams, 2018). The notion of self-labeling and the re-appropriation of one's identity has been linked to physical and psychological wellbeing (Wang et al., 2017; Cervone et al., 2021). As a means to create and strengthen that identity, oral storytelling, and autobiographical writing have been used as part of clinical interventions (Davis et al., 2021). Similarly, Pennebaker's expressive writing paradigm (Pennebaker and Chung, 2011; Pennebaker and Smyth, 2016) has shown robust positive effects on health and emotional wellbeing 3 months later. These effects have been found in a plethora of studies of traumatic experiences ranging from severe traumas such as the Holocaust and sexual assault to less severe ones such as losing a job (Pennebaker and Chung, 2011). In trauma writing interventions, participants are asked to write freely without structured prompts about their trauma over a period of time. While the health effects of expressive writing have been widely demonstrated, the mechanism by which these outcomes are effected have been unclear, and multiple pathways, including cognitive, emotional, social, and biological, have been implicated (Pennebaker, 2004). One significant pathway may be the adoption of a new perspective, as words indicating insight or new understanding (e.g., "I realized"; "I see now") were correlated with positive outcomes (Pennebaker and Chung, 2011).

In studies on the evolution of narrative identity over the life course, McAdams (2018) has used a semi-structured interview format

with specific prompts that highlight key aspects of a person's life, including: (1) high point; (2) low point; (3) turning point; (4) challenges; and (5) dreams, hopes, and plans for the future. Both formats may be integrated and adapted to reconstruct one's racial identity narrative following race-based trauma through a series of questions or prompts; for example, "what was your first memory that included an awareness of your racial background?" A critical prompt would be one that centers around the pivotal race-based trauma, per Pennebaker's studies, and the breakdown of assumptions that lead to a new perspective and narrative. Specifically, with respect to Black Americans and the externally imposed inferiority narrative, one prompt might ask "what are some views about Black Americans that others seem to hold?" To stimulate an internally generated narrative: "what are your views?" Similar prompts may be used for Asian Americans and other minoritized groups. Through this process, participants are doing the cognitive work of reappraising the incident, apropos the aforementioned PTG theories (Joseph et al., 2012; Tedeschi and Blevins, 2015), which also aligns with the Historical Trauma framework of deliberative rumination, creating redemptive narratives, and discovering deeper meaning (Ortega-Williams et al., 2019). From a cognitive perspective, while engaging in multiple appraisals, one's identity narrative is deconstructed and reconstructed.

While "narrative" implies a verbal representation of a life experience and serves as the focus of this article, it is worth mentioning that identity may be constructed through non-verbal means as well, particularly for those with a greater affinity toward visual or aural representations. In the field of art therapy, it is recognized that cultural identity is communicated through art, and through visual art (Mauro, 1998). The evolution of identity may be illustrated through drawing, painting, videos, and other media (Kaimal and Arslanbek, 2020).

Once identity reconstruction and transformation begins to take root, elements of PTG are hypothesized to follow (see **Figure 2**), consistent with those outlined in PTG research: a new sense of meaning and purpose, increased pride and appreciation for one's race and culture, and enhanced connection to others. These values and priorities may be enacted in one's daily life in behaviors such as greater engagement in a community and social action.

Discussion and future directions

This paper presents a theoretical framework by which PTG following racial trauma may be fostered through identity transformation. Many inter-relationships among these constructs have been postulated and they await empirical testing. Does transforming racial identity narratives toward internally generated ones lead to PTG? Which elements of PTG result? In regards to clinical implications, structured or semi-structured programs based on this framework may be used in settings such as college counseling centers using the tools described above. While this process may happen organically for some, others may need direction and support to move through these steps, requiring interventions that explicitly target such growth. Given that racial incidents occur regularly and psychological damage has been shown to accumulate, interventions need to be developed and sustained on an ongoing basis and not only in response to a highly publicized incident. Furthermore, various modalities of interventions need to be widely available, including formal structured programs as well as informal community "check-ins," offered in-person and virtually. Technology may be leveraged to make resources and networks more accessible. In light of the ubiquitous nature of race-based trauma and their pernicious effects, the facilitation of PTG after such trauma should be a high priority and a vital cornerstone in efforts toward racial justice.

Author contributions

DC conceptualized the framework, did the background research and literature review, and wrote the manuscript. AS-C constructed the figures, conducted the literature review, compiled references, and edited the manuscript. GW helped the conceptualize and reviewed the manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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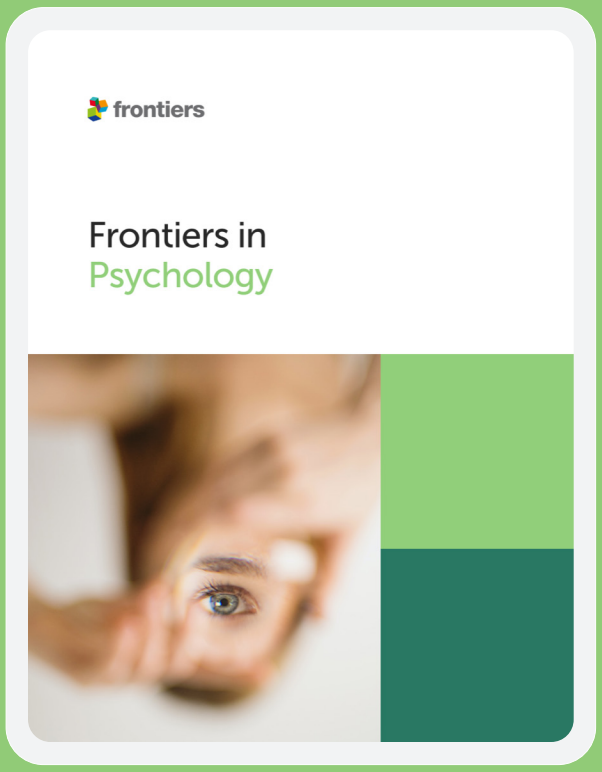

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