Early maladaptive schemas in patients with schizophrenia and non-patients with high and low schizotypal traits and their differences based on depression severity

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A R T I C L E   I N F O

A B S T R A C T

Background: The aims of this study were to predict positive and negative symptoms of psychosis via early maladaptive schemas (EMSs) in patients with schizophrenia (SZ); to compare EMSs among SZ patients, non-patients with high schizotypal traits, and non-patients with low schizotypal traits; and to compare EMSs among subgroups concerning depression severity.
Methods: We applied three groups of participants including SZ patients ($n = 105$), non-patients with low schizotypal traits ($n = 90$), and non-patients with high schizotypal traits ($n = 90$). Participants completed the Young Schema Questionnaire-Short Form (YSQ-SF), the Positive and Negative Syndrome Scale (PANSS), the Schizotypal Personality Scale (STA), and the Beck Depression Inventory-II (BDI-II).
Results: The results indicated that the mistrust/abuse and social isolation schemas were significant predictors of positive and negative symptoms in SZ patients respectively. SZ patients and non-patients with high schizotypal traits exceeded non-patients with low schizotypal traits on all EMSs. There were no differences between SZ patients and non-patients with high schizotypal traits regarding EMSs. In the subgroups with high depression, SZ patients showed higher levels of EMSs than non-patients with low and high schizotypal traits. In the subgroups with low depression, both SZ patients and non-patients with high schizotypal traits had higher scores on EMSs than non-patients with low schizotypal traits.
Conclusion: The findings suggest that mistrust/abuse and social isolation may be specific to psychosis symptoms. Also, SZ and schizotypal traits may overlap in relation to EMSs. In addition, the activated EMSs may contribute to high depression in SZ.

1. Introduction

Schizotypy as a multifaceted structure [1] is described as a 'liability' to schizophrenia (SZ) [2] and individuals with high scores on schizotypy show elevated risk for SZ and SZ-related psychoses [3,4]. Also, it is related to psychotic-like experiences [5]. Further, in a review study, Debbané et al. [6] have suggested a longitudinal link of schizotypy to later risk for a psychotic disorder. In addition, high trait schizotypy has been shown to culminate in an elevated liability to psychotic states which along with endogenous and exogenous factors as well as their dynamic interactions among sensitive episodes may finally result in SZ spectrum disorders [7]. Therefore, the study of schizotypy may facilitate the better perception of how to develop psychosis at the clinical level [8]. It has recently been suggested that schizotypy involves a uniform concept that effectively associates a vast continuum of clinical and subclinical representations of psychosis (such as schizotypal traits, psychotic-like experiences, attenuated psychotic symptoms, and basic symptoms) and also "normal" personality changes [9]. Schizotypy and schizotypal traits may be different concepts. Schizotypal traits are thought to be phenotypic indicators or expressions or latent personality liability of schizotypy [5,10–12]. On the other hand, schizotypy is able to create several phenotypic and endophenotypic outcomes [4]. Also, it is described as a latent personality organization representing a putative liability for SZ spectrum disorders [10].

For early detection of schizotypy in the general population samples, there are several screening tools including the Schizotypal Personality Questionnaire (SPQ [13]), the Schizotypal Personality Scale (STA [14]), the Schizotypal Personality Questionnaire-Brief (SPQ-B [15]), the Oxford-Liverpool Inventory of Feelings and Experiences (O-LIFE [16]), the Wisconsin Schizotypy Scales (WSS [17]), the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q [18]), and the Multidimensional

Schizotypy Scale (MSS [19]). These scales have shown that schizotypy has a multidimensional structure. For example, it has been suggested that schizotypy has a nine-factor structure on the SPQ [1]; a three-factor structure on the SPQ-B [20], the MSS [19], and the SAT [14]; a four-factor structure on the O-LIFE [16]; a two-factor structure on the WSS [17]; and a ten-factor structure on the ESQUIZO-Q [18].

Young [21] has specified stable structures named early maladaptive schemas (EMSs). One model which may be useful regarding psychopathology is schema theory [21]. According to this model, EMSs involve memories, emotions, cognitions, and bodily sensations that are believed to trigger during childhood because of exposure to unpleasant experiences (e.g., childhood trauma (CT) and insecure attachment) [21]. EMSs are considered as maladaptive patterns concerning oneself and one's communications with others [21]. Young [22] has represented fifteen EMSs such as emotional deprivation, abandonment, mistrust/abuse, social isolation, defectiveness, failure, dependence, vulnerability to harm, enmeshment, subjugation, self-sacrifice, emotional inhibition, unrelenting standards, entitlement, and insufficient self-control. EMSs have been reported to be high in obsessive-compulsive disorder [23], addiction [24–26], major depressive disorder [27], and borderline personality disorder [28].

