The Mediating Role of Difficulty in Emotion Regulation in the Relationship Between Traumatic Life Events and Character with Negative Symptoms of Schizophrenia

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Purpose: This study aimed to examine the mediating role of difficulty in emotion regulation in the relationship between traumatic life events and character with negative symptoms of schizophrenia.

Methodology: The research employed a quantitative, fundamental, cross-sectional, and descriptive-correlational design. The statistical population included all individuals diagnosed with schizophrenia who were hospitalized at Razi Psychiatric Hospital in 2023–2024, from whom 200 participants were selected through convenience sampling. Data collection tools included the Positive and Negative Syndrome Scale (PANSS), the Temperament and Character Inventory (TCI), the Trauma History Questionnaire (THQ), and the short form of the Difficulties in Emotion Regulation Scale (DERS). Data analysis was conducted using SPSS and AMOS software, as well as Pearson correlation analysis and structural equation modeling (SEM).

Findings: The analysis of direct path coefficients indicated that the relationship between traumatic life events and difficulty in emotion regulation with negative symptoms of schizophrenia was significant. Another finding demonstrated that the direct effect of traumatic life events and character on difficulty in emotion regulation was also significant. Furthermore, the analysis of indirect path coefficients revealed that the indirect effect of traumatic life events and character on negative symptoms of schizophrenia, mediated by difficulty in emotion regulation, was statistically significant. Finally, the proposed research model demonstrated a good fit (CFI = 0.97, NFI = 0.95, IFI = 0.97, GFI = 0.97, RMSEA = 0.071).

Conclusion: Therefore, emotion regulation training can be considered an essential approach in addressing the challenging treatment of negative symptoms of schizophrenia.

Keywords: Schizophrenia, Difficulty in Emotion Regulation, Negative Symptoms, Character.

1. Introduction

Anhedonia, alogia, avolition, flat affect, and social withdrawal are among the negative symptoms of schizophrenia. These symptoms include intrinsic pathophysiological features (primary symptoms) or symptoms associated with psychiatric or medical conditions, adverse treatment effects, or environmental factors (secondary symptoms) (Mosolov & Yaltonskaya, 2020; Mosolov & Yaltonskaya, 2022). More than half of individuals with chronic schizophrenia experience at least one negative symptom (Rabinowitz et al., 2013), and the prevalence of persistent negative symptoms following the first psychotic episode ranges from 11% to 37% (Galderisi et al., 2021; Galderisi et al., 2013).

In addition to reducing quality of life, negative symptoms are associated with impairments in daily functioning, social relationships, and professional activities (Mosolov & Yaltonskaya, 2020; Mosolov & Yaltonskaya, 2022), as well as poorer treatment outcomes and lower-quality recovery trajectories over the course of the disorder (Căpățînă et al., 2021). Compared to positive symptoms, negative symptoms do not tend to improve spontaneously over the disease course and respond poorly to currently available antipsychotic medications (Galderisi et al., 2021; Galderisi et al., 2013). This has shifted the focus of clinical research on schizophrenia from merely improving psychopathology and preventing hospitalization to enhancing real-life functioning and identifying its determinants (Mucci et al., 2021).

The exact causes of schizophrenia remain unknown. Research suggests that a combination of biological, genetic, psychological, and environmental factors may increase an individual's risk of developing the disorder (McCutcheon et al., 2020). Traumatic life events have been implicated in the conceptualization of both the etiology and symptomatology of schizophrenia spectrum disorders since their initial theorization (Anglin et al., 2021; Kendler, 2020). Traumatic life events can be considered a form of severe stress (e.g., natural disasters, death, illness, suicide of a close individual, physical injuries, physical abuse, and domestic violence) that increases vulnerability to schizophrenia (Popovic et al., 2019; Tajeryan et al., 2022, 2023).

