



Posttraumatic growth among people with serious mental illness, psychosis and posttraumatic stress symptoms



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ABSTRACT

Recent research has shown high rates of exposure to trauma among people with serious mental illness (SMI). In addition, studies suggest that psychosis and mental illness-related experiences can be extremely traumatic. While some individuals develop posttraumatic symptomatology related to these experiences, some appear to experience posttraumatic growth (PTG). Little is known, however, about PTG as a possible outcome among people who experienced psychosis as well as posttraumatic stress symptoms (PTSS). For further understanding of the relationship between PTSS and PTG among people with SMI who experienced psychosis, 121 participants were recruited from community mental health rehabilitation centers and administered trauma and psychiatric questionnaires. Results revealed that while high levels of traumatic exposure were common, most participants experienced some level of PTG which was contingent upon meaning making and coping self-efficacy. In addition, posttraumatic avoidance symptoms were found to be a major obstacle to PTG. The range of effect sizes for significant results ranged from $\eta^2 = 0.037$ to $\eta^2 = 0.144$. These findings provide preliminary evidence for the potential role of meaning making and coping self-efficacy as mediators of PTG in clinical, highly traumatized populations of people with SMI and psychosis. Implications of these findings for future research and clinical practice are discussed.

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1. Introduction

The notion of growth after trauma is not new, and has been recognized in the fields of religion, philosophy, and literature for decades [1]. Since the 1970s, numerous models of positive change (i.e., growth) following trauma in general have been developed and researched; namely, stress-related growth, perceived benefits, thriving, positive adjustment, and meaning making [2–5]. Studies have found that some individuals can experience growth following trauma [6], including those who have experienced psychosis and mental illness-related difficulties, which can be extremely traumatic [7–9]. As in the case of traumatic life-events in non-clinical populations [10], some people with serious mental illness (SMI), who experienced psychosis and endured traumatic histories, can also experience posttraumatic growth (PTG). PTG consists of five facets of growth (i.e., major positive qualitative shifts in the manner one feels or behaves) that can coexist as well as develop independently following a specific stressor, namely: appreciation of life, relating to others, new found possibilities in life (e.g., better familial relationships following trauma), personal strength, and spiritual change [11,12]. PTG can occur only when an event of

“seismic” proportions overwhelms or destroys key elements of a person's goals and worldviews [12]. However, the same traumatizing events can also evoke posttraumatic stress symptoms [13] alongside PTG. Although multiple studies have found that traumas are frequent and repetitive experiences among people with SMI who experienced psychosis [14–16], and qualitative studies on the experiences of recovery have reported elements of growth in this population [17,18], only few have explored the possibility of PTG in this population. The current study focused on what is helpful or detrimental to PTG among people with SMI. Understanding facilitators of PTG can contribute to the treatment, rehabilitation, and recovery processes of people who have often experienced massive traumas as a result of their symptoms and/or treatment. In addition, revealing possible facilitators of PTG in this population can also contribute to our understanding of the potentially salutogenic aspects of psychosis, traumatic symptoms, and their aftermath [19].

People with SMI, who experienced psychosis, tend to be more vulnerable to both traumatic exposure and the development of posttraumatic stress symptoms (PTSS; [20]). Traumatic exposures that dismantle one's internal integrity and basic life assumptions [21], such as psychosis, are especially devastating [22]. Research has identified reasons for elevated levels of both traumatic exposure and PTSS, including impaired social judgment, cognitive deficits, risk-taking behaviors, difficulties in reality testing, and psychosis-related cognitive and perceptual

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distortions [14,15,23–25]. In addition, psychosis-related cognitive and perceptual distortions such as delusions and hallucinations [13,26] might contain adverse and frightening content [27,28], which can be perceived as extremely traumatic [29]. Psychosis can lead to psychiatric hospitalization, which, based on reported experience, can be traumatizing in and of itself as a result of forcible incarceration and physical and chemical restraint [9,30–32].

Alongside higher trauma incidence compared to the general population [20], people with psychosis have a higher incidence of undetected PTSS, which does not necessarily lead to full-blown posttraumatic stress disorder (PTSD), yet generates distress and hardship in daily and social functioning [14,15]. Like PTSD, PTSS includes symptoms that are structured in four clusters: reexperiencing, avoidance, negative alterations in cognition and mood, and arousal [33]. Research shows that when people with adverse traumatic histories experience both SMI and psychosis, their posttraumatic sequelae are aggravated [7,22,34,35]. These negative consequences might be due to the adverse interaction between schizophrenia and schizoaffective-related symptoms (i.e., positive psychotic symptoms and negative symptoms) and PTSS [36]. For example, positive symptoms can be traumatic intrusions, thus intensifying the trauma of the psychotic experience. Other risk factors for increased severity of illness course and posttraumatic sequelae are cumulative trauma and retraumatization [37,38,117]. Research shows that repeated traumatic experiences, both in childhood and in adulthood, can contribute to the development of psychosis, PTSS, and to lower functional and mental outcomes [7,39,40].