Regarding EMSs in SZ, Bortolon et al. [29] have found that SZ patients exceed healthy controls on emotional deprivation, social isolation, defectiveness, enmeshment, failure, and subjugation. They have also shown that mistrust/abuse predicts positive symptoms beyond depression while none of the EMSs relate to negative symptoms. Also, Sundag et al. [30] have revealed that all EMSs, except for emotional inhibition and unrelenting standards, are higher in psychotic patients than normal controls and mistrust/abuse associates with positive symptoms, while this schema is not linked to positive symptoms after adjusting for depression. They have also suggested that EMSs have no significant relations to negative symptoms. Moreover, Giblin et al. [31] have found that patients with late-onset psychosis show higher levels of EMSs domains such as other-directedness, overvigilance/inhibition, rejection/disconnection, and impaired autonomy/performance than those with late-onset depression and healthy adults. Further, the dependence and enmeshment schemas have been shown to relate to social functioning as well as eight EMSs of abandonment, mistrust/abuse, social isolation, failure, dependence, vulnerability to harm, enmeshment, and subjugation associate with distress in individuals with psychosis [32]. In addition, EMSs have been shown to correlate with coping strategies in SZ patients [32]. Since EMSs stem from traumatic experiences including CT [21], SZ patients show significantly high CT [34] and also those with a history of CT have an earlier age at onset and frequent hospitalizations [35]. Also, CT has been found to affect development, treatment [36], and cognitive functions [37] in SZ. Further, it has been found that CT and dissociation relate to severe symptoms of SZ [38] and also dissociation mediates the link of CT to psychosis symptoms [39]. Furthermore, particular EMSs and dissociation may affect the link of CT to auditory hallucination [40]. In addition, the schemas of defectiveness, dependence, emotional inhibition, and enmeshment associate with psychotic experiences and these schemas, except for emotional inhibition, mediate the link of CT to psychotic experiences [41].

Concerning EMSs in schizotypy, Thimm [42] have found that EMSs significantly predict personality disorder symptoms. Also, Lynam and Widiger [43] have reported that mistrust/abuse and social isolation are specific to schizotypal personality disorder. In addition, Nordahl et al. [44] have revealed that EMSs relate to personality pathology. On the other hand, given that EMSs result from unpleasant experiences such as CT and insecure attachment [21], it has been shown that these childhood unpleasant experiences relate to schizotypal traits [45,46]. Further, Sheinbaum et al. [47] have indicated that insecure attachment mediates the relations of CT to schizotypy and psychotic-like experiences. Moreover, Schürhoff et al. [48] have found that CT associates with schizotypy in first-degree relatives of SZ patients. Therefore, the evaluation of maladaptive events related to childhood such as EMSs among SZ patients and non-patients with high and low schizotypal traits may be useful.

The study of depression severity regarding EMSs in SZ patients and non-patients with schizotypal traits may also be useful. For example, the prevalence of persistent depression has been found to be high in first-episode psychosis [49] and depression also relates to schizotypal traits [50]. Moreover, it has been shown that patients with major depressive disorder have higher scores on EMSs than normal controls [27]. Further, the links of EMSs to the severity of depressive symptoms has been found in another study [51]. In addition, Atalay et al. [52] have reported that EMSs are more activated in the presence of depressive symptoms than anxious mood states. Therefore, the comparison of EMSs among SZ patients and non-patients with high and low schizotypal traits may be interesting and important to therapeutic programs of psychosis.

This study aimed to predict positive and negative symptoms via EMSs in SZ patients; to compare EMSs among SZ patients, non-patients with high schizotypal traits, and non-patients with low schizotypal traits; and to compare EMSs among subgroups in terms of depression severity. We hypothesized that mistrust/abuse would predict positive symptoms by controlling for depression (hypothesis 1). Also, we expected that none of the EMSs would predict negative symptoms by controlling for depression (hypothesis 2). Further, we hypothesized that there would be significant differences among SZ patients, non-patients with high schizotypal traits, and non-patients with low schizotypal traits regarding EMSs (hypothesis 3). Moreover, we predicted that subgroups with high depression would be significantly different from each other in relation to EMSs (hypothesis 4). In addition, we assumed that there would be significant differences among subgroups with low depression concerning EMSs (hypothesis 5).

2. Methods

2.1. Participants

A total of 180 patients with principal diagnoses of SZ were randomly selected. Finally, one hundred and five SZ patients (age range = 15–59 years) were selected in this study by a clinical psychologist (Dr. A. M) according to the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Patient Edition (SCID-I/P [53]). Neurological, medical diseases, psychosis NOS or psychosis due to medical condition, active psychosis at the time of interview, and substance abuse were exclusion criteria. The information on age of onset and illness duration was collected through patients' psychiatric records. All SZ patients received antipsychotic medications at the time of assessment. All SZ patients were Iranian among whom 28.6% were bilingual (Persian-Turkish) and 71.4% spoke just Persian.

To select non-patients with and without schizotypal features (high versus low schizotypal groups), we initially asked 400 undergraduate college students to complete the Persian version of the STA [14] developed by Mohammadzadeh et al. [54]. Among these individuals, 90 students who had the lowest scores of 2 standard deviations below the mean on the STA were selected as the low schizotypal group ($n = 90$, 54 females and 36 males, mean age = 18.7 years). Also, 90 people who obtained the highest scores of 2 standard deviations above the mean on the STA were selected as the high schizotypal group ($n = 90$, 60 females and 30 males, mean age = 18.9). In both groups, 33.3% were bilingual (Persian-Turkish) and 66.7% spoke just Persian. This research was extracted from an MA thesis in general psychology approved by Islamic Azad University of Tabriz and the Ethics Committee of the university.