Two explanatory causal models, the stress-diathesis model and the stress generation model, may clarify the fundamental relationship between traumatic life events and schizophrenia spectrum disorders. The stress-diathesis model posits that traumatic life events may act as an environmental risk factor for the onset and exacerbation of schizophrenia spectrum disorders in individuals with a genetic predisposition to the disorder (Nuechterlein & Dawson, 1984). The stress generation hypothesis (Hammen, 2006) suggests that individuals with these disorders may experience a greater number of traumatic life events due to behaviors associated with schizophrenia spectrum disorders (Hillow et al., 2023; Kilian et al., 2021; Uyan et al., 2022).

The research literature indicates that the relationship between traumatic and stressful life events and symptom severity is not uniform across different symptom domains of schizophrenia spectrum disorders. The stress-diathesis model has been used to explain the relationship between positive symptoms and stressful life events (Donaldson et al., 2022). However, the relationship between traumatic life events and symptoms in other domains is more complex. Some studies have confirmed the association between traumatic life events and negative symptoms of schizophrenia (Anglin et al., 2021; Campodonico et al., 2022; Kendler, 2020). However, several studies have found no significant relationship between traumatic life events and negative symptoms (Tessner et al., 2011; Ware et al., 2024). Additionally, some studies have found that a greater number of stressful life events predict fewer negative symptoms, and vice versa (Donaldson et al., 2022; Ma et al., 2023). This contradiction may arise from existing research focusing solely on the direct impact of traumatic life events on negative symptoms of schizophrenia without considering potential interactive relationships or underlying psychological mechanisms influencing this association.

Character is another variable often overlooked in schizophrenia research. Character represents the cognitive core of personality and refers to individual differences in self-concept, goals, and values, which are shaped by social and cultural factors (Cloninger et al., 1993; Cloninger & Zohar, 2011; De Fruyt et al., 2000). Evidence suggests that the heritability of character dimensions may influence the likelihood of schizotypy as a premorbid condition for schizophrenia (Zwir et al., 2020). According to Cloninger's neurobiological model, character consists of three dimensions: self-directedness (which includes responsibility, purposefulness, resourcefulness, acceptance, and congruence), cooperativeness (which includes social acceptance, empathy, helpfulness, and compassion), and self-transcendence (which reflects traits such as self-forgetfulness and spiritual acceptance) (Cloninger et al., 1993; Cloninger & Zohar, 2011; Conrad et al., 2007).

Regarding character, individuals with schizophrenia report lower self-directedness and cooperativeness but higher self-transcendence compared to control groups (Río-Martínez et al., 2020). Gaweda et al. (2015) also found that high self-transcendence and lower cooperativeness were associated with psychotic experiences (Gawęda et al., 2015). Another study identified cooperativeness as a significant predictor of overt psychosis conversion in ultra-high-risk groups (Song et al., 2013). Despite the documented influence of traumatic life events and character on the course of schizophrenia, the mechanisms through which these factors ultimately contribute to the onset, exacerbation, reduction, or persistence of negative symptoms remain poorly understood. This knowledge gap hinders the development of effective preventive interventions for individuals with schizophrenia.

Among various psychological risk mechanisms, difficulty in emotion regulation is a crucial area for further research (Liu, Chua, et al., 2020; Liu, Lim, et al., 2020) in individuals with schizophrenia spectrum disorders. Gratz and Roemer (2004) define difficulty in emotion regulation as the lack of one or more abilities related to adaptive emotional responses, including emotion acceptance, the ability to experience and differentiate a full spectrum of emotions, and the ability to regulate behaviors in response to emotional distress. In other words, difficulty in emotion regulation refers to problems with emotional awareness, understanding, and acceptance; impulsive behaviors; goal-directed behaviors when experiencing negative emotions; and flexible use of emotion regulation strategies in response to situational demands (Gratz & Roemer, 2004; Tajeryan et al., 2023).

Emotional dysregulation is prevalent among individuals with schizophrenia and is considered a core feature of the disorder (Kimhy et al., 2020). Most importantly, difficulty in emotion regulation is associated with a wide range of adverse clinical outcomes, including positive symptoms, negative symptoms, and impaired functional outcomes (Bartolomeo et al., 2021; Bartolomeo et al., 2022; Fitzpatrick et al., 2023; Sedighi et al., 2019). One study found that general emotion dysregulation was linked to both positive and negative symptoms in schizophrenia spectrum disorders (Liu, Chua, et al., 2020; Liu, Lim, et al., 2020; O'Driscoll et al., 2014).