Together with the adverse consequences of traumatic histories and PTSS, an additional outcome of coping with adversity might emerge [1]; namely, posttraumatic growth (PTG). PTG is an ongoing, dynamic process defined as the possible outcome of coping with adversity [115]. PTG manifests through changes in thought processes, emotions, and behaviors, and might include both a functional and an illusory aspect, i.e., a self-enhancing appraisal that helps coping with threat in initial stages of trauma [41,42]. PTG occurs when ruminations and distress, which usually accompany trauma and its aftermath, are reduced, allowing development of deliberate thinking about the traumatic experience, and facilitating the process of PTG. As a result, people might sense a positive change following their traumatic experience [1,43], or act in a new and different way such as through improved functioning [44] and political and civic defiance [45,46].

Just as not all trauma survivors develop posttraumatic stress symptoms (PTSS), not all individuals who undergo adverse trauma experience PTG. Experiencing either one or multiple traumas might result in PTG [47, 48], but some traumas might be so adverse that PTG is impossible and a PTG “ceiling effect” might develop [2,49]. This “ceiling effect” (a.k.a. “PTG threshold;” [1]) might arise as a result of two different scenarios. The first is when too much trauma overwhelms a person's emotional and cognitive resources, leaving PTG unreachable [50,51]. The second is when individuals are not distressed “enough” as a result of a certain trauma, their world assumptions are not “shattered” and therefore do not require “growth” and thus, do not experience PTG [50]. Indeed, although PTG is well researched in various populations with traumatic histories [52], and its aspects are vigorously studied, little is known about facilitators of PTG among individuals with SMI, psychosis, and PTSS.

One major factor that can contribute to posttraumatic growth (PTG) is coping self-efficacy (CSE). CSE is the appraised ability to manage one's personal functioning and environmental demands through cognitive processes and changes in one's belief system following traumatic or stressful events [53,54]. These processes can provide a sense of control and actual control in the face of traumatic adversity, reducing vulnerability to being overwhelmed by helplessness [54,55]. CSE includes three dimensions: (a) self-appraisal of coping capabilities; (b) transformative actions (e.g., the ability either to change or to maintain one's coping style when faced with different challenges; [55]), and (c) thought control efficacy (i.e., people's sense of control over their thoughts, and their ability not to be influenced continuously by

cognitive intrusions). Studies indicate that people's success in coping with traumatizing situations depends on how well they appraise their ability to manage and control such situations [54], and that CSE positively correlates with PTG in people who experienced adverse traumas [56].

Another factor, which is both protective of posttraumatic symptomatology and facilitative of PTG, is the process of conferring meaning, i.e., meaning making [6,57]. Conferring meaning is a basic human motivation, and might be intensively activated in individuals who have undergone trauma that violated their basic life assumptions [21,58–60, 116]. Meaning making reorganizes these basic assumptions through reframing and reevaluating the traumatic situation. Theoreticians agree that meaning is a crucial component in confronting adversity, reducing symptomatology, and facilitating growth [61,62], as well as an outcome of growth in its own right [1], and that individuals with SMI are indeed capable of seeking and finding meaning [18,63]. However, as posttraumatic stress symptoms (PTSS) might affect meaning-making processes [64], we do not know whether it might also affect PTG in individuals with SMI who underwent psychosis. On the one hand, research indicates that meaning making might act as a protective factor of PTSS and PTSD [65]. On the other hand, some studies show that extreme levels of PTSS (specifically avoidance symptoms and cognitive intrusions) might hamper people's ability to engage in the cognitive and emotional processes needed for meaning making [66]. In relation to PTG, Calhoun & Tedeschi [67] specified that to attain PTG, a traumatic memory would be recalled until incorporated into a new life schema, namely, “constructive rumination.” Hence, people who were able to transform the cognitive intrusions into an adaptive thought process (i.e., constructive rumination) were better able to engage in meaning making and experience PTG. To conclude, although coping self-efficacy and meaning-making processes were both found to be facilitators of PTG and protective of PTSS, this model has not been studied among people who experience psychosis and PTSS.

Trauma, although excruciating, might trigger a process of rebuilding and positive change, i.e., PTG. Only a few studies have investigated PTG in people with psychosis [68,69], and most of these concentrated on first episode psychosis [70,71] suggesting that PTG is indeed possible after first episode psychosis [72]. To date, however, no thorough, quantitative investigation has been conducted of the possibility of PTG in individuals who experienced psychosis with incremental posttraumatic stress symptoms (PTSS).

To address this gap, in this study, we examined the extent to which posttraumatic growth (PTG) occurs, and assessed the possible mediating effect of coping self-efficacy, meaning-making processes, and traumatic history in individuals with serious mental illness (SMI) who experienced psychosis and posttraumatic stress symptoms (PTSS). Since coping self-efficacy and meaning making can coexist and change over time [42,73], there is no reason to assume that one process is more dominant than the other. Therefore, in the current study, we hypothesized and analyzed meaning making and coping self-efficacy as parallel processes mediating the relationship between PTSS and PTG. We hypothesized that:

- (a) Elevated levels of traumatic exposure and PTSS would be found in individuals with SMI who experienced psychosis, compared to the general population.
- (b) PTSS would negatively correlate with meaning making, coping self-efficacy, and PTG.
- (c) Traumatic history would positively correlate with PTG and PTSS levels.
- (d) Coping self-efficacy and meaning making would mediate the relationship between: (d1) Traumatic history and PTG (Model 1), and (d2) PTSS level and PTG (Model 2).

