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Predicting the Symptoms of Schizophrenia based on Early Maladaptive Schemas and Dysfunctional Attitudes with the Mediating Role of Self-Esteem

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Parvin Heydari, PhD *
Department of Clinical Psychology
Faculty of Education & Psychology
University of Shiraz, Shiraz, Iran.
Email: p.l.heydari1394@gmil

Javad Mollazade, PhD
Department of Clinical Psychology
Faculty of Education & Psychology
University of Shiraz, Shiraz, Iran.

Abdolaziz Aflakseir, PhD
Department of Clinical Psychology
Faculty of Education & Psychology
University of Shiraz, Shiraz, Iran.

Mehdi Reza Sarafraz, PhD
Department of Clinical Psychology
Faculty of Education & Psychology
University of Shiraz, Shiraz, Iran.

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According to previous studies, various factors can affect the symptoms of schizophrenia. The present study aimed to predict the symptoms of schizophrenia based on early maladaptive schemas and dysfunctional attitudes with a mediating role of self-esteem. This study is a cross-sectional correlational study using the structural equation model. The sample consisted of 210 patients with schizophrenia who had the conditions to participate in this study. The Young's early maladaptive schemas questionnaire, short form 3 (YSQ-S3), the dysfunctional attitudes scale-26 (DAS-26), the Rosenberg self-esteem scale, and the positive and negative syndrome scale (PANSS) were used. To test the research hypotheses, simultaneous multiple regression was performed

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according to the steps of Baron and Kenny (1986) and the structural equation modeling, along with the mood control of depression. To fit the proposed model of the indices RMSEA, AGFI, CFI were used, and the results were .74, .73, .93, respectively. also Repeated sampling method was used to determine the indirect significance of the mediating variable. the mediating role of self-esteem in the relationship between early maladaptive schemas, dysfunctional attitudes, and the occurrence of schizophrenia symptoms was confirmed ($p<.05$). The results of fit indices showed that the designed model has a good fit and is closely related to the hypotheses. Therefore, early maladaptive schemas and dysfunctional attitudes are significant predictors of schizophrenia symptoms both directly and through the mediating role of self-esteem.

Keywords: schizophrenia symptoms, early maladaptive schemas, dysfunctional attitudes, self-esteem, structured equation modeling

Schizophrenia seems to be the result of genetic disorders and environmental influences. It is possible that genetic factors have been modified by environmental factors (Owen., Sawa & Mortensen, 2016). Environmental factors in interaction with genetic risk factors are involved in predicting the symptoms of psychosis (Van Os et al., 2009). In models and theories of etiology of psychosis, stress has been an enduring factor (Holtzman et al., 2013). In a way that predisposed individuals, when exposed to stressors may show more genetic factors which can trigger psychotic symptoms (Read et al., 2001; Daskalakis & Binder., 2015; Comes and Grace, 2017). stressful life events such as sexual abuse, social exclusion, separation from parents can be risk factors for psychosis (Bentall et al., 2014). Sexual and emotional abuse through early maladaptive schemas and segregation can create auditory hallucinations in the general population (Bortolon et al., 2017). These negative experiences and early maladaptive schemes can be associated with psychiatric disorder (Specht, Chapman & Cellucci, 2009; Hwake & Provencher, 2012). In addition, Young (1999)

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proposed that early maladaptive schemas serve as unconditional enduring negative thoughts and beliefs about oneself, others, and the world (Young, Klosko & Weishaar, 2003). They are deep cognitive structures that have a great impact on haw individual perceive, think, and behave in the world (Young et al., 2008). Negative experiences in early childhood lead to the development of negative schemas about self (Young et al., 2003) Which may lead to reference ideas, paranoia, and incorrect attribution of perceptual abnormalities (Morrison., et al. 2003; Garety et al., 2007). Beck's cognitive theory assumes that it is the maladaptive beliefs about oneself and one's personal world that make a person more predispose to depression (Clark and Beck,1999; Dozois and Beck, 2008). Most researchers who have studied the etiology of depression schemas believe that these schemas became operational as dysfunctional attitudes (Abela et al., 2009). In addition, Previous studies has shown that dysfunctional attitudes are as rigid and maladaptive beliefs about oneself, the world, and the future (Eaves and rush 1984; Ilardi & Graighead, 1999). These beliefs are based on past experiences of people about themselves and the world around them (Beck et al., 1993). Dysfunctional attitudes are recognized as a leading pathological factor in the development of psychological pathology and may help maintain and recur psychological and behavioral problems (Hankin and Abramson, 2001). In addition, these maladaptive beliefs act as vulnerability potential agents in stressful situations (Gibbe et al.,2013; Slavich et al., 2010; Slavich, and Irwin, 2014). Cognitive schemas underlie dysfunctional attitudes that are assumed to be latent until the stressor activates the schemas (Gibb et al., 2001; Alloy et al., 2006; Lewinsohn et al., 2001; Monroe et al., 2007;