The research literature suggests that individuals exposed to various traumatic events may develop general emotion regulation deficits, regardless of the nature of the traumatic event (Conti et al., 2023). This highlights the role of difficulty in emotion regulation as a potential mechanism mediating the relationship between trauma exposure and negative symptoms of schizophrenia. Specifically, difficulty in emotion regulation and the inability to engage in goal-directed behavior when experiencing intense emotions related to a traumatic event (Duru & Balkıs, 2024; Nabizadeh asl et al., 2020; Seery, 2011) may contribute to the development of negative symptoms in individuals with schizophrenia spectrum disorders.

The relationship between character and difficulty in emotion regulation has not been thoroughly examined, and existing studies have reported contradictory findings. For instance, Meshksar (2017) found a positive relationship between character and maladaptive cognitive emotion regulation in children (Meshkasar, 2017). Rajabi Marandian et al. (2023) and Chae et al. (2019) found associations between temperament and character with adaptive and maladaptive emotion regulation strategies in adolescents and university students (Chae et al., 2019; Rajabi Marandian et al., 2023). However, Lotfi and Amini (2019) reported no relationship between character and emotion regulation strategies in individuals with emotional disorders (Lotfi & Amini, 2019). Sedighi et al. (2019) reported that both adaptive and maladaptive cognitive emotion regulation strategies were associated with positive, negative, and overall psychotic symptoms in individuals with schizophrenia (Sedighi et al., 2019).

Given the limited and contradictory findings in the literature, and considering that each subscale of Cloninger's Temperament and Character Inventory overlaps significantly with the Five-Factor Model of personality (De Fruyt et al., 2000), as well as the fundamental role of emotions in character development (Eley et al., 2013; Lee et al., 2017; Starkey, 2015), it is plausible that difficulty in emotion regulation mediates the relationship between character and negative symptoms of schizophrenia.

Considering the significant burden and reduced quality of life associated with negative symptoms of schizophrenia, understanding their underlying mechanisms remains a critical research focus. Since schizophrenia results from the complex interplay of genetic, environmental, and psychological factors (McCutcheon et al., 2020), this study aims to investigate the simultaneous relationships among environmental factors (traumatic life events), individual factors (character), and psychological mechanisms (difficulty in emotion regulation) within a structural model. Additionally, given the potential influence of emotion regulation difficulties on negative symptoms and their

relationships with traumatic life events and character, this study seeks to expand existing knowledge in this area. Accordingly, the present study investigates the mediating role of difficulty in emotion regulation in the relationship between traumatic life events and character with negative symptoms of schizophrenia.

2. Methods and Materials

2.1. Study Design and Participants

This study employs a quantitative, fundamental, cross-sectional, and descriptive-correlational research design. The statistical population included all individuals diagnosed with schizophrenia who were hospitalized at Razi Psychiatric Hospital in Tehran between December 2023 and August 2024. From this population, 200 participants were selected using convenience sampling. A minimum sample size of 200 is recommended for structural modeling (Myers et al., 2016).

Following the acquisition of an official research authorization from the Research Vice-Presidency of Islamic Azad University, Birjand Branch, and coordination with the hospital authorities, hospitalized patients from various wards of Razi Psychiatric Hospital in Tehran were screened for eligibility based on psychiatric referral, medical records, and psychologist interviews. Participants were included in the study if they met the following inclusion criteria: (1) providing informed consent for participation, (2) being 18 years or older, (3) having at least a middle school education, (4) meeting the diagnostic criteria for schizophrenia according to the DSM-5-TR (American Psychiatric Association, 2022), (5) being in the remission phase following the acute stage, and (6) being able to communicate with the researcher.

Exclusion criteria included: (1) unwillingness to participate, (2) comorbid psychiatric or medical disorders, and (3) incomplete questionnaires (missing responses to at least 5% of the items on a given questionnaire).