2.2. Instruments

2.2.1. The Young Schema Questionnaire-Short Form (YSQ-SF [21,22])

The YSQ-SF is a 75-item questionnaire which assesses fifteen maladaptive schemas such as emotional deprivation, abandonment,

mistrust/abuse, social isolation, defectiveness, failure, dependence, vulnerability to harm, enmeshment, subjugation, self-sacrifice, emotional inhibition, unrelenting standards, entitlement, and insufficient self-control. In the present study, the Persian version of the YSQ-SF [55] was used. The Cronbach's alpha for the YSQ-SF was 0.96 [23]. The Cronbach's alpha for the YSQ-SF in the present study was 0.84.

2.2.2. The Beck Depression Inventory-II (BDI-II [56])

The BDI-II is a 21-item self-report scale that measures depression severity. In the present study, the Persian version of the BDI-II was used [57]. The Cronbach's alpha for the scale was 0.85 [58]. The cut-off scores of the BDI-II with high (≥21) and low (<21) depression were used in the present research [56]. The Cronbach's alpha for the BDI-II in the current research was 0.91.

2.2.3. The STA [14]

It is a 37-item true/false self-report scale which was developed by using the DSM-III [59] criteria for schizotypal personality disorders as a guide. The Cronbach's alpha for the STA was 0.86 [14]. In this study, the Persian version of the STA designed by Mohammadzadeh et al. [54] was used. The STA Cronbach's alpha in this study was 0.82.

2.2.4. The Positive and Negative Syndrome Scale (PANSS [60])

The PANSS was applied to assess symptoms of psychosis such as positive and negative symptoms, disruption, excitement, and depression/anxiety. The PANSS is administered as a semi-structured interview measure.

2.3. Statistical analysis

Chi-square, one-way analysis of variance (ANOVA), multivariate analysis of variance (MANOVA), and multivariate analysis of covariance (MANCOVA) were used to compare variables in the present study. To assess the relations of EMSs to positive and negative symptoms, partial correlation and stepwise multiple regression were used. The results of the Kolmogorov-Smirnov test revealed that the data were normal. Also, non-significant results in Levine's test and the Box test confirmed the assumptions of performing ANOVA, MANOVA, and MANOVA. In this research, the power analysis was computed using the effect size partial eta square (η^2). A small effect is rated for $\eta^2 > 0.01$, a medium effect for $\eta^2 > 0.06$, and a large effect for $\eta^2 > 0.14$. In this study, there were no missing values. Data were analyzed using SPSS-22.0 for Windows (IBM Corporation, Armonk, NY, USA). $p < .05$ was considered statistically significant and all tests were two-tailed.

3. Results

3.1. Demographic and clinical characteristics of participants

Demographic and clinical factors are shown in Table 1. SZ patients were older, less-educated, more severely depressed, and had higher rates of being single or divorced than those with high and low schizotypal traits ($p < .001$). Also, compared with non-patients with low schizotypal traits, those with high schizotypal traits had higher depression and divorce ($p < .001$) (Table 1).

3.2. The links of EMSs to psychosis symptoms by controlling for depression in SZ patients

The results of partial correlation showed that all EMSs except for failure, subjugation, emotional inhibition, and unrelenting standards were related to positive symptoms after controlling for depression ($p < .05$, or $p < .01$, or $p < .001$). Also, among all EMSs, social isolation ($r = 0.28$, $p < .01$), defectiveness ($r = 0.27$, $p < .01$), and vulnerability to harm ($r = 0.23$, $p < .05$) had significant associations with negative symptoms after controlling for depression (Table 2). The results of stepwise multiple regression revealed that among all EMSs, only mistrust/abuse significantly predicted 22% of the total variance for positive symptoms by controlling for depression (adjusted $R^2 = 0.22$, $\beta = 0.31$, $F = 15.89$, $t = 2.81$, $p < .01$). In addition, only social isolation significantly explained 27% of the total variance for negative symptoms after controlling for depression (adjusted $R^2 = 0.27$, $\beta = 0.29$, $F = 20.01$ $t = 2.90$, $p < .01$). Therefore, according to these findings, hypothesis 1 was fully confirmed but hypothesis 2 was not supported, so that social isolation predicted negative symptoms.

3.3. The comparison of EMSs among SZ patients, non-patients with high schizotypal traits, and non-patients with low schizotypal traits

The results of MANOVA showed that there was a significantly overall difference among the three groups (Wilks $\lambda = 0.62$; $F = 2.62$; $p < .001$). The findings revealed that both SZ patients and non-patients with high schizotypal traits exceeded subjects with low schizotypal traits on all EMSs ($p < .001$). SZ patients were not different from non-patients with high schizotypal traits regarding EMSs (Table 3). The effect sizes among the three groups concerning self-sacrifice were small ($\eta^2 = 0.06$, $\eta^2 > 0.01$). The effect sizes for enmeshment ($\eta^2 = 0.13$), subjugation ($\eta^2 = 0.13$), and insufficient self-control ($\eta^2 = 0.14$) were medium ($\eta^2 > 0.06$). Also, the effect sizes for abandonment ($\eta^2 = 0.15$), social

Table 1
Demographic and clinical characteristics of patients with schizophrenia and non-patients with high and low schizotypal traits (mean ± SD).