2. Materials & methods

2.1. Participants and procedure

We recruited 121 participants from community mental health rehabilitation services in Israel. To be eligible for the study, participants had

to meet Israeli criteria for having a psychiatric disability severe enough to compromise at least 40% of their functioning. This is determined by a committee, including a psychiatrist, and is recognized by National Insurance Institute regulations. Most of the participants had schizophrenia disorders according to their last registered hospital discharge diagnosis, and hence were entitled to Israeli rehab services [74]. This schizophrenia diagnosis has acceptable sensitivity and specificity when assessed against schizophrenia diagnosis in research and, has acceptable stability over time [75]. It has captured over 90% of cases of schizophrenia disorder based on research criteria in a community sample [76]. Inclusion criteria for the study were: men and women over the age of 18, who had been psychiatrically hospitalized in the past, had experienced psychotic symptoms according to their clinicians, and were eligible to sign an informed consent. Mental health professionals in the rehabilitation services referred potential participants to the study. Those who wished to take part and who met the inclusion criteria contacted the researcher and signed an informed consent form. Participants completed the questionnaires, for which they received payment. The first author collected data between May and October 2014. The study protocol was reviewed and approved by the University of Haifa. Power analysis using G*Power [77] revealed that for a regression model with 3 predictors, a rather low effect size of 0.10, alpha of 0.05, and power of 0.80. The required sample size was 114 participants.

The 121 participants were men (46.3%) and women (53.7%), with average age of 43.8 years ($SD = 11.8$). Most of them had schizophrenia or schizoaffective disorders (78.5%). The rest of the participants were diagnosed with personality or affective disorders with psychotic symptoms (11.6%) or as bipolar with past psychotic symptoms (7.4%), and only 2.5% ($n = 3$) of the sample had PTSD as a diagnosis (which also included a history of psychotic symptoms like all the other participants). Most were single (57.9%), or divorced/separated/widowed (26.5%), whereas the rest were married or in a relationship (15.6%). Almost all participants had been psychiatrically hospitalized (98%). It is noteworthy that when examined using Trauma History Screen (THS, [78], see measures) 87.5% experienced >5 high magnitude stressors. Over half of participants (57%) had previous traumatic experiences, almost two thirds (66.2%) were suffering from persisting posttraumatic distress, and 47.1% suffered from continuous traumatic stressors. Most frequent high magnitude stressors were psychiatric hospitalization (90.1%) and psychosis (90.9%). Notably, 43% of the sample referred to psychosis and hospitalization as the most acute traumatic event, and completed the PTG Inventory with reference to these experiences.

2.2. Measures

2.2.1. Demographic data

Factors such as gender, age, education, and marital status were queried.

2.2.2. Clinical history

Diagnosis and time since last hospitalization were queried either from the mental health professional who referred the participant or from the participant.

2.2.3. Traumatic history

The Trauma History Screen (THS; [78]) is an 18-item instrument used to screen lifetime trauma history. For the current study, we used the THS, which examines high magnitude stressors (HMS—referring to sudden events that have been found to cause distress in most of those exposed and witnessed by the participant), and traumatic stressors (TS—used to describe HMS events that were noted by the individual to cause extreme distress). For each potentially traumatic event on the scale, participants indicated whether they had ever experienced it, responding in a binary (yes/no) format. The THS has been found to be reliable and has good psychometric properties [78]. The THS was translated into Hebrew and back translated, and a third bilingual person with trauma expertise resolved any language discrepancies. As the total score was the only one used in this study, and due to the current sample size, factor analysis was not conducted. Three psychosis-related items were added, namely: “Have you ever experienced psychosis?” “Have you been psychiatrically hospitalized?” and “Do you suffer from serious mental illness?” In addition, a question was added regarding continuity of the traumatic exposure, namely: “Was the traumatic experience continuous or a one-time event?” For all three measures, the total number of events experienced was used in this study. Only HMS was entered into the final models proposed.

2.2.4. The Screen for Posttraumatic Stress Symptoms

The Screen for Posttraumatic Stress Symptoms (SPTSS; [79,80]) is a 21-item scale that assesses PTSS (the screen is not suitable for a “full” PTSD diagnosis). The scale includes three clusters: reexperiencing symptoms, avoidance/numbing symptoms, and hyperarousal symptoms. Responses are scored on a 4-point scale; from 0 (“not at all”) to 3 (“extremely”). Cronbach’s α for the SPTSS in the present sample was 0.88, and ranged from 0.61 to 0.84 for the sub-scales. The SPTSS was translated and back translated into Hebrew by Caspi et al. [80], and was modified based on Elhai et al. [81] to fit DSM-V. Factor analysis conducted by Elhai et al. [81] verified the factor structure of the questionnaire. Due to the small sample size, it was not performed here. The total score was used to assess the models proposed in this study.

2.2.5. Posttraumatic growth inventory

The Posttraumatic Growth Inventory (PTGI; [11]) is a 21-item scale that assesses PTG—positive changes occurring in response to major adversities. The PTGI is scored on a 6-point Likert-type scale, from 0 (“I did not experience this change as a result of my crisis”) to 5 (“I experienced this change to a very great extent as a result of my crisis”). The Hebrew PTGI showed good psychometric properties [82,83] and was successfully

Table 1

Means, standard deviations and correlations of the research variables, total scores.