2.2. Measures

2.2.1. Trauma History

This 24-item instrument, developed by Green (1996), assesses traumatic life events, including criminal acts, natural disasters, physical injuries, and experiences of physical or sexual abuse. Responses are recorded in a binary format (Yes = 1, No = 0), with total scores ranging from 0 to 24, where higher scores indicate a greater history of trauma. The THQ has demonstrated high test-retest reliability over two- and three-month periods, and inter-item correlations range from 0.47 to 0.99 (mean = 0.70) (Green, 1996). The Persian version has an internal consistency (Cronbach's alpha) of 0.76. Confirmatory factor analysis (CFA) demonstrated good construct validity (CFI = 0.93, NFI = 0.92, IFI = 0.93, GFI = 0.91, RMSEA = 0.041) (Khoramimanesh & Mansouri, 2019). In the present study, Cronbach's alpha for this questionnaire was 0.77. Additionally, CFA confirmed an adequate model fit (CFI = 0.926, GFI = 0.906, IFI = 0.931, RMSEA = 0.03).

2.2.2. Temperament and Character

This 56-item inventory, developed by Adan et al. (2009), includes seven subscales categorized under two major dimensions: temperament (novelty seeking, harm avoidance, reward dependence, and persistence) and character (self-directedness, cooperativeness, and self-transcendence). Each subscale consists of 8 items, scored on a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). The Cronbach's alpha coefficients for the original subscales were 0.69 (novelty seeking), 0.78 (harm avoidance), 0.80 (reward dependence), 0.74 (persistence), 0.77 (self-directedness), 0.75 (cooperativeness), and 0.85 (self-transcendence) (Adan et al., 2009). The Persian version demonstrated alpha coefficients of 0.71, 0.68, 0.73, 0.79, 0.72, 0.78, and 0.76, respectively, with test-retest reliability ranging from 0.70 to 0.76. Convergent validity was assessed through correlations between TCI subscales and the NEO Personality Inventory, with coefficients ranging from -0.19 to 0.69 (Ranjbar Noushari et al., 2022). In this study, Cronbach's alpha coefficients for self-directedness, cooperativeness, and self-transcendence were 0.71, 0.73, and 0.76, respectively. CFA results confirmed good model fit (CFI = 0.967, GFI = 0.903, IFI = 0.968, RMSEA = 0.023).

2.2.3. Difficulties in Emotion Regulation

Developed by Kaufman et al. (2016), this 18-item scale assesses six emotion regulation difficulties: (1) non-acceptance of emotional responses, (2) difficulty engaging in goal-directed behavior, (3) impulse control difficulties, (4) lack of emotional awareness, (5) limited access to emotion regulation strategies, and (6) lack of emotional clarity. Responses are rated on a five-point Likert scale (1 = Almost Never, 5 = Almost Always), with total scores ranging from 18 to 90. The original Cronbach's alpha for the total scale was 0.70, with subscale reliabilities ranging from 0.78 to 0.91 (Kaufman et al., 2016). The Persian version was

validated with a six-factor structure, and the Cronbach's alpha for the total scale was 0.85 (Shamsabadi et al., 2023). In the present study, Cronbach's alpha for the total scale was 0.76. CFA results indicated adequate model fit (CFI = 0.953, GFI = 0.923, IFI = 0.955, RMSEA = 0.033).

2.2.4. *Positive and Negative Syndrome*

This 30-item scale, developed by Kay et al. (1987), consists of three subscales: negative symptoms, positive symptoms, and general psychopathology. Given the study's focus, only the negative symptom subscale was utilized. Responses are rated on a seven-point Likert scale (1 = Not at All, 7 = Extremely), with total scores ranging from 30 to 210, where higher scores indicate greater symptom severity. Kay et al. (1987) reported Cronbach's alpha coefficients of 0.73 (positive symptoms), 0.83 (negative symptoms), and 0.79 (general psychopathology). Construct and criterion validity were also confirmed (Kay et al., 1987). Ghamari Givi et al. (2010) validated the Persian version using a five-factor structure (high tension, communication deficit, delusions, affective blunting, conceptual disorganization, and avolition) and found that PANSS correctly classified 47.1% of schizophrenia and schizoaffective cases, confirming its construct validity (Ghamari Givi et al., 2010).