Characteristics	Group 1 (n = 105)	Group 2 (n = 90)	Group 3 (n = 90)	Statistics F^a or χ^2	p
Male/female, n	43/62	30/60	36/54	0.57	.75
Age, year	32.99 ± 9.99	18.67 ± 1.40	18.97 ± 2.51	227.39	<.001*
Education level, years	9.59 ± 3.43	15.30 ± 2.12	15.40 ± 2.03	22.10	<.001*
Marital status				20.11	<.001*
Single, n (%)	43 (41%)	24 (26.7%)	30 (33.3%)		
Married, n (%)	10 (9.5%)	36 (40%)	48 (53.3%)		
Divorced, n (%)	52 (49.4%)	30 (33.3%)	12 (13.3%)		
Age at onset, years	23.71 ± 8.57	–	–	–	–
Illness duration, years	9.23 ± 6.56	–	–	–	–
BDI-II	17.70 ± 13.06	14.57 ± 11.03	7.70 ± 9.47	14.19	<.001*
PANSS positive subscale	17.44 ± 4.87	–	–	–	–
PANSS negative subscale	22.12 ± 7.55	–	–	–	–
PANSS disruption subscale	14.09 ± 6.07	–	–	–	–
PANSS excitement subscale	9.99 ± 3.47	–	–	–	–
PANSS depression/anxiety subscale	13.45 ± 4.45	–	–	–	–

BDI-II: Beck Depression Inventory-II; Group 1: patients with schizophrenia; Group 2: non-patients with high schizotypal traits; Group 3: non-patients with low schizotypal traits; PANSS: Positive and Negative Syndrome Scale.
  [a] Analysis of variance (ANOVA).
  * $p < .001$.

Table 2
The relations of EMSs to positive and negative symptoms in patients with schizophrenia by controlling for depression ($n = 105$).

	Positive symptoms	Negative symptoms
EMSs		
Emotional deprivation	0.28**	0.07
Abandonment	0.23*	0.05
Mistrust/abuse	0.45***	0.11
Social isolation	0.24**	0.28**
Defectiveness	0.27**	0.27**
Failure	0.18	0.08
Dependence	0.25**	0.18
Vulnerability to harm	0.25**	0.23*
Enmeshment	0.24**	0.08
Subjugation	0.09	0.12
Self-sacrifice	0.27**	0.02
Emotional inhibition	0.10	0.17
Unrelenting standards	0.08	0.06
Entitlement	0.29**	0.07
Insufficient self-control	0.27**	0.17

EMSs: early maladaptive schemas.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

isolation ($\eta^2 = 0.17$), defectiveness ($\eta^2 = 0.16$), failure ($\eta^2 = 0.15$), dependence ($\eta^2 = 0.15$), vulnerability to harm ($\eta^2 = 0.17$), emotional deprivation ($\eta^2 = 0.24$), mistrust/abuse ($\eta^2 = 0.25$), entitlement ($\eta^2 = 0.21$), emotional inhibition ($\eta^2 = 0.19$), and unrelenting standards ($\eta^2 = 0.15$) were large ($\eta^2 > 0.14$) (Table 3). According to these findings, hypothesis 3 was fully supported.

3.4. The determination of subgroups regarding depression severity

In the present study, MANOVA and MANCOVA were used in order to compare EMSs among SZ patients, non-patients with high schizotypal traits, and non-patients with low schizotypal traits regarding depression severity. To this aim, subjects in patient and non-patient groups were subdivided into high (BDI-II score ≥ 21) and low (BDI-II score < 21) depression subgroups. In the present study, 37.1% of SZ patients, 33.3% of non-patients with high schizotypal traits, and 13.3% of non-patients with low schizotypal traits had high depression (Table 4). Also, 62.9% of SZ patients, 66.7% of non-patients with high schizotypal

traits, and 86.7% of non-patients with low schizotypal traits had low depression (Table 5).

3.5. The comparison of EMSs among subgroups with high depression

The results of MANOVA showed that SZ patients had higher scores on all EMSs, except for self-sacrifice, than both non-patients with high and low schizotypal traits ($p < .001$ or $p < .01$). Non-patients with high and low schizotypal traits were not different from each other regarding EMSs (Table 4). As it can be seen in Table 1, the BDI-II mean scores for non-patients with high schizotypal traits as one of control groups (group 2; BDI-II mean = 14.57) were almost as high as SZ patients (group 1; BDI-II mean = 17.70). It shows that group 2 actually experience mild depressive symptoms which can activate EMSs. Therefore, we compared EMSs among three subgroups with controlling for depression using MANCOVA. The results of MANCOVA showed that the above-mentioned findings were replicated after controlling for depression. The effect sizes for these schemas were large (Table 4). Based on these findings, hypothesis 4 was fully confirmed.