	M (SD)	PTGI-relation with others	PTGI-new possibilities	PTGI-personal strength	PTGI-spiritual change	PTGI-appreciation of life	PTSS total	Number of HMS	MLQ total	CSE total
PTGI total	61.16 (21.87)	0.89***	0.86***	0.81***	0.62***	0.78***	−0.10	0.14	0.68***	0.66***
PTGI-relation with others	19.91 (7.98)		0.67***	0.64***	0.49***	0.61***	−0.08	0.11	0.58***	0.55***
PTGI- new possibilities	14.99 (6.42)			0.60***	0.48***	0.61***	−0.07	0.14	0.61***	0.62***
PTGI- personal strength	12.45 (4.58)				0.40***	0.65***	−0.14	−0.01	0.47***	0.54***
PTGI-spiritual change	4.86 (3.41)					0.30***	−0.06	0.10	0.50***	0.35***
PTGI-appreciation of life	8.96 (4.31)						−0.05	0.24**	0.55***	0.54***
PTSS total	27.50 (12.32)							0.33***	−0.29***	−0.37***
Number of HMS	7.21 (2.60)								0.08	−0.04
MLQ total	45.54 (14.57)									0.74***
CSE total	139.80 (50.64)									

$N = 121$. PTGI = Posttraumatic Growth Inventory, PTSS = Screen for Posttraumatic Stress Symptoms, Number of HMS = number of high magnitude stressors, MLQ = meaning of life questionnaire, CSE = coping self-efficacy.

** $p < .01$.

*** $p < 0.001$.

Table 2
Mediation analyses for total THS, MLQ, CSE, and PTGI scores (total and its five factors).

Dependent variable (DV)	Total effects		Direct effects		Indirect effect
	IV to DV		IV to DV		
	B (SE) 95%CI	IV to Mediator B (SE) 95%CI	B (SE) 95%CI	Mediator to DV B (SE) 95%CI	
IV = total THS, M = MLQ total PTGI total	1.18 (0.76) −0.33, 2.69	0.44 (0.51) −0.57, 1.46	0.74 (0.57) −0.39, 1.86	1.00*** (0.10) 0.80, 1.20	0.44 (0.48) −0.44, 1.43
Relations with others	0.33 (0.28) −0.22, 0.88	0.44 (0.51) −0.57, 1.46	0.19 (0.23) −0.27, 0.64	0.32*** (0.04) 0.23, 0.40	0.14 (0.15) −0.14, 0.46
New possibilities	0.35 (0.22) −0.09, 0.80	0.44 (0.51) −0.57, 1.46	0.24 (0.18) −0.12, 0.59	0.26*** (0.03) 0.20, 0.33	0.12 (0.12) −0.13, 0.37
Personal strength	−0.03 (0.16) −0.35, 0.29	0.44 (0.51) −0.57, 1.46	−0.09 (0.14) −0.38, 0.19	0.15*** (0.03) 0.10, 0.20	0.07 (0.07) −0.07, 0.23
Spiritual change	0.13 (0.12) −0.11, 0.36	0.44 (0.51) −0.57, 1.46	0.07 (0.10) −0.13, 0.28	0.12*** (0.02) 0.08, 0.15	0.05 (0.06) −0.06, 0.17
Appreciation of life	0.40** (0.15) 0.11, 0.69	0.44 (0.51) −0.57, 1.46	0.33** (0.12) 0.09, 0.58	0.16*** (0.02) 0.11, 0.20	0.07 (0.08) −0.07, 0.24
IV = total THS, M = MLQ total PTGI total	1.18 (0.76) −0.33, 2.69	−0.69 (1.78) −4.22, 2.84	1.38* (0.57) 0.25, 2.51	0.29*** (0.03) 0.23, 0.34	−0.20 (0.53) −1.25, 0.86
Relations with others	0.33 (0.28) −0.22, 0.88	−0.69 (1.78) −4.22, 2.84	0.39 (0.23) −0.07, 0.85	0.09*** (0.01) 0.06, 0.11	−0.06 (0.16) −0.41, 0.25
New possibilities	0.35 (0.22) −0.09, 0.80	−0.69 (1.78) −4.22, 2.84	0.41* (0.17) 0.06, 0.75	0.08*** (0.01) 0.06, 0.10	−0.05 (0.15) −0.36, 0.22
Personal strength	−0.03 (0.16) −0.35, 0.29	−0.69 (1.78) −4.22, 2.84	0.01 (0.14) −0.26, 0.28	0.05*** (0.01) 0.03, 0.06	−0.03 (0.09) −0.22, 0.14
Spiritual change	0.13 (0.12) −0.11, 0.36	−0.69 (1.78) −4.22, 2.84	0.14 (0.11) −0.08, 0.36	0.02*** (0.01) 0.01, 0.04	−0.02 (0.04) −0.11, 0.07
Appreciation of life	0.40** (0.15) 0.11, 0.69	−0.69 (1.78) −4.22, 2.84	0.43*** (0.12) 0.19, 0.68	0.05*** (0.01) 0.03, 0.06	−0.03 (0.09) −0.21, 0.14

N = 121.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

used in previous studies [118]. Previously conducted factor analyses verified the factor structure of the questionnaire. Due to the small sample size, it was not performed here. Cronbach's α for the PTGI factors in the present sample was good to excellent (range $\alpha = 0.84$ – 0.92). The total score and subscale scores were used in this study. In the current study, a gate question was added at the beginning of the questionnaire to determine the specific traumatic event addressed by participants when referring to PTG.