The reliability of the total scale (Cronbach's alpha) was 0.92, with subscale reliabilities of 0.82 (negative symptoms), 0.74 (positive symptoms), and 0.86 (general psychopathology) (Sedighi et al., 2019). In the present study, Cronbach's alpha for the negative symptom subscale was 0.83. CFA results confirmed good model fit (CFI = 0.958, GFI = 0.954, IFI = 0.959, RMSEA = 0.068).

2.3. *Data Analysis*

For data analysis, the path analysis method was used with SPSS (version 26) and AMOS (version 24).

3. Findings and Results

The mean age of participants was 43.04 years, with a standard deviation (SD) of 12.09. The mean duration of illness was 12.55 years (SD = 7.71). Among the participants, 162 (81%) were male and 38 (19%) were female. Regarding marital status, 147 participants (73.5%) were single, 28 (14%) were married, and 25 (12.5%) were divorced. In terms of educational level, 84 participants (42%) had a high school diploma. Regarding suicidal behavior, 140 participants (70%) had no history of suicide attempts, while 60 participants (30%) had a history of suicide attempts. Table 1 presents the descriptive statistics for the study variables.

Table 1

Descriptive Statistics and Pearson Correlation Coefficients Among Study Variables

Variable	1	2	3	4	5	6	7	8	Mean	SD	Skewness	Kurtosis
1. Physical-Sexual Trauma	-								1.28	1.17	0.52	-0.76
2. Natural Disasters	0.643	-							4.36	2.66	0.32	-0.47
3. Criminal Acts	0.568	0.699	-						1.76	1.47	0.65	0.24
4. Self-Directedness	0.258	0.406	0.383	-					19.82	6.43	0.79	0.14
5. Cooperativeness	0.343	0.382	0.363	0.471	-				19.39	6.04	0.56	-0.13
6. Self-Transcendence	0.419	0.524	0.442	0.475	0.507	-			20.29	6.88	0.52	-0.50
7. Difficulty in Emotion Regulation	0.467	0.536	0.527	0.523	0.467	0.449	-		48.42	11.18	0.24	-0.20
8. Negative Symptoms of Schizophrenia	0.376	0.346	0.356	0.507	0.372	0.304	0.630	-	23.56	6.74	0.17	0.01

The study variables were on an interval scale. The results in Table 1 indicate that skewness and kurtosis values were within the acceptable range (±1), suggesting that the variables were normally distributed (Myers et al., 2016). The findings also show:

a) A positive correlation between traumatic life events and character with negative symptoms of schizophrenia (p < 0.01).

b) A positive correlation between traumatic life events and character with difficulty in emotion regulation (p < 0.01).

c) A positive correlation between difficulty in emotion regulation and negative symptoms of schizophrenia (p < 0.01).

Below tables and figure present the results of structural equation modeling (SEM).

Table 2

Direct Effects (Without the Mediator Variable)

Path	Estimate	SE	β	CR	p
Traumatic Life Events → Difficulty in Emotion Regulation	3.03	1.06	0.29	2.84	< 0.05
Character → Negative Symptoms of Schizophrenia	0.32	0.13	0.24	2.42	< 0.05
Character → Difficulty in Emotion Regulation	1.11	0.26	0.48	4.25	< 0.05
Difficulty in Emotion Regulation → Negative Symptoms of Schizophrenia	0.28	0.05	0.47	5.46	< 0.05

Table 3

Indirect Effects (With the Mediator Variable)

Path	β	Lb	Ub	p
Traumatic Life Events → Negative Symptoms of Schizophrenia (via Difficulty in Emotion Regulation)	0.136	0.036	0.277	0.013
Character → Negative Symptoms of Schizophrenia (via Difficulty in Emotion Regulation)	0.226	0.117	0.388	0.0001