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Otto et al., 2007). According to Beck's cognitive theory, dysfunctional attitudes are likely to reflect happiness and self-worth (Weissman and Beck, 1978; Olinger et al., 1987)). self-esteem has a particular importance for mental health and refers to the sensitivity and value of individuals. Low self-esteem is known to be the cause and consequence of severe mental disorders and also helps to cause delusions and psychotic symptoms (Kumar & Mohanty, 2016). Patients with schizophrenia are expected to have poor quality of life and psychosocial functioning (Brekke et al., 2001; Gureje et al., 2004). While self-esteem is one of the important factors that causes a person act effectively in the environment (Layton, 1994). On the other hand, self-esteem can include a person's beliefs about his or her characteristics (Dalgard et al., 2008). In a self-esteem study of schizophrenia patients, Barrowclough et al. (2003 (found that a negative evaluation in these patients was associated with positive symptoms of delusions and hallucinations. Furthermore, negative or positive attitude of individuals towards themselves is defined as explicit self-esteem (Stets, & Burke, 2014). It seems when maladaptive schemas are activated by life stressors, Cognitive errors and negative automatic thoughts arise that lead to negative interpretation and self-evaluation (Weissman & Beck, 1978). Based on the above, the aim of our study was to predict the symptoms of schizophrenia based on maladaptive schemas, dysfunctional attitudes with a mediating role of self-esteem. We assumed Early maladaptive schemas predict the symptoms of schizophrenia patients (Hypothesis 1). Dysfunctional attitudes predict the symptoms of schizophrenia patients (Hypothesis 2), Self-esteem predicts the symptoms of schizophrenia patients (Hypothesis 3), Early maladaptive schemas with the mediating

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role of self-esteem predict the symptoms of schizophrenia patients (Hypothesis 4). Dysfunctional attitudes with the mediation of self-esteem predict the symptoms of schizophrenia patients (Hypothesis 5) and finally predicting schizophrenia symptoms based on primary maladaptive schemas and dysfunctional attitudes with the mediating role of self-esteem (hypothesis 6)

Methods

Participants

Two hundred and ten patients with schizophrenia (42% men) who wished to participate in this study were selected out of patients referred to the psychiatric ward of Ganjavian Hospital and Psychiatric Clinics in Dezful from March 2020 to September 2021. Participants were selected if (1) they were between 19 and 60 years old, (2) had a diagnosis of schizophrenia according to the Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-IV-TR) criteria) American Psychiatric Association, 2013) and (3) minimum duration of their illness was one year. Exclusion criteria were organic impairment, not having the capacity to consent to research participation, having sever symptoms, and a primary diagnosis of drug and alcohol dependency. All SZ patients were receiving antipsychotic medications at the time of evaluation. This research was extracted from the PhD desertation of clinical psychology and is approved by Shiraz University and the University Ethics Committee.

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Instruments

The Young Schema Questionnaire- Short Form 3 (SQ-SF)

The SQ-SF is a 90-item instrument and each item of it is graded using a six-point scale (From completely true to completely false). Each scale contains 5 items with scores between 5 and 30 and is used to measure a schema. This questionnaire is a self-report inventory designed to measure 18 schemas in five areas by Young (2005). Eighteen maladaptive schemas include, abandonment, mistrust/abuse, emotional deprivation, defectiveness, social isolation, dependence, vulnerability to harm, enmeshment, failure, entitlement/grandiosity, insufficient self-control, subjugation, self-sacrifice, approval-seeking, negativity, emotional inhibition, unrelenting standards, and punitiveness. Alpha coefficients of the scales of this questionnaire range α= .71 (entitlement) to α= .91 (distrust/abuse) and its median is α= .84. Previous studies confirm the validity and internal consistency of this instrument (Bach, Lockwood, Young, 2017). In a study conducted by Ghiashi et al., 2011, the Cronbach's alpha coefficient of this questionnaire in a clinical and non-clinical community was reported as 0.94 and its validity as .64. The Cronbach's alpha for the YSQ-SF in the present study was .93.

