HUMAN, TECHNOLOGIES AND QUALITY OF EDUCATION, 2024
https://doi.org/10.22364/htqe.2024.31

PARENTAL PERCEPTIONS OF CHILDHOOD CANCER IN LATVIA: COPING AND OUTCOMES

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ABSTRACT

Objectives: The factors that influence parents' coping strategies after their child is diagnosed with cancer and the outcomes of coping are not fully understood. The challenges of coping can be accompanied by negative consequences, such as posttraumatic stress symptoms (PTSS), but can also result in positive long-term effects, like posttraumatic growth (PTG) experienced after the struggle of a challenging life event. This study aims to examine the relationship between caregivers' cognitive beliefs about the illness, personality traits, coping strategies they use to adapt to childhood cancer, and the psychological outcomes (PTSS and PTG) after cancer treatment.
Method: A prospective, longitudinal, exploratory design was used in this study. Fifty-nine caregivers (51 mothers, 8 fathers) of pediatric cancer patients completed the Latvian version of the Psychosocial Assessment Tool (PAT) and brief personality measure Big Five Inverntory-10 (BFI-10) shortly after the diagnosis (T1). The second data collection (T2) was after the completion of the curative treatment. During this phase, the Responses to Stress Questionnaire (RSQ), Survivors' version, the Impact of Event Scale-Revised (IES-R), and the Posttraumatic Growth Inventory (PTGI) were administered. Parents were recruited from Children's Clinical University Hospital in Riga, Latvia.
Results: Significant correlations were found between psychosocial risk factors (e.g., acute stress reactions of parents after diagnosis and negative cognitive beliefs about the illness) at the beginning of the treatment and posttraumatic symptoms after the completion of the treatment. The differences in the choice of coping strategies (Primary / Secondary Control Engagement Coping), as well as two types of involuntary stress responses (involuntary engagement and involuntary disengagement) were observed and were significantly related to posttraumatic outcomes.
Implications: The findings indicate that the intricate interconnection of initial cancer perceptions of parents, personality traits, and involuntary coping reactions plays a significant role in influencing levels of PTTS and PTG.

Keywords: *childhood cancer, coping strategies, parental stress, psychosocial assessment, posttraumatic growth, posttraumatic stress.*

Introduction

The field of pediatric oncology has witnessed significant changes in recent years due to the increased possibility of achieving remission more frequently. Despite childhood cancer still being one of the leading causes of childhood, there is a shift towards destigmatizing the perception of the disease. Notable increases in 5-year survival rates have been observed, particularly for acute lymphoblastic leukemia and non-Hodgkin lymphoma, with lymphomas showing a survival rate over 90% (Botta et al., 2022). In Latvia, where approximately 50 children are diagnosed annually, cancer incidence and survival rates align with European trends.

These survival improvements (Jemal et al., 2017) have led researchers to explore posttraumatic growth (PTG), in the face of adversity. PTG refers to the mental process through which individuals who have undergone trauma construct positive interpretations and discover significance in the traumatic experience. This process leads to the restoration of pre-existing mental frameworks and brings about positive alterations in one's self-perception, relationships, and appreciation of life (Tedeschi & Calhoun, 1996). This focus represents a shift from solely addressing negative psychological impacts like posttraumatic stress symptoms (PTSS) and health anxiety, revealing significant resilience in patients and parents amid adversity (Howard Sharp et al., 2023).

This study integrates both approaches by assuming the coexistence of PTSS and PTG and emphasizing their interaction. The longitudinal design at two time points provides a more nuanced view of the contribution of psychosocial factors, personality traits and stress coping strategies in predicting outcome results.

Posttraumatic Growth in Relation to Posttraumatic Stress in Parents

A systematic review by Duran (2013) highlights that childhood cancer survivors (CCS) and their families often derive benefits from trauma, such as increased life appreciation, self-awareness, positive family attitudes, and motivation for societal contribution. Additionally, Halldorsdottir et al. (2022) reviewed 16 studies on PTG in CCS family members, finding that most caregivers reported high PTG scores, especially in personal growth and family relationships. Notably, no connections were found between sociodemographic or medical factors and PTG; rather, social support and proactive coping strategies were key to fostering growth in the face of adversity.