3.6. The comparison of EMSs among subgroups with low depression

The results showed that SZ patients and non-patients with high schizotypal traits had no significant differences regarding all EMSs. Also, both of these subgroups had higher scores on all EMSs than non-patients with low schizotypal traits ($p < .001$ or $p < .01$) (Table 5). Also, the effect sizes for self-sacrifice ($\eta^2 = 0.08$), insufficient self-control ($\eta^2 = 0.12$), enmeshment ($\eta^2 = 0.09$) defectiveness ($\eta^2 = 0.13$), and dependence ($\eta^2 = 0.12$) were medium ($\eta^2 > 0.06$). The effect sizes regarding emotional deprivation ($\eta^2 = 0.19$), abandonment ($\eta^2 = 0.22$), mistrust/abuse ($\eta^2 = 0.27$), social isolation ($\eta^2 = 0.15$), failure ($\eta^2 = 0.15$), vulnerability to harm ($\eta^2 = 0.21$), subjugation ($\eta^2 = 0.16$), emotional inhibition ($\eta^2 = 0.21$), unrelenting standards ($\eta^2 = 0.15$), and entitlement ($\eta^2 = 0.21$) were large ($\eta^2 > 0.14$) (Table 5). According to these findings, hypothesis 5 was fully confirmed.

4. Discussion

This study aimed to predict positive and negative symptoms via EMSs in SZ patients, to compare EMSs among SZ patients, non-patients with high schizotypal traits, and non-patients with low

Table 3
Comparison of EMSs among patients with schizophrenia, non-patients with high schizotypal traits, and non-patients with low schizotypal traits (mean ± SD).

	Group 1 ($n = 105$)	Group 2 ($n = 90$)	Group 3 ($n = 90$)	F [a]	Post-hoc [b]	η^{2} [c]
EMSs						
Emotional deprivation	18.10 ± 8.10	16.57 ± 6.76	8.83 ± 3.67	36.88*	Group 1, Group 2 > Group 3	0.24
Abandonment	16.85 ± 7.10	16.37 ± 7.59	10.40 ± 4.63	19.49*	Group 1, Group 2 > Group 3	0.15
Mistrust/abuse	17.49 ± 7.31	16.67 ± 6.40	8.90 ± 4.68	36.52*	Group 1, Group 2 > Group 3	0.25
Social isolation	15.27 ± 8.06	15.17 ± 7.26	8.33 ± 3.53	21.94*	Group 1, Group 2 > Group 3	0.17
Defectiveness	14.20 ± 7.61	12.03 ± 5.95	7.50 ± 3.44	21.65*	Group 1, Group 2 > Group 3	0.16
Failure	14.18 ± 6.95	13.40 ± 6.01	8.23 ± 4.36	19.27*	Group 1, Group 2 > Group 3	0.15
Dependence	13.18 ± 6.49	11.23 ± 5.55	7.50 ± 3.35	19.96*	Group 1, Group 2 > Group 3	0.15
Vulnerability to harm	14.79 ± 7.34	15.10 ± 6.36	8.43 ± 3.62	23.37*	Group 1, Group 2 > Group 3	0.17
Enmeshment	15.29 ± 7.41	13.53 ± 5.96	9.47 ± 4.20	16.29*	Group 1, Group 2 > Group 3	0.13
Subjugation	14.05 ± 7.38	14.33 ± 5.96	8.70 ± 3.77	16.67*	Group 1, Group 2 > Subjugation	0.13
Self-sacrifice	18.55 ± 5.90	18.50 ± 5.11	15.00 ± 5.14	9.07*	Group 1, Group 2 > Group 3	0.06
Emotional inhibition	15.70 ± 6.93	16.40 ± 7.07	9.27 ± 3.06	25.95*	Group 1, Group 2 > Group 3	0.19
Unrelenting standards	19.98 ± 5.85	18.83 ± 6.53	14.17 ± 5.29	19.13*	Group 1, Group 2 > Group 3	0.15
Entitlement	17.51 ± 6.27	17.70 ± 6.93	10.70 ± 3.94	29.52*	Group 1, Group 2 > Group 3	0.21
Insufficient self-control	15.94 ± 6.07	15.73 ± 7.12	10.53 ± 4.12	17.78*	Group 1, Group 2 > Group 3	0.14

EMSs: early maladaptive schemas; Group 1: patients with schizophrenia; Group 2: non-patients with high schizotypal traits; Group 3: non-patients with low schizotypal traits.
[a] Multivariate analysis of variance (MANOVA).
[b] With the Tukey HSD correction.
[c] Effect sizes were assessed by partial eta squared (η^2).
* $p < .001$.