Dysfunctional Attitude Scale-26 (DAS-26)

DAS original questionnaire consists of 40 items designed by Beck and Wisman (1978) based on Beck's cognitive theory. This scale consists of 4 subscales of success-perfectionism, need for approval of others, need to please others and vulnerability-performance evaluation. Cronbach's alpha of DAS has been confirmed in general and clinical populations (.85). Also, the validity of the content of this tool through Correlation with Beck

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depression questionnaire (.47) and with automatic thinking questionnaire (ATQ) (.47) is acceptable (Chioqueta and Stiles, 2004). In our study, the Persian version of the DAS-26 was used. Ebrahimi et al. (2012) in their research in clinical and non-clinical populations, extracted 26 items of the original dysfunctional attitude scale (DAS), with the same 4 valid factors based on factor analysis and item-total correlation. In this scale, respondents indicate their agreement or disagreement with each statement on a 7-point Likert scale. The internal consistency of the questions of the 26-question version of the DAS was obtained through Cronbach's alpha to be equal to .92, which is very favorable and stronger than the 40-question version and compared to the alpha obtained for the short versions of the DAS. The correlation between DAS-26 and concurrent validity of this questionnaire by calculating the correlation of this questionnaire with psychiatric diagnosis and GHQ-28 was .55, .56 respectively (Ebrahimi et al., 2012). Other researches have confirmed the psychometric quality of DAS-26 in the Iranian population ((Ebrahimi et al., 2007; Mehdipour, Rafiepoor and Alizadeh, 2021) In this study, Cronbach's alpha was obtained for the subscales of success-seeking, need for approval of others, need for satisfaction of others, and vulnerability, respectively as .91, .78, .83, .78.

The Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987)

The PANSS is one of the most widely used semi-structured interview tools for assessing the wide range of psychopathology in schizophrenia. The 30-item PANSS measures symptoms of

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psychosis such as positive and negative symptoms, disruption, excitement, and depression/anxiety.

Rosenberg Self-Esteem Scale (RSES)

This scale has 10 general items that is used to evaluate global self-esteem. All items are rated on a 4-point Likert and the scores varied between +10 and -10, where the score +10 represents the highest self-esteem and the score -10 represents the lowest self-esteem. The internal consistency of this scale is .77 and its reliability is reported between .63 and .85 (Rosenberg, 1965). The Iranian version of this scale has been validated by Alizadeh et al., 2003, and Cronbach's alpha coefficient for this scale has been reported in the range of .77 to .88, also the internal validity of this scale has been reported to be satisfactory (Alizadeh et al., 2005). The validity of the Persian version was calculated by Vahdat Nia (2003) and the correlation coefficient was .74 (Vahdat Nia, 2003). The Cronbach's alpha for this scale in the current research was 0.84.

Statistical analysis

Initially, the Kolmogorov-Smirnov test showed that the data were normal. Pearson correlation was used to investigate the relationship between variables by SPSS software version 27. Also simultaneous multiple regression test and structural equation modeling were used to test research hypotheses based on Baron and Kenny steps. Fitting statistics (Chi-Square, GFI, RMSE, AGFI, NFI, IFI, PGFI, CFI) were used to fit the proposed model. In addition to determine the significance of the indirect effect of the intermediate variable, repeated sampling was used by version 24 of Amos software.

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Results

Demographic, Mean Ratings, Descriptive Statistics.

Demographic and clinical factors are shown in Table 1. Table 1 describes the contextual variables of age of participants and age of onset, which according to the results, the mean age of participants was 33.70 with a standard deviation of 8.28 and the minimum age was 19 and the maximum age was 60 years. The mean age of onset was 31.44 with a standard deviation of 7.27 and the minimum age of onset was 18 years.