The relationship between PTSS and PTG is not clear. Yonemoto et al. (2012) reported that elevated levels of PTSS were linked to increased PTG in parents of osteosarcoma cancer survivors. In contrast, Irie et al. (2021) did not observe an association between PTSS and PTG among parents of CCS. They noted that parents who engaged in more re-examination of core beliefs reported higher levels of PTG, but there was no significant positive correlation between intrusive rumination and PTG. In a study involving parents and adolescent cancer survivors (Barakat et al., 2006), it was found that PTG and PTSS were positively correlated for survivors. However, for parents, PTG was not associated

with their child's treatment or PTSS. Instead, it was found to be better predicted by caregivers' sense of perceived control.

This suggest that, despite PTSS and PTG can co-occur after a traumatic event, their relationship is nonlinear and may be better explained as curvilinear. It is probable that as an individual's distress levels rise, the usefulness of benefit finding increases, but only up to a certain extent (Kritikos et al., 2021). The outcomes of PTG may be predicted through different pathways, that are specific to trauma type and also the time after traumatic event (van Gorp et al., 2023).

Posttraumatic Growth in Relation to Coping Strategies and Personality Traits

A comprehensive review by Seiler & Jenewein (2019) analyzed 154 studies on PTG and resilience in cancer, proposing a model with two PTG trajectories. The direct pathway highlights how personality traits (e.g., optimism) and coping competencies (e.g., problem-solving, seeking social support) facilitate coping. Conversely, the indirect pathway involves reducing cancer-related stress by reshaping core beliefs about oneself.

Kritikos et al. (2021) found that engagement coping strategies like deliberate rumination and positive reappraisal positively correlate with benefit finding and growth in pediatric populations, while accepting responsibility for a child's diagnosis (Willard et al., 2016) and intrusive rumination negatively impact these outcomes. Secondary control strategies, such as acceptance and cognitive restructuring, help children adapt to chronic illness, whereas disengagement coping hinders adjustment (Compas et al., 2012).

In a study of 83 caregivers, Gardner et al. (2017) found that higher active and emotional coping, positive spiritual coping, social support, and optimism predict greater benefit finding, while acceptance coping showed no association. Quality of life was more strongly linked to benefit finding in caregivers with fewer psychosocial resources, suggesting that benefit finding may serve as a resilience factor.

Personality significantly influences specific coping strategies, but not general (engagement vs. disengagement) coping styles (Connor-Smith & Flachsbart, 2007). However, research on how personality affects coping in pediatric oncology remains limited.

The findings of Bürger Lazar & Musek (2020) confirmed that approximately 60% of the variance in parental well-being in cancer settings could be attributed to factors such as parental personality, specifically Neuroticism, emotion-focused coping strategies, and the child's quality of life, particularly in terms of physical functioning. Recent findings suggest that parental coping outcomes after a child's cancer diagnosis are more closely related to dispositional traits (e.g., optimism, neuroticism) than to medical factors (Sharp et al., 2022). Further research is needed to explore the mechanisms between personality and posttraumatic outcomes in these parents.

Posttraumatic Growth and Cognitive Beliefs about Illness

Illness cognitions refer to how parents perceive the stress of their child's illness, treatment severity, and their coping ability, directly influencing their distress levels (Kazak et al., 2004). In a study of 120 parents of children with (Lietaviete & Martinsone, 2024),

42% of the variation in cancer-related beliefs of parents could be attributed to 'catastrophic' versus 'optimistic' thinking patterns (e.g., *"Cancer is a death sentence"* vs. *"We are capable of making sound treatment decisions"*). Optimism is seen as both a positive thinking pattern and a personality trait. The research also found that child behavioral problems and family illness beliefs significantly affected parental stress reactions post-diagnosis, with cancer-related beliefs explaining 11% of the variability in this connection.