2.2.6. Coping self-efficacy

The Coping Self-Efficacy Scale (CSE; [84]) is a 26-item scale that assesses the respondent's confidence in performing coping behaviors when faced with life challenges, and is constructed from three facets: (a) problem-focused coping; (b) ability to stop unpleasant emotions and thoughts, and (c) ability to receive support from family and friends. The CSE is scored on a 10-point scale from 0 ("cannot do it at all") to 10 ("certain I can do it when faced with challenges"). The CSE has been used in several studies worldwide [85,86], and has been back translated into Hebrew. As the total score was the only one used in this study, and due to the current sample size, factor analysis was not performed. The internal consistency of the CSE in the present study was good to excellent (range.84–0.93). The total score was used in this study.

2.2.7. Meaning in life

The Meaning in Life Questionnaire (MLQ; [62]) is a 10-item scale that was used to identify meaning making processes; namely, the presence of meaning and the search for meaning, on a scale from 1 ("absolutely untrue") to 7 ("absolutely true"). The MLQ was used in a variety of studies [87,88], and was back translated into Hebrew. Factor analysis conducted in this study revealed a one major factor structure, explaining 53% of the variance. Cronbach's α for the MLQ total score was excellent ($\alpha = 0.90$). The total score was used in the current study.

2.3. Statistical analyses

Descriptive statistics was used to examine the prevalence of traumatic exposure, and Pearson correlations were calculated between the study variables. To assess whether meaning making (MLQ) and coping self-efficacy (CSE) mediate between PTSS (SPTSS) and PTG, mediation was examined with Preacher and Hayes' [89,90] bootstrapping procedures (PROCESS, SPSS24.0). Bootstrapping procedures were conducted with 10,000 samples, as this appears to be a midrange quantity [91]. Total effects, direct effects, and indirect effects were computed. The total effect of X (Independent Variable–IV) on Y (Dependent

Table 3
Mediation analyses for PTSS, MLQ, CSE, and PTGI scores (total and its five factors).

Dependent variable (DV)	Total effects		Direct effects		Indirect effect
	IV to DV	IV to	IV to DV	Mediator to	IV to DV
	B (SE) 95%CI	Mediator B (SE) 95%CI	B (SE) 95%CI	DV B (SE) 95%CI	Estimate (SE) 95%CI
IV = PTSS total, M = MLQ total					
PTGI total	−0.18 (0.16) −0.50, 0.14	−0.35** (0.10) −0.55, −0.14	0.19 (0.12) −0.06, 0.44	1.06*** (0.11) 0.85, 1.27	−0.37** (0.13) −0.62, −0.12
Relations with others	−0.05 (0.06) −0.17, 0.06	−0.35** (0.10) −0.55, −0.14	0.06 (0.05) −0.04, 0.16	0.33*** (0.04) 0.25, 0.42	−0.12** (0.04) −0.20, −0.04
New possibilities	−0.04 (0.05) −0.13, 0.06	−0.35** (0.10) −0.55, −0.14	0.06 (0.04) −0.02, 0.14	0.28*** (0.03) 0.22, 0.35	−0.10** (0.03) −0.17, −0.04
Personal strength	−0.05 (0.03) −0.12, 0.01	−0.35** (0.10) −0.55, −0.14	−0.01 (0.03) −0.07, 0.06	0.15*** (0.03) 0.10, 0.20	−0.05** (0.02) −0.10, −0.02
Spiritual change	−0.02 (0.03) −0.07, 0.03	−0.35** (0.10) −0.55, −0.14	0.03 (0.02) −0.02, 0.07	0.12*** (0.02) 0.09, 0.16	−0.04** (0.01) −0.08, −0.02
Appreciation of life	−0.02 (0.03) −0.08, 0.04	−0.35** (0.10) −0.55, −0.14	0.03 (0.03) −0.01, 0.10	0.17*** (0.02) 0.12, 0.22	−0.06** (0.02) −0.11, −0.02
IV = PTSS total, M = CSE total					
PTGI total	−0.18 (0.16) −0.50, 0.14	−1.54*** (0.35) −2.23, −0.85	0.30* (0.13) 0.04, 0.56	0.31*** (0.03) 0.25, 0.37	−0.48*** (0.14) −0.77, −0.23
Relations with others	−0.05 (0.06) −0.17, 0.06	−1.54*** (0.35) −2.23, −0.85	0.09 (0.05) −0.01, 0.20	0.10*** (0.01) 0.07, 0.12	−0.15*** (0.04) −0.25, −0.07
New possibilities	−0.04 (0.05) −0.13, 0.06	−1.54*** (0.35) −2.23, −0.85	0.10* (0.04) 0.02, 0.18	0.09*** (0.01) 0.07, 0.11	−0.13*** (0.04) −0.21, −0.06
Personal strength	−0.05 (0.03) −0.12, 0.01	−1.54*** (0.35) −2.23, −0.85	0.02 (0.03) −0.04, 0.09	0.05*** (0.01) 0.04, 0.07	−0.08** (0.03) −0.14, −0.04
Spiritual change	−0.02 (0.03) −0.07, 0.03	−1.54*** (0.35) −2.23, −0.85	0.02 (0.03) −0.03, 0.07	0.03*** (0.01) 0.01, 0.04	−0.04** (0.01) −0.07, −0.02
Appreciation of life	−0.02 (0.03) −0.08, 0.04	−1.54*** (0.35) −2.23, −0.85	0.06* (0.03) 0.01, 0.12	0.05*** (0.01) 0.04, 0.07	−0.08** (0.02) −0.11, −0.04

N = 121.
* p < 0.05.
** p < 0.01.
*** p < 0.001.

