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The Relationship Between Traumatic Life Events and Negative Symptoms of Schizophrenia: The Mediating Role of Cognitive Biases and Difficulty in Emotion Regulation

Hadi. Razmyar[1], Ahmad. Mansouri[2*], Qasem. Ahi[1], Seyed Abdolmajid. Bahreinian[1], Fahime. Saied[3]

[1] Department of Psychology, Birjand Branch, Islamic Azad University, Birjand, Iran
[2] Department of Psychology, Neyshabur Branch, Islamic Azad University, Neyshabur, Iran
[3] Department of Psychiatry, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran

*** Corresponding author email address**: mansoury_am@yahoo.com

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A B S T R A C T

Objective: Negative symptoms significantly contribute to the burden of illness and reduced quality of life in individuals with schizophrenia. The primary aim of this study was to examine the mediating role of cognitive biases and difficulty in emotion regulation in the relationship between traumatic life events and negative symptoms of schizophrenia.

Methodology: This descriptive study employed a correlational design. The statistical population consisted of all individuals with schizophrenia hospitalized at Razi Psychiatric Hospital in 2023–2024. From this population, 200 participants were selected through convenience sampling. Data collection instruments included the Positive and Negative Syndrome Scale, the Trauma History Questionnaire, the Cognitive Bias Scale, and the Short Form of the Difficulties in Emotion Regulation Scale. Data were analyzed using SPSS and LISREL software, as well as Pearson correlation and structural equation modeling (SEM).

Results: The findings indicated that cognitive biases and difficulty in emotion regulation mediated the relationship between traumatic life events and negative symptoms of schizophrenia (CFI = 1, NNFI = 0.99, IFI = 1, GFI = 0.99, RMSEA = 0.039).

Conclusion: Individuals with schizophrenia who experience traumatic life events are likely to exhibit negative symptoms due to cognitive biases and difficulties in emotion regulation. Therefore, training in emotion regulation skills and enhancing cognitive biases may serve as a critical component in the challenging task of treating negative symptoms of schizophrenia.

Keywords: *Schizophrenia, Emotion Regulation Difficulties, Traumatic Life Events, Cognitive Biases, Negative Symptoms.*

1. Introduction

Schizophrenia is often a chronic and disabling disorder characterized by heterogeneous positive and negative symptoms (Menon, 2020). While positive symptoms reflect distortions of normal functions (e.g., delusions, hallucinations, disorganized behavior), negative symptoms refer to reductions or absences of normal behaviors associated with motivation and interest (e.g., avolition, anhedonia, social withdrawal) or expression (e.g., blunted affect, alogia) (Correll & Schooler, 2020). Negative symptoms constitute a core aspect of schizophrenia and significantly contribute to long-term disability and poor functioning in individuals with the disorder, accompanied by substantial deficits in motivation, interactions, emotion, and social performance (Galderisi et al., 2018). Although positive symptoms are often effectively managed with existing antipsychotic medications, there are limited treatment options for negative symptoms. Despite advancements in understanding the epidemiology, etiology, biology, and psychotherapy of schizophrenia, addressing negative symptoms remains an unmet medical need (Carbon & Correll, 2022). Therefore, identifying and examining the psychological pathogenic factors and mechanisms underlying negative symptoms is crucial for alleviating the burden on affected individuals, caregivers, and healthcare systems.

Schizophrenia is a multifactorial disorder, with complex gene-environment interactions contributing to the onset and progression of psychotic symptoms. Early life environmental risk factors have been shown to play a major role in altering neurodevelopmental trajectories, subsequently contributing to the development of prodromal symptoms in vulnerable individuals (McCutcheon et al., 2020). According to vulnerability-stress models of schizophrenia, traumatic life events may act as triggers for the onset or exacerbation of psychotic symptoms (Isvoranu et al., 2017; Nuechterlein et al., 1992). Traumatic life events can be conceptualized as severe stressors (e.g., natural disasters, death, illness, suicide of a close individual, physical trauma, physical abuse, and domestic violence) that increase individuals' vulnerability to schizophrenia (Popovic et al., 2019). Studies have shown that individuals with schizophrenia report more traumatic life events compared to healthy controls in the general population (Uyan et al., 2022). Another study found that the severity of positive symptoms in schizophrenia was positively associated with the total number of stressful life events, while the severity of negative symptoms was negatively correlated with the number of stressful life events (Ma et al., 2023). Despite documented effects of life events on the course of schizophrenia, the mechanisms through which exposure to psychosocial stressors may lead to exacerbation of negative symptoms remain poorly understood.