Cognitive beliefs about illness significantly affect parents' initial stress responses and long-term coping outcomes, particularly PTG, which results from cognitive and emotional processing of trauma (Picoraro et al., 2014). Key components of cognitive processing involve re-examination of disrupted core beliefs, engaging in intrusive and negative rumination, and practicing deliberate and constructive rumination to derive meaning from trauma. Notably, parents of CCS benefit more from re-examining core beliefs, while those with children facing chronic diseases find deliberate rumination more beneficial for PTG (Irie et al., 2021).

Further, van Gorp et al. (2023) found that parents' illness perceptions, particularly beliefs about helplessness vs. acceptance, influence their long-term psychosocial well-being. Psychological factors, such as fear of disease progression, negatively impact pediatric cancer patients' well-being, especially in follow-up care (Herzog et al., 2023).

Hence, we hypothesize that cancer-related beliefs not only forecast the initial stress response of parents but also play a role in shaping coping outcomes, such as PTSS and PTG. Thus far, comprehensive studies on the illness cognitions, coping strategies, and psychological outcomes of parents of children with cancer in Latvia are lacking. The research questions for this study are:

(1) What are relations between posttraumatic stress symptoms and posttraumatic growth in a sample of Latvian parents of CSS?
(2) What are the relationships between caregivers' personality traits, cognitive beliefs about the illness and initial stress reactions after diagnosis in T1, and coping strategies they use to adapt to childhood cancer and the psychological outcomes (PTSS and PTG) after cancer treatment in T2?
(3) How parental coping strategies and personality traits predict adaptation (lower PTSS) and PTG in parents of cancer survivors?

Methodology

Participants and procedure

The data in this article were collected through a longitudinal follow-up study, which was part of a larger research project involving 120 children with cancer and their parents who participated in a psychosocial support program at the Children's Clinical University Hospital in Riga (Latvia) from 2020 to 2023 (Lietaviete, 2023). Institutional Review Board at the academic medical center approved the study procedures.

At T1 data were collected from 109 mothers and 11 fathers with children newly diagnosed or relapsed with cancer (the time ranged from 1 to 12 months). The participants'

ages ranged from 25 to 68 years (mothers: M age = 40.94, SD = 6.83, fathers: M age = 39.45, SD = 3.64). Data was collected primarily from the main caregiver, present with the child during the hospital visit. There were 66 boys and 54 girls among the patients (M age = 7.13, SD = 4.73, range: 0–17 years). The childhood cancer diagnoses in the sample were leukemia and lymphoma (n = 74; 62%), brain and spinal cord tumors (n = 19; 16%), solid tumors, e.g., sarcoma (n = 23; 19%), and others (n = 4; 3%).

At T2, data were collected from 59 parents, predominantly mothers (n = 51; 86%). The participants' ages ranged from 27 to 54 years (M age = 40.21, SD = 3.91). Parents whose child succumbed to cancer between the two study phases or experienced current relapse of cancer were not invited to participate in the second research (19 parents excluded). The time since the end of the curative treatment ranged from 2–41 month (M = 15.16, SD = 12.58). In the original research design, the follow-up was initially planned for up to a year after curative treatment. However, due to the small sample size, the survey was expanded to include parents who were up to 41 months post-treatment and had participated in the initial research in 2020. There were 32 boys and 27 girls among the patients (M age = 9.12, SD = 4.24, range: 3–18 years). The cancer diagnoses in the subsample were leukemia and lymphoma (n = 41; 69%), brain and spinal cord tumors (n = 5; 9%), solid tumors, e.g., sarcoma (n = 12; 20%), and others (n = 1; 2%). For recruitment, families were sent an email of inviting participation in the second study. The response rate was 58.41%. Informed consent was obtained from all participants.

Measures

At T1 parents completed the Latvian version of the Psychosocial Assessment Tool (PAT) and brief personality measure Big Five Inverntory-10 (BFI-10).