Table 1

Participant Characteristics

Measures		Patients (n=210) M (SD)
Age (years)		33.70(8.28)
Education (years)		9.39
Age at onset (years)		31.44(7.27)
Illness duration (years)		2.56(2.26)
Gender (% male)		42
Marital status	Single (%)	67
	Married (%)	15
	Divorced (%)	16

The descriptive indicators of the frequency of schizophrenia symptoms based on the score of PANSS questionnaire in the sample are shown in Table 2.

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Table 2
Descriptive Indicators of Participants' Symptoms of Schizophrenia based on the PANSS Questionnaire Score

Percentage	Frequency	Severity of symptoms
22	46	Mild
68	143	Moderate
10	21	Severe
100	210	Total

The relationships between the variables were tested using Pearson correlation test. The correlation results are shown in Table 3. Divergent validity was also investigated using Fornell and Larker methods. The results showed a significant relationship between the three variables of early maladaptive schemas, dysfunctional attitudes and self-esteem with the appearance of schizophrenia symptoms ($p < .05$). It was positive for the relationship between early maladaptive schemas and dysfunctional attitudes with the appearance of schizophrenia, and negative for the relationship between self-esteem and schizophrenia.

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Table 3

Pearson Correlation Matrix between the Main Variables and Symptoms of Schizophrenia

Incidence of schizophrenia symptoms	Self-Esteem	Dysfunctional attitude	Early maladaptive schemas	Variables
			.66	Early maladaptive schemas
		.72	.51**	dysfunctional attitudes
	.72	-.29**	**.58	Self-esteem
.71	-.63**	.42**	.49**	Symptoms of schizophrenia

Note: p<.01 **

The results of the regression test with the aim of predicting the symptoms of schizophrenia based on maladaptive schemas, dysfunctional attitudes, and self-esteem, are shown in Table 4

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Table 4

Regression Test with the Aim of Predicting the Symptoms of Schizophrenia based on Maladaptive Schemes, Dysfunctional Attitude, and Self-Esteem

P- value	T-value	S.D.	Standard error	Non-S.D. Coefficietnt	independent variable
.001<	5.30	–	2.53	13.39	**Fixed amount**
.001<	9.78	.492	.013	.129	**Early**
.001<	**4.43**	**–**	**3.70**	**16.41**	**Fixed amount**
.001<	8.19	.419	.031	.254	**Dysfunctional**
.001<	**4.32**	**–**	**3.53**	**15.24**	**Fixed amount**
.001<	11/87	-.631	.067	.795	**Self-esteem**

Predicting the symptoms of schizophrenia based on early maladaptive schemas with the role of mediating self-esteem

The results of regression test with the aim of predicting the symptoms of schizophrenia based on maladaptive schemas with the role of mediating self-esteem are shown in Table 5. Baron and Kenny method was used to investigate the mediating role. Model estimation was performed based on simultaneous method (Enter).

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Table 5

Regression Test with the Aim of Predicting the Symptoms of Schizophrenia based on Maladaptive Schemes with the Role of Mediating Self-Esteem

P _Value	standard coefficient	Non-standard coefficient	R^2	R	Criterion Variable	Predictive Variable	Step
.001<	.492	.129	.24	.49	Symptoms of schizophrenia	Early maladaptive schema	1
.001<	-.583	.132	.34	.58	Self-esteem	Early maladaptive schema	2
.001<	-.631	.795	.40	.63	Symptoms of schizophrenia	Self-esteem	3
.001<	.317	.113	.45	.67	Symptoms of schizophrenia	Early maladaptive schema	4
.001<	-.594	.692				Self-esteem	

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The results of regression test with the aim of predicting the symptoms of schizophrenia based on dysfunctional attitudes with the role of mediating self-esteem are shown in Table 6.

Table 6

Regression Test with the Aim of Predicting the Symptoms of Schizophrenia based on Dysfunctional Attitudes with the Role of Mediating Self-Esteem

P-Value	Standard coefficient	Non-standard coefficient	R^2	R	Criterion Variable	Predictive Variable	Step
.001<	.419	.254	.18	.42	Symptom of schizophrenia	Dysfunctional attitude	1
.001<	.289	.412	.08	.29	Self-esteem	Dysfunctional attitude	2
.001<	-.631	.795	.40	.63	Symptom of schizophrenia	Self-esteem	3
.003	.185	.175	.41	.64	Symptom of schizophrenia	Dysfunctional attitude	4
.001<	.614	.760				Self-esteem	

3.4 Model test

The conceptual model of the research was tested using structural equation modeling technique and Amos software. Figure 1-shows the research model in the form of standardized coefficients. The test results of the model are presented in Table 1-2 and Table 1-3 shows the model fit indices.