One possible mechanism linking traumatic life events to negative symptoms of schizophrenia is cognitive biases, which may function as the executive aspect of a personality trait involved in the formation and maintenance of beliefs (Gawęda et al., 2024; Gawęda et al., 2015; Phiri et al., 2017). Cognitive biases are associated with the schizophrenia spectrum (Gawęda et al., 2024; Livet et al., 2020) and play a role in the development and/or maintenance of delusions and hallucinations (Underwood et al., 2016). Cognitive biases such as jumping to conclusions, self-referential processing, and biases against disconfirmatory evidence have also been observed in individuals with schizotypal personality traits who have not been diagnosed with schizophrenia spectrum disorders (Zahid & Best, 2023). However, contradictory findings have also been reported (Pionke-Ubych et al., 2021). Furthermore, the mediating role of cognitive biases in the relationship between traumatic life events and both positive and negative psychotic experiences, as well as self-disturbances, has been supported (Mętel et al., 2020; Pionke-Ubych et al., 2021).

Emotion regulation difficulties are another variable whose mediating role has been examined in research. Gratz and Roemer (2004) defined emotion regulation difficulties as the absence of one or more adaptive methods for responding to emotions, including acceptance of emotions, the ability to experience and differentiate a full spectrum of emotions, and the ability to control behaviors in the face of emotional distress (Gratz & Roemer, 2004). Emotional difficulties are prevalent among individuals with schizophrenia and are considered a core feature of the disorder (Kimhy et al., 2020). Most importantly, emotion regulation difficulties are associated with a range of poor clinical outcomes, including positive symptoms, negative symptoms, and impaired functional outcomes (Bartolomeo et al., 2021; Bartolomeo et al., 2022). Previous studies have recorded increased use of suppression and reduced use of reappraisal among individuals with psychotic spectrum disorders, including those with schizophrenia, individuals at clinical high risk for psychosis (Chapman et al., 2020), and individuals with nonclinical psychotic vulnerability (Krkovic et al., 2018). Additionally, childhood adversity—but not traumatic events occurring after the age of 15—has

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been identified as a risk factor for emotion regulation difficulties (Dragan, 2020). Another study indicated that the direct and indirect effects of negative life events on psychological distress vary depending on the levels of cognitive emotion regulation strategies (Duru & Balkıs, 2024).

Previous findings indicate that cognitive biases (Mętel et al., 2020; Pionke-Ubych et al., 2021) and emotion regulation (Duru & Balkıs, 2024; Nabizadeh asl et al., 2020) serve as mediating variables. Therefore, it can be hypothesized that cognitive biases and emotion regulation difficulties potentially mediate the relationship between traumatic life events and negative symptoms of schizophrenia.

As outlined above, negative symptoms impose a significant burden and reduce quality of life in patients with schizophrenia. The pathogenic mechanisms underlying primary negative symptoms remain unknown and are a subject of extensive research, as understanding these mechanisms may improve therapeutic interventions and potentially enhance our broader understanding of schizophrenia pathogenesis. Given that schizophrenia results from a complex interplay between genetic, environmental, and psychological factors (McCutcheon et al., 2020), this study aims to simultaneously examine the relationships between environmental variables (traumatic life events) and psychological variables (cognitive biases and emotion regulation difficulties) within a structural model. Furthermore, given the significant clinical implications of cognitive biases and emotion regulation difficulties on negative symptoms of schizophrenia and their relationship with traumatic life events, another objective of this study is to expand existing knowledge regarding the relationships among these variables. Accordingly, the current study investigates the mediating role of cognitive biases and emotion regulation difficulties in the relationship between traumatic life events and negative symptoms of schizophrenia.