The Latvian version of the PAT (Lietaviete & Martinsone, 2024), adapted from PAT 2.0 and PAT 3.1 (Kazak et al., 2018), assess families' psychosocial risks across five domains, of which two have been included in this analysis: Stress Reactions after diagnosis (13-items) and Family Beliefs (10-items). Stress Reactions subscale encompasses parental initial stress reactions shortly after diagnosis (such as mood swings, bad dreams or nightmares about the child's illness, discomfort (sweating, feeling angry or anxious) when asked about the child's diagnosis, difficulties in relaxing due to increased stress, etc.). Family Beliefs subscale contains both positive and strongly negative cancer-related cognitions (e.g., *"The doctors will know what to do"*; *"Cancer is a death sentence"*).

BFI-10 (Rammstedt & John, 2007) is a brief 10-item self-assessment survey that measures five personality factors: neuroticism, extraversion, openness, agreeableness and conscientiousness.

At T2 parents of cancer survivors were asked to complete two outcome measures: the Impact of Event Scale-Revised (IES-R), the Posttraumatic Growth Inventory (PTGI) and the Responses to Stress Questionnaire (RSQ), the survivors' version focusing on coping strategies.

The IES-R (Weiss & Marmar, 1997) is a self-assessment survey for PTSS comprising 22 items and three distinct subscales: 'Intrusion' (consisting of intrusive thoughts,

nightmares, etc.); 'Avoidance' (e.g., emotional numbness, avoidance of emotions, situations, and thoughts); and 'Hyperarousal' (e.g., irritability, hypervigilance, etc.).

PTGI (Tedeschi & Calhoun, 1996) is also a self-report questionnaire comprising 21 items and contains five domains of PTG: 'Relation to others', 'New possibilities', 'Personal strength', 'Spiritual change' and 'Appreciation of life'. Psychometric properties are adequate (Maslovska, 2008).

RSQ (et al., 2000) is a self-report questionnaire about parental coping responses in two versions: during the pediatric cancer treatment and for survivors. Both versions contain 57 items and 5 subscales. At the top of the hierarchy is the distinction between engagement and disengagement coping. At the next level, engagement coping can be distinguished into 'Primary Control Engagement' (problem solving, emotional expression and emotional regulation) and 'Secondary Control Engagement' (cognitive restructure, positive thinking, acceptance). 'Disengagement' coping includes strategies such as avoidance, denial, wishful thinking, and distraction. Additional two subscales reflect involuntary responses to stress: 'Involuntary Engagement' (e.g., rumination, intrusive thoughts, impulsive action) and 'Involuntary Disengagement' (e.g., cognitive interference, inaction, numbing).

Data analytic plan

The data were analyzed with R version 4.20 using the psych package (Revelle, 2023). A series of correlational and regression mediation analyses were performed. Correlations were investigated employing Pearson's and Spearman's correlation coefficient, adjusted with BH methods. The choice between Pearson's and Spearman's tests was based on the nature of the data, specifically the assumptions of normality and the linear relationship. A p value < .05 was considered to be statistically significant for all tests.

The impact of various coping strategies and personality traits on outcome measures (PTG and PTSS) were examined using causal mediation analysis with multiple linear regression. The indirect and direct effects were estimated using a non-parametric bootstrap procedure with 5,000 samples and 95% bias-corrected confidence intervals to ascertain associated standard errors and significance levels.

Results

The means, standard deviations and Cronbach's alphas for the study variables are presented in Table 1. All of the subscales showed nearly acceptable to good Cronbach's alphas (.63–.86). Some coping subscales like 'Secondary Control Engagement' and 'Disengagement' exhibited lower internal consistency (.63) compared to other subscales, as it probably assesses a broader, multi-dimensional concept.