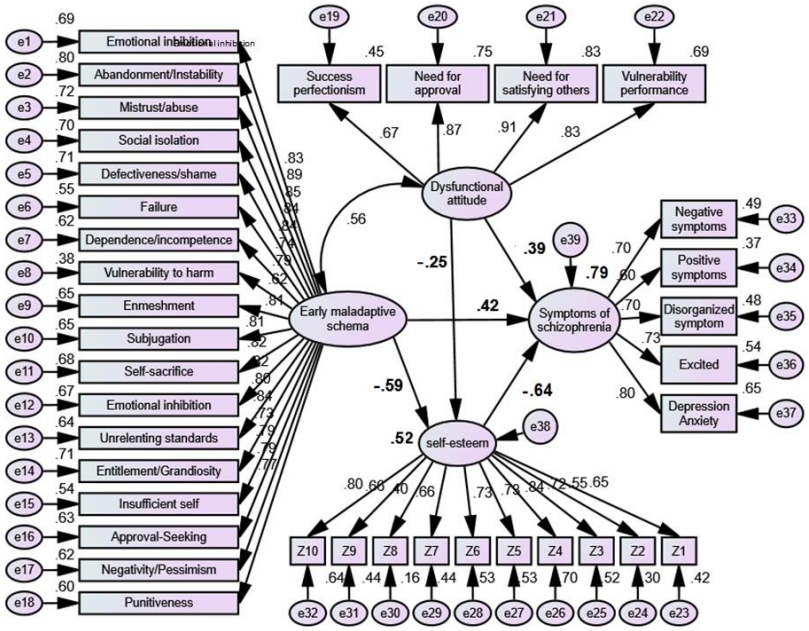


Figure.1. Experimental model of research in the case of standard path coefficients

Figure.1 is a standard model that shows the intensity of the effect of variables on each other. Comparing the coefficients shows that the strongest relationship in the model is related to the effect of self-esteem on schizophrenia symptoms with an impact factor of -.64 And the effect of early maladaptive schemas on self-esteem with a coefficient of -.59

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Examination of Fit Indices

The model fit indices are given in Table 1-2. Values greater than .90 (CFI), and less than .05 (RMSEA) indicate an acceptable fit between models and data (Hu and Bentler,1999). By evaluating all the fit indices (Table 1-2), it can be inferred that the fit indices obtained in total indicate an acceptable and appropriate fit of the data with the model and the model fit can be considered acceptable according to the obtained fit indices. Most of the fit indices in Table 1-2 confirm the model fit. Also, the coefficient of determination of the regression analysis was equal to .79 which showed that the independent variables of the model were able to explain 79% of the variance of schizophrenia symptoms.

Table 1-2
Research Model Fit Indices

Interpretation	Result	Acceptable amount	Indicators
Acceptable fit	.92	.90> (Greater than	GFI)Goodness of fit Index
Acceptable fit	.074	.08< (Less than	RMSEA Root mean square
Acceptable fit	.93	.90> (Greater than	CFI Comparative fit
Medium fit	.87	.90> (Greater than	NFI)Softened fit index(
Acceptable fit	.91	.90> (Greater than	IFI []Incremental fit

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Acceptable fit	.73	.70> (Greater than	AGFI)Adjusted Goodness
Acceptable fit	.73	.70> (Greater than	PGFI Parsimony Goodness
Acceptable fit	4.15	5 ≤ Index≤ 1 (Between 1	/df Chi-Square

Structural Model Relations Test Results

Table 1-3 shows the results of the direct effects test that the results of the structural equation modeling test showed that all direct effects in the model were confirmed (p <.05). The results of structural equation modeling test showed that the direct effect of three variables of Early maladaptive schemas, dysfunctional attitudes and self-esteem on the incidence of schizophrenia symptoms was confirmed (p <.05). Also, the effect of two independent variables of Early maladaptive schemas and dysfunctional attitudes on the mediating variable of self-esteem was confirmed (p <.05). The results showed that the effect of Early maladaptive schemas and dysfunctional attitudes in the appearance of schizophrenia symptoms were positive and the effect of self-esteem in the appearance of schizophrenia symptoms was negative (-.64).