2. Methods and Materials

2.1. Study Design and Participants

This study was a fundamental, cross-sectional, descriptive correlational study, and the relationships between variables were analyzed using structural equation modeling (SEM). The statistical population consisted of all individuals diagnosed with schizophrenia and hospitalized at Razi Psychiatric Hospital in Tehran in 2023. A sample of 200 participants was selected using convenience sampling. The minimum sample size for SEM is 200 participants.

After obtaining an introduction letter from the Research Deputy of the Islamic Azad University, Birjand Branch, and coordinating with the authorities at Razi Psychiatric Hospital in Tehran, inpatients in different hospital wards were evaluated based on psychiatrist referrals, medical records, and psychologist interviews. Individuals who met the inclusion criteria and expressed willingness to participate were selected as the study sample.

Inclusion criteria included providing informed consent, being aged 18 years or older, having a minimum middle school education, confirmed diagnosis of schizophrenia based on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (American Psychiatric Association, 2022), stabilization of acute symptoms, and the ability to communicate with the researcher. Exclusion criteria included unwillingness to participate, comorbidities with other diseases, and incomplete questionnaires (failure to respond to at least 5% of the items in any questionnaire).

2.2. Measures

2.2.1. Positive and Negative Syndromes

This 30-item scale, developed by Kay et al. (1987), consists of three subscales: negative symptoms (7 items), positive symptoms (7 items), and general psychopathology (16 items). For the purpose of this study, only the negative symptom items were used. Responses are scored on a 7-point Likert scale ranging from 1 (not at all) to 7 (extremely), with a minimum score of 30 and a maximum score of 210. Higher scores indicate greater symptom severity. Internal consistency reliability (Cronbach's alpha) for the positive, negative, and general psychopathology subscales was reported as 0.73, 0.83, and 0.79, respectively, and the scale demonstrated good construct and criterion validity (Kay et al., 1987). A study by Ghamari Givi et al. (2010) adapted the scale to a 5-point Likert scale and identified five factors: high tension, communication deficiency, delusions, emotional blunting, and conceptual and volitional disorders, with a scoring range of 30 to 150. Their diagnostic analysis showed that the scale correctly classified schizophrenia and schizoaffective disorders in 47.1% of cases and demonstrated acceptable construct validity (Ghamari Givi et al., 2010). In the present study, the internal consistency reliability (Cronbach's alpha) for the negative symptom subscale was 0.83.

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2.2.2. *Trauma History*

This 24-item instrument, developed by Green (1996), assesses traumatic events, including crimes (4 items), natural disasters and accidents (13 items), and physical and sexual experiences (7 items). Responses are scored dichotomously as yes (1) or no (0), with a total score range of 0 to 24. Higher scores indicate greater trauma history. The THQ has high test-retest reliability over two- and three-month intervals, with item correlations ranging from 0.47 to 0.99 (mean = 0.70) (Green, 1996). The internal consistency reliability (Cronbach's alpha) for the Persian version of the scale was reported as 0.76 for the total score. Confirmatory factor analysis indicated good construct validity (CFI = 0.93, NNFI = 0.92, IFI = 0.93, GFI = 0.91, RMSEA = 0.041) (Khoramimanesh & Mansouri, 2019). In the present study, the internal consistency reliability (Cronbach's alpha) was 0.77.

2.2.3. *Cognitive Biases*

This 42-item scale, developed by van der Gaag et al. (2013), consists of six subscales: four measuring cognitive biases related to psychosis (jumping to conclusions, belief inflexibility, attention to threat, and external attribution bias) and two assessing socio-cognitive schemas (cognitive problems and mental health issues). Additionally, one subscale evaluates behavioral coping strategies (safety behaviors). Items are rated on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree), with a score range of 42 to 294. The overall scale's internal consistency reliability (Cronbach's alpha) and test-retest reliability were reported as 0.90 and 0.92, respectively. Subscale reliability ranged from 0.64 to 0.82 for Cronbach's alpha and from 0.74 to 0.88 for test-retest (van der Gaag et al., 2013). The Persian version demonstrated internal consistency reliability (Cronbach's alpha) of 0.89 for the overall scale and 0.81, 0.74, 0.75, and 0.88 for the subscales of jumping to conclusions, belief inflexibility, attention to threat, and external attribution bias, respectively. Confirmatory factor analysis indicated good construct validity (CFI = 0.97, NNFI = 0.96, IFI = 0.97, GFI = 0.91, RMSEA = 0.059) (Nabizadeh asl et al., 2020). In the present study, the internal consistency reliability (Cronbach's alpha) for the overall scale was 0.90.