Table 1 Descriptive Statistics and Internal Consistency Coefficients for Study Variables

	M	*SD*	Range	Cronbach's α
IES-R total	1.81	0.57	0–3.49	.92
Intrusion	1.81	0.66	0–3.61	.84
Avoidance	1.82	0.64	0–3.71	.84
Hyperarousal	1.86	0.55	0–3.33	.65
PTGI total	59.32	17.82	17–92	.93
Relation to others	20.85	7.72	3–33	.86
New possibilities	12.61	5.79	0–24	.84
Personal strength	13.80	12.94	2–21	.73
Spiritual change	5.23	3.34	0–10	.82
Appreciation of life	11.50	12.86	0–15	.84
RSQ				
Primary Control Engagement	23.55	4.08	15–36	.79
Secondary Control Engagement	38.28	6.13	25–53	.63
Disengagement	59.30	8.18	41–77	.63
Involuntary Engagement	38.28	9.75	18–60	.81
Involuntary Disengagement	25.12	6.97	12–39	.81

IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory; RSQ – the Responses to Stress Questionnaire

Majority of parents of CSS in the study reported experiencing personal changes (positive or negative) after the end of the cancer treatment of their children. Specifically, 45 (77%) affirmed experiencing changes, 12 (20%) were uncertain, and 2 (3%) denied any personal changes. There was no significant correlation found between posttraumatic growth (PTGI score) and the overall posttraumatic stress symptoms (IES-R score) and its clusters (Table 2).

Table 2 Pearson's Correlation between IES-R Subscales and PTGI Subscales

	IES-R total	Intrusion	Avoidance	Hyperarousal
PTGI total	.00	.13	–.12	.06
Relation to others	–.06	.07	–.16	.00
New possibilities	.09	.22	–.02	.10
Personal strength	–.09	–.06	–.10	–.03
Spiritual change	.13	.23	–.02	.24
Appreciation of life	**.28***	**.32***	.21	.26

IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory
*$p < .05$. **$p < .01$

Only 'Appreciation of Life' subscale showed a significant correlation with the IES-R total score and 'Intrusion'. Neither the IES-R nor the PTGI score was significantly correlated with the parents and patients age at the time of diagnosis, gender of parents, diagnosis, or time after the end of treatment.

To answer the research question regarding the relationships between caregivers' personality traits, cognitive beliefs about the illness, initial stress reactions in T1 and the psychological outcomes (PTSS and PTG) after cancer treatment in T2, Spearman's correlation analysis was conducted (Table 3).

Table 3 Spearman's Correlation between Outcome Measures (IES-R, PTGI) at T2 and Variables Measured at T1 (Personality Traits, PAT Subscales: Stress Reactions, Family Beliefs)

	Measures at T1						
	N	**E**	**O**	**A**	**C**	**Stress Reactions**	**Family Beliefs**
Measures at T2							
IES-R total	**.36****	–.19	–.23	–.19	–.01	**.41****	.22
Intrusion	**.37****	–.17	**–.27***	–.08	–.05	**.45*****	.20
Avoidance	.23	–.22	–.18	–.21	.02	**.33***	.25
Hyperarousal	**.34***	–.05	–.13	–.17	–.01	**.38****	.16
PTGI total	–.09	.07	.10	**.33***	.18	–.16	**–.39****
Relation to others	.11	.02	.16	.17	–.07	–.05	**–.32***
New possibilities	–.08	.07	.14	.24	.12	–.12	**–.30***
Personal strength	**–.45****	.22	.09	**.43****	.25	**–.30***	**–.43****
Spiritual change	.07	–.13	–.15	.12	.15	–.02	–.19
Appreciation of life	.03	–.01	–.01	–.05	–.01	.01	–.15

IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory; N – Neuroticism, E – Extraversion, O – Openness, A – Agreeableness and C – Conscientiousness.
$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

Neuroticism significantly correlated with IES-R total score ($rho(57) = .36$, $p = .043$) and with the 'Intrusion' and 'Hyperarousal' subscale. Negative correlation was found between Neuroticism and the 'Personal strength' subscale, but not with PTGI total score. Some significant associations were found between Agreeableness as personality trait and PTGI total score and the 'Personal strength' subscale. Significant correlations (Spearman's *rho* between .33–.45) were observed between the Stress Reactions subscale, which encompasses parental stress reactions shortly after diagnosis, and the IES-R total score and its subscales.