Table 4

Structural Equation Modeling Test Results

Result	P-value	T-value	Standard coefficient	Type of impact
Confirmation	.001<	10.62	-.59	Early maladaptive schema-<-Self-esteem

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Confirmation	<.002	3/13	-.25	Dysfunctional attitudes <-- Self-esteem
Confirmation	.001<	6.63	.42	Early maladaptive schema- <-Symptoms of schizophrenia
Confirmation	.001<	5.91	.39	Dysfunctional attitudes <-- Symptoms of schizophrenia
Confirmation	.001<	11.18	-.64	Self-esteem <-- Symptoms of schizophrenia

Table 1-4
Investigation of the Effect of Self-esteem on the Appearance of Schizophrenia Symptoms

Result	P-value	T-value	Standard coefficient	Type of impact
Confirmation	.001<	11.18	-.64	Self-esteem <appearance of schizophrenia symptom

The evaluation of self-esteem mediation results in relation to early maladaptive schemas, dysfunctional attitudes and the appearance of schizophrenia symptoms is shown in Table 1-5. The role of mediation was investigated using the bootstrap method.

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Table 1-5

Results of Self-Esteem Mediation Test in Relation between Early Maladaptive Schemes, Dysfunctional Attitude and the Appearance of Schizophrenia Symptoms

Result	P-value	T-value	Indirect effect rate	Relationship type
Confirmation	.001<	9.61	.378	Early maladaptive schema <--Self-esteem <-- appearance of schizophrenia symptom
Confirmation	.004	2.93	.160	Dysfunctional attitudes <-- Self-esteem <-- appearance of schizophrenia symptom

The results of the mediation test show that the mediating role of self-esteem in the relationship between early maladaptive schemas, dysfunctional attitudes and the incidence of schizophrenia symptoms was confirmed ($p < .05$). The role of mediation was investigated using the bootstrap method. The intensity of the indirect effects is equal to .378, .160, respectively.

Discussion

Based on the approved model, the first hypothesis is confirmed and the early maladaptive schemas predict the symptoms of schizophrenia. In the research of Khosravani, Mohammadzadeh and, Eskoi (2019) it has also been determined that

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mistrust/abuse schemas predict positive symptoms and social isolation predict negative symptoms. But in the study of Bortolon et al. (2013) only mistrust/maltreatment schema was a significant predictor of positive symptoms, while Sundag et al. (2016) found that early maladaptive schemas can cause positive symptoms. The research findings of Devoe et al. (2021) showed that defeatist beliefs, self-efficacy, and early maladaptive schemas contribute to the emergence of negative symptoms in schizophrenia. A study by Giblin et al. (2004) on people with late onset psychosis compared to healthy people also showed that psychotic patients report higher levels of cognitive schemas and life maltreatments than healthy people. Hosseini, Akbari and Mohammadi (2012), in their research entitled "Investigation of the effect of cognitive-behavioral therapy on the positive symptoms of schizophrenia", determined that cognitive-behavioral therapy can be used to improve the positive symptoms of schizophrenia patients. Velligan (2009) also determined the effect of cognitive therapy on positive symptoms in his research. Taylor et al. (2020) also identified a synergistic relationship between core beliefs and psychotic symptoms. A study by Saarijarvi, Wahlman, and Karukiviearly (2019) found that early maladaptive schemas are related to a wide range of mental illnesses, including psychosis (Taylor et al., 2018) also determined that by changing the negative schema in psychotic patients, it is possible to help reduce annoying delusions. The findings show that cognitive schemas play an essential role in creating and maintaining psychological disorders such as schizophrenia, as well as in their recurrence in future periods (Riso et al., 2007). In their research (Taylor and Harper, 2017), also identified the role of early maladaptive schemas in social functioning, distress and possibly psychotic symptoms. On the