2.2.4. *Difficulties in Emotion Regulation*

This 18-item scale, developed by Kaufman et al. (2016), measures six subscales: non-acceptance of emotional responses, difficulties engaging in goal-directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. Items are rated on a 5-point Likert scale from 1 (almost never) to 5 (almost always), with a score range of 18 to 90. Cronbach's alpha for the total scale was reported as 0.70, and subscale reliability ranged from 0.78 to 0.91 (Kaufman et al., 2016). The Persian version confirmed the six-factor structure and reported Cronbach's alpha of 0.85 for the total scale (Shamsabadi et al., 2023). In the present study, the internal consistency reliability (Cronbach's alpha) for the total scale was 0.76.

2.3. *Data analysis*

Path analysis was performed using SPSS version 26 and LISREL version 8.8.

3. Findings and Results

The final sample of this study consisted of 200 individuals diagnosed with schizophrenia. The mean and standard deviation (SD) of participants' age were 43.04 and 12.09, respectively. The mean duration of illness was 12.55 years (SD = 7.71). Among the participants, 162 were male (81%) and 38 were female (19%). Regarding marital status, 147 participants were single (73.5%), 28 were married (14%), and 25 were divorced (12.5%). In terms of education, 84 participants (42%) held a high school diploma. Additionally, 140 participants (70%) had no history of suicide attempts, while 60 (30%) had a history of suicide attempts. Descriptive statistics for the study variables are presented in Table 1.

The variables in this study are interval-scaled. The results in Table 1 show that skewness and kurtosis values for all variables fall within the acceptable range of ±3 and ±10, respectively, indicating that the predictor and criterion variables are normally distributed.

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Table 1

Descriptive Statistics (Mean and Standard Deviation) for Study Variables

Variable	1	2	3	4	5	6	Mean	SD	Skewness	Kurtosis
1. Physical-Sexual Experiences	1						1.285	1.171	-0.763	0.529
2. Natural Disasters	0.643	1					4.365	2.668	-0.476	0.326
3. Crimes	0.568	0.699	1				1.765	1.477	0.244	0.658
4. Difficulty in Emotion Regulation	0.467	0.536	0.527	1			48.425	11.184	-0.201	0.246
5. Cognitive Biases	0.47	0.55	0.53	0.611	1		153.815	39.255	1.994	1.121
6. Negative Symptoms	0.376	0.346	0.356	0.63	0.554	1	23.56	6.749	-0.017	-0.176

All p<0.01

The findings demonstrate significant relationships between traumatic life events, difficulty in emotion regulation, cognitive biases, and negative symptoms of schizophrenia ($p < .01$). Path analysis was employed to analyze the data.