Table 4

Comparison of EMSs among patients with schizophrenia, non-patients with high schizotypal traits, and non-patients with low schizotypal traits according to high depression.[a]

	High depression			Statistics			
	Group 1 (n = 39, 37.1%)	Group 2 (n = 30, 33.3%)	Group 3 (n = 12, 13.3%)	F[b]	F[c]	Post-hoc[d]	η^{2}[e]
EMSs							
Emotional deprivation	23.23 ± 4.82	9.09 ± 2.95	8.00 ± 2.58	45.30***	45.71***	Group 1 > Group 2, Group 3	0.59
Abandonment	20.00 ± 6.44	13.20 ± 6.90	15.50 ± 4.69	7.81***	6.91**	Group 1 > Group 2, Group 3	0.20
Mistrust/abuse	21.13 ± 5.64	16.80 ± 7.55	12.75 ± 8.83	6.59**	6.12**	Group 1 > Group 2, Group 3	0.17
Social isolation	21.15 ± 5.90	15.80 ± 7.55	7.75 ± 2.44	17.32***	16.61***	Group 1 > Group 2, Group 3	0.35
Defectiveness	19.33 ± 6.04	10.20 ± 5.35	7.75 ± 2.96	25.88***	24.09***	Group 1 > Group 2, Group 3	0.45
Failure	17.26 ± 6.62	10.70 ± 3.08	7.00 ± 2.00	17.45***	17.28***	Group 1 > Group 2, Group 3	0.35
Dependence	17.03 ± 5.99	8.80 ± 3.61	6.75 ± 1.91	25.23***	23.76***	Group 1 > Group 2, Group 3	0.44
Vulnerability to harm	18.54 ± 6.38	12.70 ± 5.15	9.75 ± 3.50	11.64***	10.59***	Group 1 > Group 2, Group 3	0.27
Enmeshment	18.59 ± 6.53	12.30 ± 5.41	9.00 ± 2.93	13.08***	12.64***	Group 1 > Group 2, Group 3	0.29
Subjugation	18.38 ± 6.74	12.20 ± 3.46	9.25 ± 3.50	13.41***	13.39***	Group 1 > Group 2, Group 3	0.30
Self-sacrifice	18.79 ± 4.45	18.70 ± 4.81	15.25 ± 5.87	1.94	1.92	NS	0.03
Emotional inhibition	18.36 ± 6.10	10.60 ± 3.01	9.50 ± 3.82	10.64***	9.96***	Group 1 > Group 2, Group 3	0.25
Unrelenting standards	20.41 ± 4.64	13.81 ± 4.61	15.75 ± 6.21	3.11*	3.06*	Group 1 > Group 2, Group 3	0.15
Entitlement	20.56 ± 5.06	12.70 ± 4.15	11.25 ± 1.91	11.21**	10.62***	Group 1 > Group 2, Group 3	0.26
Insufficient self-control	20.79 ± 5.94	15.70 ± 6.19	12.00 ± 4.96	6.29**	6.01**	Group 1 > Group 2, Group 3	0.20

[a] High depression (BDI-II ≥ 21).
[b] Multivariate analysis of variance (MANOVA).
[c] Multivariate analysis of covariance (MANCOVA) by controlling for depression.
[d] With the Tukey HSD correction.
[e] Effect sizes were assessed by partial eta squared (η^{2}).
* $p < .05$.
** $p < .01$.
*** $p < .001$.

schizotypal, and to compare EMSs among subgroups concerning depression severity.

The results of the present research revealed that similar to Bortolon et al.'s [29] study, the schema of mistrust/abuse predicted positive symptoms beyond depression. Also, this finding was inconsistent with Sundag et al.'s [30] study, showing no association between mistrust/abuse and positive symptoms after controlling for depression. On the other hand, contrary to Bortolon et al.'s [29] and Sundag et al.'s [30] studies, the present study showed that social isolation predicted negative symptoms above depression. However, one of the possible reasons for these inconsistencies may be due to differences in sample sizes

between our research (n = 105) and Sundag et al.'s [30] (n = 81) and Bortolon et al.'s [29] (n = 48) studies.

Individuals with the mistrust/abuse schema show difficulties in establishing secure and intimate relationships to others [21]. Also, these individuals report a history of CT such as physical and/or sexual abuse, rigorous punishment or living in an unsecure setting [61]. Therefore, the link of mistrust/abuse to positive symptoms may result from the increased prevalence of CT experiences in SZ patients. Individuals with social isolation feel alone and isolated from the world and others, and also believe that they are misfit in the society and unable to create close interactions with others [21]. Although research studies reported no

Table 5

Comparison of EMSs among patients with schizophrenia, non-patients with high schizotypal traits, and non-patients with low schizotypal traits according to low depression.[a]