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other hand, traumatic life events are strongly related to the increased risk of developing psychotic disorders and the progression of psychosis (Gibson et al., 2016). In addition, childhood trauma can lead to psychotic symptoms (Varese et al., 2012), especially positive symptoms (Bentall et al., 2012) and negative self-schemas (kesting and Lincoln, 2013). Research shows that repeated exposure to childhood trauma has a major impact on the development of schizophrenia (Haug et al., 2015). In a model that included early maladaptive schemas, harm avoidance (mood factor), and early life stress, explained 31%, 25%, and 69%, of changes in psychiatric symptoms, respectively. And the highest predictive power associated with early life stress is associated with early maladaptive schemas and to a lesser extent with harm avoidance (da Costa et al., 2020). Previous studies have also shown that the amount of childhood adversity is higher in patients with schizophrenia than in the control group (Matheson et al., 2012). Additionally, several studies have researched that childhood negative experiences and EMSs are associated with psychiatric disorders (Newman et al., 2002). Bortolon et al. (2017) also found that in a general population, early maladaptive schemas may play a key role in the association between trauma exposure, auditory hallucinations, and dissociative symptoms. Boyda et al. (2018) also stated that different forms of child maltreatment are significantly related to psychotic experiences through specific dimensions of maladaptive schemas. On the other hand, it has been found that negative experiences may play a role in creating a faulty self (Morrison, 2001). According to Young et al. (2003), early maladaptive schemas are the core of self and environment perception. On the other hand, one of the primary symptoms of

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schizophrenia is a disturbance in self-perception (Møller and Husby, 2000). Another function of the schema is that by distorting the facts during life, they force the person to act based on the incompatibility of the schema (Young et al., 2003). Of course, this distortion of reality also happens in schizophrenia (American Psychiatric Association, 2013). Therefore, in schizophrenic patients, the disturbance in self-perception, and the distortion of reality, followed by psychotic symptoms, may be due to the stimulation of early maladaptive schemas. In some studies, such as the study of Werbeloff et al. (2015) it is stated that after the onset of positive symptoms, negative symptoms increase. It is possible that in our sample, the factors that caused positive symptoms are also capable of causing negative symptoms. That is, in our research, the early maladaptive schemas that have the ability to create positive symptoms also played a role in creating negative symptoms. According to the mentioned cases, the first hypothesis is confirmed.

The second hypothesis states that dysfunctional attitudes predict schizophrenia symptoms. Research data show that dysfunctional attitudes are predictors of schizophrenia symptoms. Also, in the cognitive formula of Beck et al. (2009) maladaptive cognitions play a key role in the expression and persistence of negative symptoms and functional deficits related to the real world. And in this regard, dysfunctional attitudes and defeatist performance beliefs are the determining factors in creating negative symptoms and low performance capacity in schizophrenia patients (Horan et al., 2010). Even after controlling the severity of depression symptoms, defeatist performance beliefs in dysfunctional attitudes are associated with the severity of negative symptoms in a non-clinical population, and in fact, maladaptive cognitive schemas are

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involved in the expression of these symptoms (Fervaha et al., 2015). The relationship between neuro-cognition and performance outcomes in important areas of social life in serious mental illnesses is strong. Therefore, dysfunctional attitudes (defeatist performance beliefs, and asocial beliefs) have been identified as intervening variables in this causal chain (Thomas et al., 2016). Pillny and Lincoln (2016) also determined in their research that negative symptoms in psychotic patients are caused by defeatist performance beliefs which has caused demotivation in these patients. In young people at risk for psychosis, decreased performance levels and negative symptoms can be related to their defeatist beliefs and attitudes (Devoe et al., 2021). Rector (2004) also found in his research that the intensity of paranoid thoughts is uniquely related to the increase in the need for confirmation scores. On the other hand, the set of negative symptoms is specifically related to dysfunctional performance beliefs. Of course, it should be kept in mind that based on cognitive theories, there is a connection between dysfunctional attitudes and delusions (Grant and Beck, 2009; Beck et al., 2009; Lincoln et al., 2010). Furthermore, irrational beliefs about the self, the future, and the world have been shown to be central problems in affective disorders (Weizman & Beck, 1978). According to Beck's theory, dysfunctional attitudes are a key factor in causing depression, anxiety and hallucinations (Clark and Beck, 2010; Beck et al., 2009: Birchwood, 2003: Hafner, 2005: Birchwood and Trower,2006). On the other hand, Beck et al. (2009) stated that negative beliefs about oneself, such as believing that one is weak and incapable or believing that others are annoying, are also effective in the occurrence of delusions. The formation of dysfunctional attitudes is the result