Figure 1

Final Model of the Study
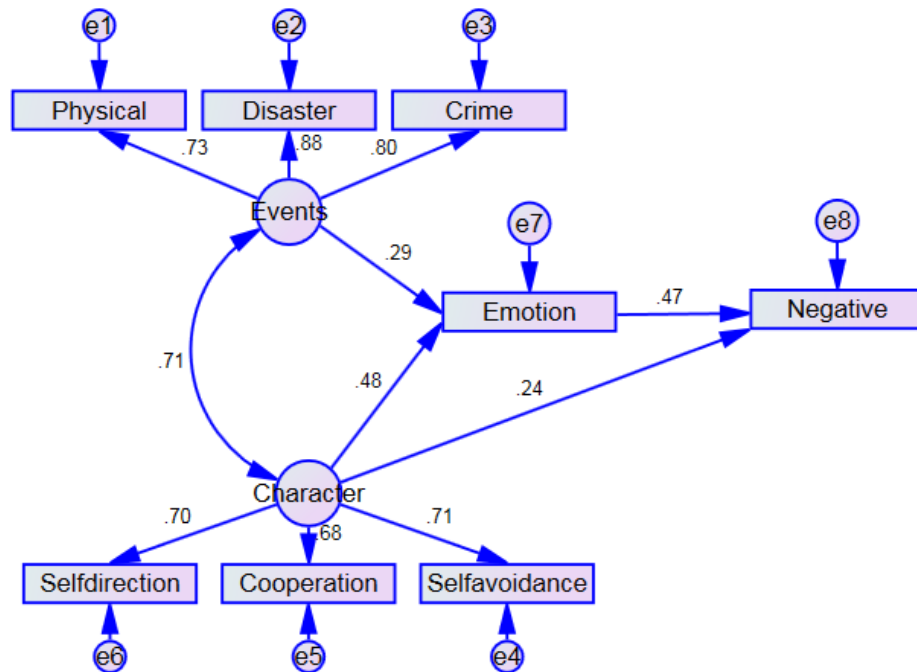
The results in Table 2 indicate that the significant F values for the within-group factor in the variables of social skills (F = 5.982, p = .001) and theory of mind (F = 5.931, p = .001) confirm the presence of a significant difference between the three measurement points (pre-test, post-test, and follow-up) at the .01 significance level.

Table 4

Model Fit Indices

Fit Index	χ^2/DF	RMSEA	CFI	NFI	TLI	IFI	RFI	GFI
Fit Criteria	≤3	≤0.08	≥0.90	≥0.90	≥0.90	≥0.90	≥0.90	≥0.90
Final Model	2.005	0.071	0.975	0.952	0.959	0.975	0.921	0.960

After removing the non-significant path from stressful life events to difficulty in emotion regulation (p = 0.43, β = 0.08, CR = -0.78), the results indicate:

a) The direct effect of traumatic life events on negative symptoms was significant (p < 0.05).

b) The direct effects of traumatic life events and character on difficulty in emotion regulation were significant (p < 0.05).

c) The direct effect of difficulty in emotion regulation on negative symptoms was significant (p < 0.05).

The indirect effects were tested using the bootstrap method, revealing:

a) The indirect effect of traumatic life events on negative symptoms via difficulty in emotion regulation was significant (p < 0.05).

b) The indirect effect of character on negative symptoms via difficulty in emotion regulation was significant (p < 0.05).

The results in Table 4 demonstrate that the chi-square, comparative fit index (CFI), normed fit index (NFI), Tucker-Lewis index (TLI), incremental fit index (IFI), relative fit index (RFI), goodness-of-fit index (GFI), and root mean square error of approximation (RMSEA) for the final model were $\chi^2/DF = 2.005$ (p = 0.008, DF = 17), CFI = 0.975, NFI = 0.952, TLI = 0.959, IFI = 0.975, RFI = 0.921, GFI = 0.960, and RMSEA = 0.071.

According to Myers et al. (2016), fit indices should be greater than 0.90, and RMSEA should be less than 0.08. Thus, the model exhibits an acceptable fit to the data. In other words, difficulty in emotion regulation mediates the relationship between traumatic life events and character with negative symptoms of schizophrenia.