Variable–DV) is defined when M (the mediator) is excluded from the equation; the direct effect of X on Y is the direct relationship of IV and DV with M present, and the indirect effect of X on Y quantifies the effect of IV on DV through M (see Tables 2 and 3). Due to high intercorrelations between the two MLQ factors ($r = 0.59, p < 0.001$) and between the three CSE factors ($r = 0.62$ to $r = 0.80, p < 0.001$), only total scores were used for data analysis.

3. Results

3.1. Traumatic exposure

Elevated levels of traumatic exposure were found in the current sample; participants experienced up to 15 potential stressors, coded by the traumatic history questionnaire as high-magnitude stressors (HMS—sudden events that have been found to cause distress in most exposed individuals), ($M = 7.21; SD = 2.60$), as with 69 participants (57.0%) experiencing multiple traumatic stressors (TS) calculated as HMS events that caused extreme distress for the respondent. Fifty-seven participants (47.1%) experienced continuous trauma, which caused persistent posttraumatic distress (PPD—events associated with

significant subjective distress that lasted more than a month). Additionally, 40 participants (33.1%) experienced multiple traumatic events that resulted in PPD, and 40 participants (33.1%) experienced one event that resulted in PPD. Interestingly, 98.3% indicated that having a serious mental illness (SMI) was traumatic for them, 90.9% of participants felt that psychosis was traumatic, and almost all participants (90.1%) experienced psychiatric hospitalization as traumatic.

3.2. Descriptive statistics

Correlations between age, years of education, time of hospitalization and the total PTG score were not significant ($r = 0.08, p = 0.414, r = 0.11, p = 0.215$, and $r = 0.04, p = 0.668$, respectively). Differences by gender were not significant either. Family status had low variance. Thus, analyses were conducted without control for background variables.

Intercorrelations were performed between the study variables (Table 1). Posttraumatic stress symptoms (PTSS; SPTSS measure) negatively correlated with meaning making (MLQ) and coping self-efficacy (CSE), and positively correlated with the traumatic history screen (THS). Posttraumatic growth (PTGI) positively correlated with meaning

making and coping self-efficacy. Although the total scores of PTGI and PTSS were unrelated, PTGI total and PTGI dimensions of relations with others and new possibilities in life were negatively related to avoidance-related PTSS avoidance symptoms ($r = -0.34, -0.39$, and $-0.29, p < 0.001$, respectively).

3.3. PTSS and traumatic history

Traumatic history (THS) was positively related to posttraumatic stress symptoms (PTSS). PTSS total score was positively related to the number of high magnitude stressors (HMS) ($r = 0.33, p < 0.001$). The total PTSS score was positively related to the number of traumatic stressors (TS) ($M = 30.16, SD = 12.22, n = 69$) or one traumatic stressor ($M = 27.05, SD = 11.04, n = 39$), compared to participants with no trauma ($M = 14.69, SD = 8.20, n = 13$) ($F(2, 118) = 9.94, p < 0.001, \eta^2 = 0.144$). The total PTSS score was higher for participants with multiple events resulting in persistent posttraumatic distress (PPD) ($M = 33.33, SD = 11.01, n = 40$) than for participants with only one event that evoked PPD ($M = 26.50, SD = 10.70, n = 40$) ($F(2, 118) = 8.56, p < 0.001, \eta^2 = 0.127$). Moreover, the total PTSS score was higher for participants with continuous trauma ($M = 30.00, SD = 10.85, n = 57$) than for participants with no continuous trauma ($M = 25.27, SD = 13.19, n = 64$) ($F(1, 119) = 4.58, p = 0.034, \eta^2 = 0.037$).

3.4. PTG and traumatic history

The experience of past traumas was partially correlated with posttraumatic growth (PTG). The total PTG was higher for participants with multiple traumatic stressors ($M = 64.83, SD = 20.17, n = 69$) than for participants with no trauma ($M = 49.00, SD = 29.84, n = 13$) ($F(2, 118) = 3.34, p = 0.039, \eta^2 = 0.054$). The number of persistent posttraumatic distress events (PPD—sudden events that were found to cause extreme distress, and which caused participants acute distress for over a month; Traumatic History Scale by [78]), and continuous trauma, were unrelated to PTG total score.

3.5. Model 1—meaning making and coping self-efficacy as mediators between traumatic history and PTG

Mediation analysis (Table 2) revealed that meaning making and coping self-efficacy did not mediate the relationship between traumatic history and PTG. Results show that traumatic history was unrelated to meaning making (MLQ) and coping self-efficacy (CSE). As these total effects were non-significant, mediation did not exist. Furthermore, the number of high magnitude stressors (HMS) was unrelated to meaning making (MLQ) ($r = 0.08, p = 0.389$) and to coping self-efficacy (CSE) ($r = -0.04, p = 0.699$). Likewise, the MANOVA for MLQ and CSE by

the number of traumatic stressors (TS) was non-significant ($F(4, 232) = 1.03, p = 0.393, \eta^2 = 0.017$). The MANOVA for MLQ and CSE by the number of traumatic stressors that evoked PPD was also non-significant ($F(4, 232) = 1.32, p = 0.264, \eta^2 = 0.022$), and so was the MANOVA by continuous trauma ($F(2, 118) = 1.35, p = 0.263, \eta^2 = 0.022$). Thus, this hypothesized model was refuted.