Cancer-related cognitions, as assessed by the 'Family Beliefs' subscale in PAT, demonstrated negative correlations with various aspects of parental PTG, but not PTSS. Notably, catastrophic thinking patterns (e.g., *"Cancer is a death sentence"*; *"People will pull away from us"*) were linked to lower perceived PTG in relations to others, in acknowledging new possibilities in life, and less perceived personal strength.

Spearman's rank correlations, adjusted with BH methods, were used to answer the research question regarding which coping strategies are associated with better adaptation and PTG in parents of CCS and also with other variables, like personality traits and initial stress after diagnosis (Table 4).

Table 4 Spearman's Correlation between Coping Strategies and Outcome Measures (IES-R, PTGI) and Prognostic Variables (PAT and BFI-10)

	RSQ subscales				
	Primary Control: Engagement	**Secondary Control: Engagement**	**Primary & Secondary Disengagement**	**Involunt. Engagement**	**Involunt. Disengagement**
IES-R total	.09	.05	.15	**.73*****	**.68*****
Intrusion	.10	.05	.09	**.72*****	**.70*****
Avoidance	.03	.00	.11	**.66*****	**.59*****
Hyperarousal	.14	.13	.22	**.62*****	**.57*****
PTGI total	**.31***	**.35***	.11	–.24	–.14
Relation to others	**.35****	**.37****	.07	–.19	–.13
New possibilities	.24	**.31***	.10	–19	–.13
Personal strength	.25	**.30***	.20	**–.39****	**–.30***
Spiritual change	.10	.12	–.01	–.06	.07
Appreciation of life	.13	.15	–.04	–.05	–.06
PAT total	.04	–.02	–.04	**.40****	.24
Stress Reactions	.16	.05	.11	**.55*****	**.45*****
Illness Beliefs	–.11	–.12	–.01	**.31***	**.40****
BFI-10					
Neuroticism	.10	.07	–.11	**.59*****	**.47*****
Extraversion	**.33***	.22	.16	–.12	–.16
Openness	**.33***	**.37****	**.30***	**–.28***	–.14
Agreeableness	.01	.06	.11	**–.34***	–.22
Consciousness	–.18	–.16	–.05	–.07	–.15

RSQ – the Responses to Stress Questionnaire; IES-R – the Impact of Event Scale-Revised; PTGI – the Posttraumatic Growth Inventory; PAT – Psychosocial Assessment Tool, Latvian version; BFI-10 – brief Big Five Inventory

$^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$

It is noteworthy that among the various coping strategies studied, only engagement coping strategies demonstrated a significant link to PTG in this context. Specifically, the 'Primary Control Engagement' subscale, encompassing strategies related to problem solving and emotional expression, correlated with the PTGI total score (*rho*(57) = .31, p = .017), as well as with the 'Relation to Others' subscale. 'Secondary Control

Engagement' subscale (strategies connected with acceptance and cognitive reappraisal) also correlated with PTGI total score (*rho*(57) = .35, p = .012), and with various subscales. The 'Personal strength' subscale was negatively related to involuntary coping reactions.

The primary coping strategies were found to be correlated with personality traits such as Extraversion and Openness. Additionally, Openness as a personality factor showed various correlations with other coping styles, including secondary control engagement, disengagement, and involuntary engagement.

The involuntary engagement and disengagement reactions exhibited significant correlations with the IES-R total score and all its subscales. Moreover, these involuntary reactions were significantly associated with Neuroticism, a personality trait known for emotional instability and negative affect (correlations between .47–.59). There was also significant correlation between the 'Involuntary Engagement / Disengagement' and catastrophic cancer-related beliefs (correlations between .31–.40). No significant correlation was found between Neuroticism and the 'Family Beliefs' subscale, but the correlation between Neuroticism and Stress Reactions after diagnosis was significant.