4.   Discussion and Conclusion

The present study aimed to investigate the mediating role of difficulty in emotion regulation in the relationship between traumatic life events and character with negative symptoms of schizophrenia. The results indicated that the direct effect of traumatic life events on negative symptoms of schizophrenia was significant. Consistent with this finding, Kendler et al. (2020) found that environmental adversities can trigger the latent state of schizophrenia, leading to its manifestation (Kendler, 2020). Similarly, another study demonstrated that stressful environmental and social conditions may increase the risk of psychosis (Anglin et al., 2021). However, the findings of Donaldson et al. (2022) indicated that a greater number of stressful life events

predicted fewer negative symptoms, which contrasts with the results of the present study (Donaldson et al., 2022). These contradictory findings may be explained by the unique effects of traumatic and stressful life events across different symptom domains, as psychotic spectrum disorders manifest in various symptoms, including hallucinations, delusions, disorganization, negative symptoms, depression, and mania (Mosolov & Yaltonskaya, 2020; Mosolov & Yaltonskaya, 2022). In this regard, Campodonico et al. (2022) reported a direct relationship between past trauma and the content and characteristics of psychotic experiences (Campodonico et al., 2022).

Additionally, the severity and type of trauma experienced, as well as the timing of traumatic events, such as childhood, adolescence, or adulthood, may influence symptom domains differently (Hillow et al., 2023; Kilian et al., 2021). For example, Ware et al. (2024) found that severe trauma, physical abuse, and emotional neglect may increase the risk of reporting negative symptoms in schizophrenia patients (Ware et al., 2024). However, their study did not find a statistically significant relationship between childhood sexual and emotional abuse and the severity of negative symptoms experienced by schizophrenia patients. Overall, in explaining the relationship between traumatic life events and negative symptoms, the stress-diathesis model suggests that traumatic life experiences are key factors in the developmental trajectory of negative symptoms of schizophrenia. Exposure to traumatic events may interact with genetic predisposition and the dopaminergic system, altering an individual's perception and cognition, ultimately leading to early psychotic manifestations in some individuals.

Another finding of this study demonstrated that the direct effect of traumatic life events on difficulty in emotion regulation was significant. Consistent with this result, Nabizadeh Asl et al. (2020) found that childhood trauma affects cognitive emotion regulation in university students (Nabizadeh asl et al., 2020). Similarly, Sedighi et al. (2019) confirmed the relationship between adaptive and maladaptive cognitive emotion regulation strategies with positive, negative, and overall psychotic symptoms in individuals with schizophrenia (Sedighi et al., 2019). According to previous research, individuals with schizophrenia tend to use suppression as their primary emotion regulation strategy (O'Driscoll et al., 2014).

In explaining the relationship between traumatic life events and difficulty in emotion regulation in schizophrenia, it can be argued that traumatic life events, such as physical

and sexual abuse, natural disasters, and criminal acts, may increase an individual's sensitivity or vulnerability to adverse events. This means that even seemingly minor incidents can evoke strong emotional reactions later in life. Experiencing a traumatic event can lead to unprocessed emotions, resulting in poor emotion regulation strategies. Avoidant strategies used to protect against distress caused by traumatic experiences are associated with impaired self-regulation capacities. Consequently, individuals struggle with processing distressing emotions and connecting with their emotional experiences, leading many to suppress their emotional responses, which is indicative of poor emotion regulation (Conti et al., 2023).

Additionally, according to a transdiagnostic model, childhood trauma directly affects emotion processing (Bartolomeo et al., 2021; Bartolomeo et al., 2022). Researchers have suggested that childhood trauma accelerates the premature maturation of neural circuits underlying emotion regulation, affecting the development of brain regions involved in cognitive processing and control (Duru & Balkıs, 2024). As a result, individuals with a history of childhood trauma face difficulties in recognizing and regulating emotions, particularly in distressing situations. Moreover, they are more likely to rely on avoidant emotion regulation strategies (Duru & Balkıs, 2024).