3.6. Model 2: meaning making and coping self-efficacy as mediators between PTSS and PTG

Mediation analysis (Table 3) revealed that meaning making (MLQ) and coping self-efficacy (CSE) mediate the relationship between posttraumatic stress symptoms (PTSS) and the posttraumatic growth (PTG) total score, including its five factors. Regarding MLQ, all direct effects of posttraumatic stress symptoms (PTSS) on PTG total and factor scores were non-significant, suggesting full mediation. Regarding CSE, all direct effects of PTSS on PTG sub-scales of Relations with others, Personal strength, and Spiritual change were non-significant, suggesting full mediation for these subscales, as well. Direct effects between PTSS and the PTG total score and the sub-scales of new possibilities and appreciation of life were found, suggesting only a partial mediation for these factors. The current hypothesis was thus supported (Model 2). In other words, lower PTSS total score was related to higher MLQ and higher CSE total scores, which in turn were related to higher PTG scores (Fig. 1).

4. Discussion

The current cross-sectional study supports previous research indicating elevated levels of traumatic exposure in people with severe mental illness (SMI) who experienced psychosis [14–16,27,92], and the centrality of psychosis and hospitalization as traumatic experiences [7, 9,31,32,93]. Moreover, results replicate previous research regarding high rates of cumulative trauma and persistent posttraumatic distress in people with SMI who experienced psychosis [20,94]. Indeed, more than one third of participants in the current study suffered from multiple traumatic exposures and two thirds of the sample experienced posttraumatic distress. In addition, as in non-psychiatric populations, we found that a larger number of traumas led to more posttraumatic stress symptoms (PTSS; [95,96]). Thus, people who experienced multiple and continuous traumas tend to be more vulnerable to the development of high levels of PTSS than people who experienced only one or no traumatic events. This is consistent with the trauma literature on both non-clinical [97] and clinical populations [98].

As hypothesized, posttraumatic stress symptoms (PTSS) negatively correlated with meaning making, coping self-efficacy, and posttraumatic growth (PTG). One main reason for the negative relationship between

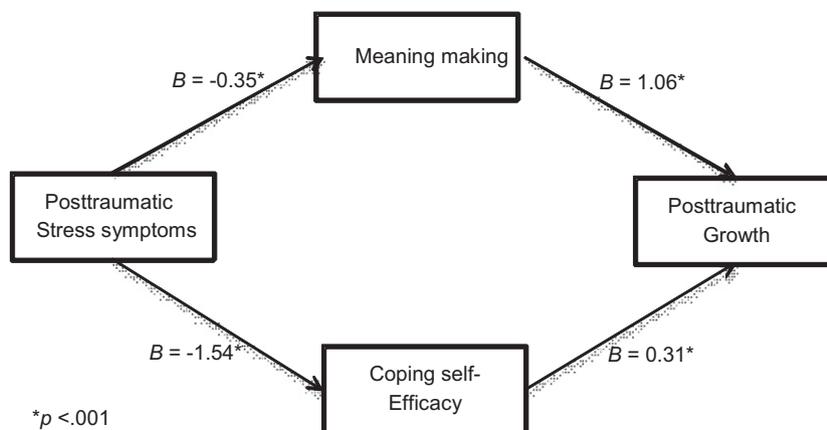


Fig. 1. Meaning making and coping self-efficacy as mediators between posttraumatic stress symptoms (PTSS) and posttraumatic growth (PTG).

PTSS and meaning making might be the nature of PTSS, which can prevent people from processing the traumatic experience both cognitively and emotionally, on account of being constantly distracted by cognitive intrusions, hyperarousal symptoms, and the attempts to avoid reminders of the trauma [66]. Thus, people might be left unable to participate in transformative and metacognitive processes needed for meaning making [99,100], and ultimately PTG. Another lead in explaining the negative relationship between PTSS, meaning making, and PTG is to distinguish between cognitive intrusions disrupting the cognitive mechanisms necessary for processing trauma and its aftermath and the ruminations that lead to PTG, which might be less intrusive and automatic, and more deliberate and reflective [51]. Thus, our findings possibly reflect the more primary and disruptive type of intrusive thoughts, which hamper meaning making and ultimately PTG. Finally, the negative correlation between PTSS and coping self-efficacy (CSE) can be understood through Foa and Rothbaum's [101] emotional processing theory, which explains the development of PTSS through two negative cognition categories; one is the belief that the world is extremely dangerous, and the other reflects people's beliefs about being incompetent. These cognitive distortions might damage the appraisal of coping self-efficacy, leaving people feeling helpless in the aftermath of trauma [55], and ultimately unable to experience PTG.