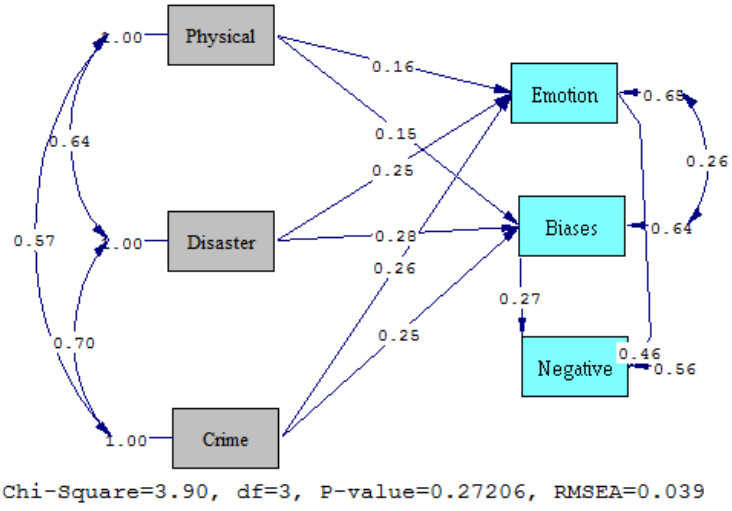
Table 2

Direct and Indirect Effects in the Revised Model

Effect	Predictor Variable	Criterion Variable	β	T	p
Direct	Physical-Sexual Experiences	Difficulty in Emotion Regulation	0.16	2.01	<.05
		Cognitive Biases	0.15	1.93	>.05
	Natural Disasters	Difficulty in Emotion Regulation	0.25	2.85	<.05
		Cognitive Biases	0.28	3.19	<.05
	Crimes	Difficulty in Emotion Regulation	0.26	3.16	<.05
		Cognitive Biases	0.25	3.04	<.05
	Difficulty in Emotion Regulation	Negative Symptoms	0.46	6.89	<.05
	Cognitive Biases	Negative Symptoms	0.27	4.01	<.05
Indirect	Physical-Sexual Experiences	Negative Symptoms (via Difficulty in Emotion Regulation and Cognitive Biases)	0.11	2.30	<.05
	Natural Disasters	Negative Symptoms (via Difficulty in Emotion Regulation and Cognitive Biases)	0.19	3.36	<.05
	Crimes	Negative Symptoms (via Difficulty in Emotion Regulation and Cognitive Biases)	0.19	3.52	<.05

Figure 1

Final Model of the Study



The results from Table 2 and Figure 1 indicate that the direct effects of physical-sexual experiences ($\beta = 0.16$, $t = 2.01$, $p < .05$), natural disasters ($\beta = 0.25$, $t = 2.85$, $p < .05$), and crimes ($\beta = 0.26$, $t = 3.16$, $p < .05$) on difficulty in emotion regulation are significant. While natural disasters ($\beta = 0.28$, $t = 3.19$, $p < .05$) and crimes ($\beta = 0.25$, $t = 3.04$, $p <$

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.05) have significant direct effects on cognitive biases, the direct effect of physical-sexual experiences (β = 0.15, t = 1.93, p > .05) on cognitive biases is not significant.

The direct effects of difficulty in emotion regulation (β = 0.46, t = 6.89, p < .05) and cognitive biases (β = 0.27, t = 4.01, p < .05) on negative symptoms of schizophrenia are significant. Additionally, the indirect effects of physical-sexual experiences (β = 0.11, t = 2.30, p < .05), natural disasters (β = 0.19, t = 3.36, p < .05), and crimes (β = 0.19, t = 3.52, p < .05) on negative symptoms of schizophrenia are significant.

Table 3

Model Fit Indices

Index	RSMEA	CFI	NFI	NNFI	IFI	RFI	GFI
Criterion	≤ 0.08	≥ 0.90	≥ 0.90	≥ 0.90	≥ 0.90	≥ 0.90	≥ 0.90
Value	0.039	1	1	0.99	1	0.98	0.99

Table 3 reports fit indices, including chi-square, comparative fit index (CFI), normed fit index (NFI), non-normed fit index (NNFI), incremental fit index (IFI), relative fit index (RFI), and goodness-of-fit index (GFI). These indices, along with RMSEA, confirm the satisfactory fit of the model. Based on the criteria (Meyers et al., 2016), fit indices greater than 0.90 and RMSEA less than 0.08 indicate an acceptable model fit. Therefore, this model demonstrates a good fit.

4. Discussion and Conclusion

The primary aim of the present study was to examine the relationship between traumatic life events and negative symptoms of schizophrenia through the mediating roles of cognitive biases and difficulties in emotion regulation. Consistent with previous research, the findings demonstrated significant relationships between traumatic life events (physical-sexual experiences, natural disasters, and crimes) and difficulties in emotion regulation (Dragan, 2020), cognitive biases (except for the subscale of physical-sexual experiences) (Mętel et al., 2020; Pionke-Ubych et al., 2021), as well as between difficulties in emotion regulation and cognitive biases with negative symptoms of schizophrenia (Bartolomeo et al., 2021; Bartolomeo et al., 2022; Gawęda et al., 2024).