	Low depression			Statistics		
	Group 1 (n = 66, 62.9%)	Group 2 (n = 60, 66.7%)	Group 3 (n = 78, 86.7%)	F[b]	Post-hoc[c]	η^{2}[d]
EMSs						
Emotional deprivation	15.06 ± 8.13	16.85 ± 7.80	8.96 ± 3.86	17.72**	Group 1, Group 2 > Group 3	0.19
Abandonment	17.95 ± 7.61	16.60 ± 5.92	9.62 ± 4.17	21.37**	Group 1, Group 2 > Group 3	0.22
Mistrust/abuse	15.33 ± 7.37	14.98 ± 6.85	8.31 ± 3.48	28.41**	Group 1, Group 2 > Group 3	0.27
Social isolation	14.85 ± 7.28	12.79 ± 7.10	8.42 ± 3.71	12.27**	Group 1, Group 2 > Group 3	0.15
Defectiveness	11.17 ± 6.79	12.95 ± 6.16	7.46 ± 3.57	11.41**	Group 1, Group 2 > Group 3	0.13
Failure	12.36 ± 6.52	14.75 ± 6.74	8.42 ± 4.65	13.35**	Group 1, Group 2 > Group 3	0.15
Dependence	10.91 ± 5.68	12.45 ± 6.05	7.62 ± 3.56	10.97**	Group 1, Group 2 > Group 3	0.12
Vulnerability to harm	16.30 ± 6.71	15.30 ± 7.35	8.23 ± 3.67	20.87**	Group 1, Group 2 > Group 3	0.21
Enmeshment	13.33 ± 7.25	14.15 ± 6.28	9.54 ± 4.42	7.95**	Group 1, Group 2 > Group 3	0.09
Subjugation	15.40 ± 7.01	14.96 ± 6.13	8.62 ± 3.87	14.99**	Group 1, Group 2 > Group 3	0.16
Self-sacrifice	18.41 ± 6.64	18.40 ± 5.38	14.96 ± 5.13	6.07*	Group 1, Group 2 > Group 3	0.08
Emotional inhibition	17.65 ± 7.85	16.12 ± 6.90	9.23 ± 3.00	21.71**	Group 1, Group 2 > Group 3	0.21
Unrelenting standards	19.73 ± 6.48	18.25 ± 7.36	13.92 ± 5.22	12.79**	Group 1, Group 2 > Group 3	0.15
Entitlement	15.71 ± 6.25	18.20 ± 7.16	10.62 ± 4.22	20.53**	Group 1, Group 2 > Group 3	0.21
Insufficient self-control	14.26 ± 6.08	15.75 ± 7.71	10.31 ± 4.02	10.86**	Group 1, Group 2 > Group 3	0.12

[a] Low depression (BDI-II < 21).
[b] Multivariate analysis of variance (MANOVA).
[c] With the Tukey HSD correction.
[d] Effect sizes were assessed by partial eta squared (η^{2}). EMSs: early maladaptive schemas; BDI-II: Beck Depression Inventory-II; Group 1: patients with schizophrenia; Group 2: non-patients with high schizotypal traits; Group 3: non-patients with low schizotypal traits.
* $p < .01$.
** $p < .001$.

relation between social isolation and negative symptoms of psychosis, it has been found that SZ patients have more loneliness and social isolation than matched controls [62]. Also, social isolation may cause or worsen delusions and hallucinations in SZ [63]. Further, individuals with high social anhedonia have been found to be high in negative symptoms than the control group [64]. In addition, SZ patients with negative symptoms and/or depression have been found to have decreased positive relations with others as a dimension of psychological wellbeing [65]. However, more studies are required to further specify these results in SZ.

The results of this study showed that SZ patients and non-patients with high schizotypal traits were not different from each other concerning all EMSs, but they had higher levels of all EMSs than non-patients with low schizotypal traits. These findings were in line with the previous studies showing the associations of EMSs and the factors causing them (e.g., CT) with SZ, psychosis [29–33,41], personality disorder, and schizotypal traits [43–48]. EMSs were related to distress and social functioning in psychosis [32]. On the other hand, schizotypy is thought to be an elevated risk for the incidence of psychotic disorders [66]. Also, Camisa et al. [67] have reported that individuals with psychotic disorders have higher scores on schizotypy. In addition, Barkus et al. [68] have shown that by enhancing schizotypy and hallucinatory proneness in healthy individuals, it is difficult to differentiate them from patients with at-risk mental states (ARMS) is difficult when healthy individuals show increased. They have also concluded that healthy subjects with schizotypal traits and proneness to hallucinations show cognitive processes similar to ARMS patients. Therefore, high schizotypal traits along with impaired cognitive structures such as elevated EMSs in individuals may be related to risk for SZ.

In the current study, SZ patients and non-patients with high schizotypal traits were not different from each other concerning EMSs. Over the past decades, the concept of the continuum of schizotypy and SZ has been confirmed in the general population as the spread of unstable, unusual experiences [69]. Based on this model, schizotypal traits and SZ are considered as different points on a continuum which according to the notions of the stress-vulnerability pattern reveal a degree of risk [70]. Claridge et al. [71] have proposed that the formation of positive and negative symptoms in SZ is parallel in schizotypal dimensions. Recent studies have considered schizotypy as a multidimensional phenotype as well as clinical and non-clinical manifestations of the SZ spectrum [9]. Schizotypy is a set of personality traits consisting of behaviors, emotions, and cognitions which are similar to SZ symptoms in the general population. EMSs are a broad set of dysfunctional cognitive, emotional patterns shaped during childhood [21]. The relation of schizotypy to cognitive impairments has been reported in both psychotic and healthy subjects [72]. Carrigan et al. [73] have revealed that individuals with high schizotypal traits have high vulnerability to cognitive failures. Given the clinical similarity between schizotypy and SZ, it has been proposed that overlapping etiological factors might underlie the two phenotypes [74]. In addition, several studies have reported that SZ and schizotypy overlap concerning genetic and functional brain mechanisms [75,76]. Therefore, in terms of broad overlaps between SZ and schizotypal traits, lack of difference between SZ patients and non-patients with high schizotypal traits regarding EMSs may be an expected finding in the present research.