In this study, we found a significant negative correlation between avoidance-related posttraumatic stress symptoms (PTSS) and the PTG total score; for PTG to occur, people must first attempt to cope with their traumatic experience [1]. However, the attempt to cope might be severely hampered when people avoid reminders of the traumatic experience (e.g., not going anywhere near the area where they were hospitalized). In people with SMI, who underwent psychosis and suffer from posttraumatic avoidance symptoms, the mutual negative interaction between posttraumatic avoidance symptoms and certain symptoms that are part of SMI (such as lack of drive, energy, and motivation, avoiding social interactions, etc.; [9,14,15,20,66]) can ultimately result in the inability to achieve PTG [102].

In support of our third hypothesis, our results indicate that traumatic history positively correlated with posttraumatic growth (PTG) in three ways: first, PTG total score was positively and significantly related to the number of traumatic stressors (TS—high magnitude events that caused extreme distress for an individual), i.e., participants with multiple traumatic stressors experienced higher levels of PTG. Along these lines, we also found that experiencing a greater number of high magnitude stressors (HMS—sudden events that have been found to cause distress in most of those exposed) lead to higher appreciation of life (PTG sub-scale). These findings are consistent with other studies, which reported that people who underwent acute distress as a result of an adverse trauma had a greater tendency for PTG (i.e., a major qualitative shift in one or more of the five dimensions that encompass PTG), whereas people with low levels of traumatic exposure and distress did not experience PTG [12,103]. However, these findings might be somewhat paradoxical on account of the anguish that adverse trauma entails. This paradox can be explained by people's feelings of gratitude for being alive, which often accompany the aftermath of adversity [11,104]. For example, Fontana and Rosenheck [105] suggested that this paradoxical relationship originates from the fact that surviving trauma strengthens beliefs in one's abilities and self-esteem. Along these lines, Solomon and Dekel [106] further emphasized that traumatic events bring people to face their own mortality, which might lead them to live their lives to the fullest [107,119]. Indeed, PTG and suffering can apparently coexist, and an "optimal level" of distress might facilitate growth in some individuals [106,108,109]. Finally, we found no positive relationship between having experienced persistent posttraumatic distress (PPD) and PTG. This can be explained by the PTG "ceiling effect," in which too many adverse traumas might hamper the ability to reach PTG due to "too much" distress, preventing people's engagement in cognitive, ruminative, and emotional processes necessary for PTG [1].

Our first hypothetical model regarding traumatic history as a predictor of posttraumatic growth (PTG), with meaning making and coping self-efficacy as mediators, was not endorsed. PTG literature does not address the types and degrees of trauma that might facilitate or hamper PTG. However, theoreticians note that some cases of traumatic exposure might be too adverse to allow people to engage in the processes needed to achieve PTG ([50,51]; "PTG threshold"/"ceiling effect" of PTG, as mentioned above), as could possibly be seen in the current study. Applying a second mediational analysis, we hypothesized that posttraumatic stress symptoms (PTSS) would predict PTG when meaning making and coping self-efficacy are mediators. This model was endorsed i.e., lower PTSS was related to higher meaning making and higher coping self-efficacy, which in turn were related to higher PTG. Results suggest that PTSS levels do not impact PTG through distress that needs to be alleviated, but through whether these symptoms permit the cognitive and emotional availability of resources for meaning making and the practice of effective coping. These findings are consistent with research in non-SMI populations, in which the path to PTG does not directly originate from PTSS, but has to go through processes of cognitive rumination, meaning making, and the attempt to cope [12,108,110,111]. These findings also resonate with qualitative findings in individuals with first episode psychosis, showing that although psychosis can be extremely traumatic, aspects of PTG, such as a sense of mastery and personal strength, can develop [68].

5. Conclusions and implications

A number of practice and policy-related implications can be drawn from the current study, including the importance of addressing both traumatic exposure as well as posttraumatic symptoms (PTSS) when treating people with serious mental illness (SMI) who experienced psychosis. Considering the high levels of comorbidity (PTSS and SMI) found in this population, regular psychiatric interventions are inadequate to treat the traumatic aspects of people's illness and life experiences [112]. Although multiple studies including the current one show that >50% of people with SMI and psychosis experience significant levels of PTSS and traumatic exposure, these individuals scarcely receive proper rehabilitation and treatment for their dual challenge. Having said that, our findings suggest also that even when facing PTSS, individuals with SMI who experienced psychosis can experience posttraumatic growth (PTG), contingent upon their ability to engage in meaning-making processes and positively appraise their coping abilities. Thus, we suggest that greater emphasis be placed on exploring, teaching and practicing effective coping strategies [14,15,113], along with broadening the perspective of recovery in mental health to PTG, developing interventions promoting meaning making [114], and addressing PTSS in the context of SMI.

Although the current study has a number of strengths, including well-established assessment tools and a good sample size, it has some limitations. First, external validity might be limited due to the selection process. Indeed, participation was voluntary and participants were solely from rehabilitation centers in the community, which might both bias and limit the generalizability of our sample. Second, this study was cross-sectional, and thus does not allow tracking of PTG over time. Third, as mentioned in the Results section, the rejection of Model 1 needs to be interpreted with caution, as its power is low due to the small sample size. We therefore recommend recruiting a large sample for longitudinal studies in the field of psychosis and PTG, specifically regarding the dynamics of PTSS and PTG in this population. Finally, since the current study is exploratory in nature, the findings provide only preliminary data regarding mediational effects. Their validation will be subject to further study of longitudinal data.

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Conflicts of interest

None.

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