The study's findings regarding the significant relationship between character and difficulty in emotion regulation are consistent with prior studies (Chae et al., 2019; Meshkasar, 2017; Rajabi Marandian et al., 2023) but contradict some other findings (Lotfi & Amini, 2019) which found a positive relationship between character and maladaptive cognitive emotion regulation in children.

Based on Cloninger's theory, self-directedness is the first personality trait that develops in humans and serves as the foundation of personality (Cloninger & Zohar, 2011; Josefsson et al., 2013). Individuals with higher self-directedness are responsible, goal-oriented, disciplined, self-accepting, and autonomous (Cloninger et al., 1993; Cloninger & Zohar, 2011). Thus, higher self-directedness may serve as a protective factor, helping individuals modify unhealthy thought patterns and adopt adaptive emotion regulation strategies (Cloninger & Zohar, 2011). Research also suggests that higher self-directedness and cooperativeness, along with lower cooperativeness or self-transcendence, play a significant role in emotional responses to stress and the selection of cognitive emotion regulation strategies in stressful situations (Chae et al., 2019). The importance of self-directedness and cooperativeness in stress responses has been confirmed in various studies (Eley et al., 2013; Lee et al., 2017).

Examining the direct effects, the study found that difficulty in emotion regulation is associated with negative symptoms of schizophrenia. This finding aligns with research highlighting the role of emotion regulation difficulties in psychosis, positive symptoms, negative symptoms, and schizophrenia spectrum disorders (Bartolomeo et al., 2021; Bartolomeo et al., 2022; Kimhy et al., 2020; Liu, Chua, et al., 2020; Liu, Lim, et al., 2020; Sedighi et al., 2019). Schizophrenia is characterized by abnormalities in every stage of emotion regulation, including inefficient identification of emotions, a limited range of emotion regulation strategies with a tendency to favor maladaptive strategies, and impairments in implementing multiple emotion regulation strategies, potentially due to deficits in cognitive and neural processes such as abnormal emotion-attention interactions and reduced cognitive effort (Bartolomeo et al., 2021; Bartolomeo et al., 2022).

Previous studies confirm that individuals with psychotic disorders, including schizophrenia, those at high clinical risk for psychosis, and even non-clinical psychotic individuals, exhibit increased reliance on suppression and avoidance while using reappraisal less frequently (Liu, Chua, et al., 2020; Liu, Lim, et al., 2020; Sedighi et al., 2019). Greater use of avoidance strategies may contribute to long-term negative symptoms in schizophrenia spectrum disorders. Avoidant emotion regulation strategies may lead individuals to avoid situations that elicit negative emotions, ultimately reducing reward-seeking, goal-directed, and social behaviors.

Finally, the study demonstrated that difficulty in emotion regulation mediates the relationship between traumatic life events and character with negative symptoms of schizophrenia. Although no previous studies have directly supported this finding, research has shown that the direct and indirect effects of negative life events on psychological distress in adults vary based on cognitive emotion regulation strategies (Duru & Balkıs, 2024). Additionally, Nabizadeh Asl et al. (2020) reported that cognitive emotion regulation, cognitive biases, and negative schemas mediate the relationship between childhood trauma and psychotic-like experiences in students (Nabizadeh asl et al., 2020).

In summary, the findings suggest that difficulty in emotion regulation, influenced by traumatic life events and character, can predict negative symptoms of schizophrenia. The study highlights the complex and dynamic relationship

among traumatic life events, character, emotion regulation, and negative symptoms, shedding light on their detrimental and protective roles in high-risk populations such as individuals with schizophrenia. Consequently, emotion regulation training could serve as a critical component in the challenging treatment of negative symptoms of schizophrenia.

Authors' Contributions

All authors significantly contributed to this study.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Declaration of Interest

The authors report no conflict of interest.

Ethical Considerations

In this study, to observe ethical considerations, participants were informed about the goals and importance of the research before the start of the interview and participated in the research with informed consent. Additionally, this study was approved by the Ethics Committee for Biomedical Research at Islamic Azad University, Birjand Branch, under the ethical code IR.IAU.BIRJAND.REC.1402.003.

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