The literature suggests that individuals exposed to various traumatic events may experience general deficits in emotion regulation, regardless of the specific nature of the trauma (Dragan, 2020). Traumatic experiences may lead to feelings of inferiority and weakened self-efficacy, contributing to causal attributions and a more external locus of control (Pionke-Ubych et al., 2021). This disruption in information processing (i.e., cognitive biases) and emotional regulation can result in the perception of negative symptoms within the schizophrenia spectrum (Chapman et al., 2020; Gawęda et al., 2024).

Another finding revealed that cognitive biases and difficulties in emotion regulation mediate the relationship between traumatic life events (physical-sexual experiences, natural disasters, and crimes) and negative symptoms of schizophrenia. While no directly comparable studies were found, some research has confirmed the mediating role of cognitive biases in the relationship between traumatic life events and both positive and negative psychotic experiences, as well as self-disturbances (Mętel et al., 2020; Pionke-Ubych et al., 2021). Other studies have shown that the direct and indirect effects of adverse life events on psychological distress vary based on the levels of cognitive emotion regulation strategies (Duru & Balkıs, 2024).

Based on the "sensitization" and "amplification" theories, it can be posited that traumatic life events (physical-sexual experiences, natural disasters, and crimes) may increase sensitivity or vulnerability to subsequent adverse events. Even seemingly minor occurrences could evoke strong emotional responses later. Traumatic experiences may result in unresolved emotions, leading to poor emotion regulation strategies. Avoidance strategies used to shield oneself from distress caused by trauma are associated with reduced self-regulatory capacity. Consequently, individuals struggle to process distressing emotions and connect with their feelings, often resorting to suppressing unpleasant emotional responses, which indicates poor emotional regulation (Dragan, 2020).

Furthermore, exposure to early traumatic events affects cognition, contributing to the development of negative views about oneself, others, and the future. This is associated with patterns of negative self-referential information processing characterized by cognitive errors, misinterpretations, and dysfunctional attitudes (Mętel et al., 2020).

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The finding of a direct effect of cognitive biases on negative symptoms of schizophrenia aligns with cognitive-behavioral models and psychosis continuum models, which emphasize the role of cognitive biases in the onset and maintenance of positive psychotic symptoms (Livet et al., 2020). According to cognitive models of psychosis, negative interpretations and evaluations of anomalous experiences are primary factors influencing the emergence of psychotic symptoms (Phiri et al., 2017). Clinical groups tend to endorse maladaptive appraisals characterized by perceptions of external and personal threats, as opposed to benign or positive appraisals typically reported by non-clinical groups. Such appraisals predict lower levels of distress. Reasoning, attentional, and attributional biases play roles in threat-based evaluations (Underwood et al., 2016). Psychotic symptoms intensify when individuals experience heightened physiological arousal related to their fears or worry about harmful agency in their environment due to selective attention to threatening stimuli (Mętel et al., 2020).

The direct effect of difficulties in emotion regulation on negative symptoms of schizophrenia can be explained by the strong beliefs among individuals with schizophrenia spectrum disorders about the uncontrollability of their emotions. These beliefs may influence the selection of emotion regulation strategies, contributing to the manifestation of negative symptoms (Kimhy et al., 2020). Beliefs about uncontrollability are associated with greater use of expressive suppression and less use of adaptive emotion regulation strategies, such as cognitive reappraisal, resulting in higher severity of both positive and negative symptoms (Chapman et al., 2020). Supporting this, previous studies have shown that individuals who believe emotions are controllable are more likely to use adaptive strategies, such as reappraisal, which effectively reduce negative emotions and psychiatric symptoms (Bartolomeo et al., 2021; Bartolomeo et al., 2022).

The findings regarding the mediating role of cognitive biases and the proposed model indicate that cognitive biases mediate the relationship between traumatic life events and negative symptoms of schizophrenia. In this regard, Mętel et al. (2020) reported that cognitive biases mediate the relationship between traumatic life events and both positive and negative psychotic experiences, as well as self-disturbances (Mętel et al., 2020). Another study reported a significant indirect effect of traumatic life events on psychotic experiences via cognitive biases (Pionke-Ubych et al., 2021).

In other words, traumatic life events may influence information processing, altering attention or memory functioning, and subsequently increasing maladaptive interpretations of current experiences (Zahid & Best, 2023). Cognitive models suggest that trauma-related cognitive biases contribute to a "current sense of threat," which partially determines an individual's recovery from a traumatic experience (Mętel et al., 2020).