Multiple linear regressions were employed to answer the research question how parental coping strategies and personality traits predict better adaptation: lower PTSS and higher PTG in parents of CSS. The mediation models, which examined the prognostic role of personality traits (e.g., Neuroticism) on outcomes (PTTS and PTG) through various coping strategies, generally failed to provide satisfactory explanations, because of the small sample size and low statistical significance, although there were a few noteworthy exceptions.

Initial stress reactions after diagnosis as a mediator explained 32% of variance in the relationship between Neuroticism and PTSS of parents after the treatment. The effect was significant (p = .028). The total effect of Neuroticism on PTSS without considering mediator was 2.55, 95% CI [0.74–4.34], p = .006. The direct effect (ADE) of Neuroticism on PTSS, accounting for the initial stress reactions of parents after the diagnosis as a mediator, was 1.71, 95% CI [–0.12–3.68], p = .076, and the indirect effect (ACME) was 0.85, 95% CI [0.89–1.97], p = .022.

Cognitive beliefs about the illness as a mediator explained 11% of variance in the negative effect between Neuroticism and 'Personal strength' as a factor of PTG, however the indirect effect was not significant. The causal mediation analysis dissected the total effect (–1.05, p < .001) into direct effect (ADE = –0.92, p < .001) and indirect effect (ACME = –0.12, p = .30).

Involuntary Engagement reactions, such as rumination, intrusive thoughts, emotional and physiological arousal, and impulsive action, as a mediator explained 10% of variance in the negative association between Neuroticism and perceived 'Personal strength', but also this effect was not significant. The causal mediation analysis dissected the total effect (–1.08, p < .001) into direct effect (ADE = –0.96, p = .01) and indirect effect (ACME = –0.108, p = .62).

Discussion

The study yields several significant findings. Firstly, we did not find significant correlations between PTG and the overall PTSS and initial stress reaction after diagnosis. However, there was a significant association between the latter two factors. Secondly, we found that engagement coping strategies significantly contributed to PTG and were correlated with personality traits such as Extraversion and Openness. Additionally, involuntary engagement and disengagement reactions were significantly linked to PTSS and Neuroticism. Thirdly, the initial perceptions of the cancer diagnosis were found to be associated with later psychological outcomes of parents. More catastrophic cancer-related cognitions were linked to lower PTG after treatment, while higher stress reactions after diagnosis were linked to higher levels of PTSS after treatment.

Co-occurrence of Posttraumatic Growth and Posttraumatic Stress Symptoms

Following the ordeal of supporting their child through illness, majority (77%) of parents disclosed experiencing profound personal transformations. Nevertheless, these changes are multifaceted, encompassing both positive and negative aspects. Despite of co-occurrence of PTG and PTSS in parents, we did not observe significant connections between them. Only 'Intrusions' subscale (e.g., intrusive thoughts, feelings, imagery, dissociative-like re-experiencing, etc.) was correlated with 'Appreciation of Life' subscale. This finding aligns with other research indicating a positive association between PTG and the fear of cancer recurrence, which encompasses future-oriented intrusive thoughts (Koutná et al., 2021), but also may enhance appreciation of life.

The Latvian sample of parents of children with cancer exhibited higher levels of PTG (M = 59.32, SD = 17.82) compared to a Dutch sample (M = 45.9, SD = 21.2) reported by van Gorp et al. (2023). This difference may be attributed to the shorter time since treatment completion in the Latvian group (M = 15.16 months) versus the Dutch group (M = 21.3 years), leading to a more acute awareness of positive changes post-trauma. Additionally, PTSS were lower in the Latvian sample compared to a Lithuanian sample (Banienė & Žemaitienė, 2020), where parents were recruited shortly after diagnosis. As distress levels typically decrease after the initial diagnosis and treatment phase and levels of PTG and PTSS vary at different stages, identifying caregivers' latent profiles of adjustment could enhance outcome predictions (Howard Sharp et al., 2023).