In the present study, among subgroups with low depression, there were no differences between SZ patients and non-patients with high schizotypal traits concerning all EMSs, but both of these two subgroups had higher levels of all EMSs than non-patients with low schizotypal traits. On the other hand, among subgroups with high depression, SZ patients exceeded non-patients with low and high schizotypal traits on most EMSs and there were no differences between non-patients with low and high schizotypal traits. Also, these findings were replicated after controlling for depression. Therefore, higher scores on all EMSs in SZ patients than non-patients with high and low schizotypal traits in the presence and absence of depression suggest that in SZ patients, activated EMSs

may be contributing factors to high depression. Similar to this conclusion, it has been shown that SZ patients have considerable levels of depression [77,78]. Also, Calvete et al. [79] have indicated that the disconnection/rejection, impaired autonomy, and other-directedness domains correlate with levels of depression. They have also revealed that these domains predict high stability of depressive symptoms over time. Furthermore, other studies have suggested that the mentioned domains associate with depressive symptoms [80]. Moreover, EMSs have been shown to associate with depression severity [51].

In general, the present study determined the differences between SZ patients and non-patients with schizotypal traits as well as the differences between these groups based on depression severity in relation to EMSs. Since dissociative symptoms and other childhood experiences such as CT are related to EMSs [40,41] and psychosis [34,38], therefore, the comparison of CT and dissociation between SZ patients and non-patients with schizotypal traits in future studies may be interesting and further specify the role of dissociation and unpleasant childhood events in psychosis.

This study may have some implications. Theoretically, mistrust/abuse and social isolation may be important schemas in relation to SZ. Also, it can be concluded that the similarity between SZ patients and non-patients with high schizotypal traits in terms of EMSs can be explained in the framework of the continuum model of pseudo-psychotic symptoms. Also, because of the strong association of schizotypy with SZ, it seems that the main focus should be on schizotypal traits in struggling to understand the pseudo-psychotic phenomena. Fonseca-Pedrero et al. [81] have suggested that schizotypal traits as a phenotypic expression are key factors to understand the etiology of psychosis. Also, the present study showed that SZ and high schizotypal traits shared dysfunctional cognitive patterns such as EMSs created during childhood. In addition, high levels of depression may increase more activated EMSs in SZ compared with non-patients with high schizotypal traits. Clinically, although there is no evidence regarding the effect of schema therapy (ST) [21] on schizophrenia, ST may be a possible therapeutic program for improving EMSs in SZ patients and non-patients with high schizotypal traits. Stowkowy et al. [82] have concluded that ST may be an important topic for future studies in patients with psychosis.

This research had some limitations. First, conclusions drawn from hospitalized patients may not be generalized to all SZ patients. For example, the use of antipsychotic drugs reduces the severity of the patients' symptoms and makes them embarrassed to talk about their previous extraneous and exotic behaviors, and thus they deny their symptoms (as a defensive behavior). It is suggested that by controlling for the effects of drugs on the evaluation of schizotypal traits in SZ patients and their families, more research can further clarify the findings of the present study. Second, this study did not evaluate comorbid psychiatric disorders with SZ, especially personality disorders. EMSs are linked to personality pathology [44] and disorders [28]. Therefore, it is proposed that future research should consider the effects of comorbid psychiatric disorders with SZ on EMSs among SZ patients compared to non-patients with schizotypal traits. Third, this study was a cross-sectional design which does not allow for an examination of causation and longitudinal research. Fourth, in this study, intelligence quotient (IQ) and socio-economic status were not assessed. IQ and socio-economic status may affect the results. Fifth, CT and dissociation are factors related to SZ, but these factors were not measured in this study. Finally, another limitation concerns the use of self-report measures such as the YSQ-SF, the BDI-II, and the STA. The use of these self-report measures may lead to response bias in participants.

5. Conclusions

The results revealed that among all EMSs, mistrust/abuse and social isolation were related to positive and negative symptoms respectively. Also, the findings suggest that SZ patients and non-patients with high

schizotypal traits reported greater EMSs than non-patients with low schizotypal traits. Also, SZ patients did not exceed non-patients with high schizotypal traits on EMSs. In the subgroup with high depression, SZ patients showed higher EMSs than non-patients with low and high schizotypal traits. In the subgroup with low depression, SZ patients and non-patients with high schizotypal traits had higher EMSs than non-patients with low schizotypal traits. Overall, the present research indicates that the schemas of mistrust/abuse and social isolation may be specific to psychosis symptoms in SZ. Also, SZ and schizotypal traits may overlap in relation to impaired cognitive structures such as EMSs. In addition, in the presence of high depression, EMSs may have more associations with SZ than schizotypal traits.

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Conflict of interest

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