In explaining these findings, individuals exposed to traumatic life events are more likely to attribute positive events to external and uncontrollable sources. They believe that positive experiences do not result from their own actions, thereby undermining their ability to derive pride or self-esteem from achievements. Combined with a fearful perception of the environment and expectations of uncontrollable danger, their hope and motivation for positive action may be weakened (Pionke-Ubych et al., 2021).

The acquisition of cognitive biases or impairments in reasoning processes plays a critical role in the onset, maintenance, and recurrence of schizophrenia symptoms (Zahid & Best, 2023). Collectively, this finding aligns with the cognitive model of psychosis, which posits that psychotic symptoms arise from biased information processing. According to this model, individuals diagnosed with schizophrenia tend to exhibit distinct cognitive biases that are central to their evaluation, reasoning, and metacognitive processes, which likely contribute to the formation and maintenance of delusions (Morrison et al., 2007).

In explaining the mediating effect of difficulties in emotion regulation on the relationship between traumatic life events and negative symptoms of schizophrenia, it can be argued that persistent or repeated traumatic experiences, such as early-life stress, jeopardize the acquisition of appropriate emotion regulation skills. Traumatic life events can disrupt the development of the brain's emotion regulation system, making it difficult to recognize, perceive, and manage emotions (Chapman et al., 2020). These abnormalities are associated with a range of poor clinical outcomes, including positive symptoms, negative symptoms, and impaired functional outcomes (Bartolomeo et al., 2021; Bartolomeo et al., 2022).

According to cognitive models of psychosis, several potential vulnerability factors—such as abnormal experiences, adverse life events and trauma, emotion regulation difficulties, and cognitive biases—combine to increase the likelihood of psychosis. In this model, the role of trauma and emotion regulation aligns with evidence

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suggesting that delusions often reflect an individual's current emotional concerns as they attempt to make sense of abnormal experiences (Morrison et al., 2007). In other words, within a context of stress-inducing life events, impaired emotion regulation and the interaction of cognitive biases lead individuals to evaluate personal and futile experiences as threatening, contributing to the development of psychotic symptoms. Psychotic symptoms are therefore maintained through persistent unusual experiences, disrupted emotion regulation, adverse life events, hostile environments, and the ongoing influence of cognitive biases on stimulus evaluations (Nabizadeh asl et al., 2020).

Overall, the results of this study demonstrated that cognitive biases and difficulties in emotion regulation, influenced by traumatic life events, can affect the negative symptoms of schizophrenia. The findings support the role of cognitive factors (emotion regulation difficulties and cognitive biases) in the relationship between traumatic life events and negative symptoms of schizophrenia. Based on these findings, individuals who experience traumatic life events are likely to develop negative symptoms of schizophrenia due to difficulties in emotion regulation and cognitive biases.

As such, teaching emotion regulation skills and improving cognitive biases may constitute a critical component of the challenging work of treating negative symptoms of schizophrenia.

5. Limitations and Suggestions

This study has several limitations. First, the research used a cross-sectional and descriptive correlational design to examine causal relationships. Future studies could employ longitudinal designs to provide more accurate insights into the causal relationships between variables. Second, data collection was limited to self-report tools, which may be subject to bias and distortion in participants' responses. Therefore, incorporating other data collection methods, such as interviews or experimental tasks, could yield more accurate information. Finally, the sample was limited to individuals with schizophrenia hospitalized at Razi Psychiatric Hospital in Tehran, which restricts the generalizability of the findings. Replicating the study in other populations and cities could produce noteworthy results.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants. Ethical considerations included obtaining informed consent, maintaining confidentiality and anonymity, and ensuring no harm to participants. Additionally, the study received ethical approval under code IR.IAU.BIRJAND.REC.1402.003 from the Biomedical Research Ethics Committee of the Islamic Azad University, Birjand Branch.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contributed in this article. The present article is derived from the first author's doctoral dissertation at the Islamic Azad University, Birjand Branch. The second author is the supervisor and corresponding author, the third author is the co-supervisor, and the third and fourth authors served as advisors for the research.

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