Initial Psychosocial Risk Factors in Relation to Post-Treatment Outcomes

The association between PTG and initial stress reactions of parents (e.g., severe mood swings, nightmares, etc.) after diagnosis was negative and non-significant. This finding is consistent with other research indicating that distress was not correlated with PTG, thereby reinforcing the notion that these are distinct dimensions in the post-diagnosis experience (Morris & Shakespeare-Finch, 2011).

However, initial stress reactions were strongly associated with PTSS after the treatment. Initial stress reactions also significantly mediated the relationship between

Neuroticism and PTSS in parents with 32% variance explained. These findings align with other research demonstrating that distress was linked to PTSS, but not to PTG (Barakat et al., 2021). Family psychosocial risk at diagnosis emerges as a stronger predictor, surpassing demographic and cancer-related factors, of caregiver resilience outcomes at the conclusion of treatment. Similarly to Barakat et al. (2021), we also did not find significant associations between demographic and medical variables and the outcome measures in our sample.

Our findings indicate that cancer-related beliefs and perceptions of illness, particularly if they are catastrophic, were linked to lower adjustment and lower PTG. Negative beliefs about illness were also related to involuntary engagement (e.g., rumination, intrusive thoughts) and involuntary disengagement (e.g., cognitive interference, emotional numbing, etc.) coping reactions. The findings suggest that initial negative beliefs about child's cancer (e.g., *"Cancer is a death sentence"*) may elicit a more profound initial shock and this, in turn, could result in interference of further cognitive processing (the re-examination of core beliefs, search for meaning, benefit finding, etc.). Consequently, it may impede the progression of PTG (Picoraro et al., 2014).

Interaction between Personality and Coping in Regard to Posttraumatic Outcomes

We found that greater use of engagement strategies, such as primary control and secondary control, was significantly associated with PTG, but involuntary reactions were strongly correlated with PTSS. The 'Primary Control Engagement' subscale, encompassing strategies related to problem-solving and emotional expression, as well as 'Secondary Control Engagement' strategies, which includes acceptance and cognitive reappraisal, are both correlated with the PTGI total score and its dimensions, especially with 'Relations to others'. The presence of social support and effective coping strategies during challenging times fosters PTG (Halldorsdottir et al. 2022). This may elucidate why families of CSS often express an increased sense of familial closeness. Furthermore, effective use of primary control coping strategies for cancer-related stressors may also extend to the use of primary control coping for social stressors, a practice linked to improved social adjustment and increased PTG (Desjardins et al., 2021).

PTG in the domain of 'Personal strength', that occurs when a greater sense of self-reliance is recognized, was positively associated with 'Secondary Control' strategies (e.g., acceptance, positive thinking) and personality traits (lower Neuroticism, higher Agreeableness). However, the mediation models, which examined the impact of personality traits like Neuroticism on outcomes through coping strategies, were generally insufficient due to small sample sizes.

Conclusions

To our knowledge, this was the first longitudinal research with parents of pediatric cancer patients involved in Latvia tracking them from the child's diagnosis until

several months after the completion of treatment. Our findings lead us to the conclusion that personality factors and the intensity of the initial stress response can predict later psychological outcomes. Parents' initial stress reactions and cognitive beliefs can be modified early in treatment, highlighting their importance in delivering posttraumatic growth-oriented support.

This study provides novel insights into pediatric oncopsychology, particularly in Latvia, but methodological challenges hinder result generalization. Variability in treatment duration, definitions of remission, and issues like drop-outs and relapses create a heterogeneous sample. The study's intended 12-month follow-up varied significantly, which could influence results related to PTSS and PTG.

Future research should prioritize controlled, longitudinal designs to clarify the link between coping mechanisms and posttraumatic outcomes in pediatric cancer. Utilizing latent profile analysis over traditional approaches is recommended, as examining caregiver trajectories and coping profiles could yield valuable insights into modifiable psychosocial traits for clinical practice and interventions.

Author Note

This research was supported by the Children's Hospital Foundation and the Hematology / Oncology Department of Children's Clinical University Hospital (Latvia). The authors would like to thank to all the families who participated for their generous cooperation.

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