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of life experiences, especially the experiences that a person has in relation to parents (Clark et al., 1999; Dozois and Beck, 2008). Also stressful events or negative moods can trigger dysfunctional attitudes that lead to the processing of negatively biased information characterized by distorted thinking (e.g., biased interpretations, over-generalization, all-or-nothing thinking) negative self-evaluations, and rumination (Wise and Barnes, 1986; Olinger., et al., 1987; Kuiper et al., 1988). On the other hand, traumatic childhood experiences are increasingly a prominent risk factor for the development of psychotic disorders such as schizophrenia (Ruby et al., 2014). Studies have shown that childhood trauma is often associated with cognitive deficits in patients with psychosis (Dauvermann, and Donoho, 2019). It has been investigated that in schizophrenic patient's dissociative symptoms can affect cognitive processes and cause hallucinations (not recognizing internal events from external ones) in these patients (Varese, Barkus and Bentall ,2012). Also, specific cognitive processes are risk factors for the transition from subclinical experiences to clinical disorder. Therefore, adversities and social damages are associated with psychosis and with negative emotional processes and these emotional processes contribute to the emergence and persistence of psychotic symptoms, especially positive symptoms. There is also evidence reasoning that biases play a role in the occurrence of delusions (Garety et al., 2007). Therefore, based on what was mentioned, dysfunctional attitudes are capable of causing schizophrenia symptoms, and the second hypothesis is confirmed.

Based on other results of this research, the third hypothesis is also confirmed and Self-esteem predicts schizophrenia symptoms. According to the theory (Crocker & Wolff, 2001),

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self-esteem is based on personal judgment and interpretation of events or circumstances and is related to personal worth and social feedback. Also, self-esteem is a self-concept that depends on many factors such as self-evaluation (Bednar and Peterson, 1995; Crocker and Wolff, 2001). One of the basic aspects of the self is the self-concept (Rosenberg, 1979), which is related in several ways to the experience of schizophrenia (Weinberg et al., 2012). Romm et al. (2011) also determined a significant relationship between positive symptoms and self-esteem in a longitudinal study. Benavides et al. (2018) reported that the self-esteem of people at high risk of psychosis was lower than that of healthy controls, and at a level comparable to that of patients with schizophrenia. Jones et al. (2010) also determined that when the self-esteem of schizophrenic patients increased, the negative symptoms of the patients decreased. But, Magaud et al., (2013); Rodrigues et al., (2013) did not find significant relationships between overall positive symptoms of psychosis and self-esteem. Self-esteem refers to an individual's evaluation of his or her own characteristics (Sitisaraw, 2013). In studies, higher psychotic scores were significantly associated with lower SE and negative self-beliefs (Pruessner et al., 2011; Smith et al., 2006). Kesting et al., (2013) identified in their study, that negative self-assessment in schizophrenia (SCZ) is associated with the severity and maintenance of delusions and hallucinations. The impact of SE is evident in many aspects of the appearance of psychosis, including the severity and type of psychotic experiences (such as hallucinations and delusions), quality of life, and recovery from psychosis (Barrowclough et al., 2003; Freeman et al., 1998). SE in psychosis may have a paradoxical quality by which individuals can experience high

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levels of global negative and positive SE (Barrowclough et al., 2003; Magaud et al., 2013). The findings show that the severity of grandiose delusions is directly related to higher SE and inversely related to negative self-esteem (Smith et al., 2006). Other studies have shown that persecutory delusions are associated with unstable SE (Kesting and Lincoln, 2013). Furthermore other findings show that SE often fluctuates in people with paranoia (Thewissen et al., 2008). According to the fourth hypothesis, early maladaptive schemas predict the symptoms of schizophrenia patients through the mediation of self-esteem. According to the results of this research and according to the confirmation of the first and third hypothesis, both early maladaptive schemas and self-esteem are able to predict the symptoms of schizophrenia. Negative views of self and others are positively related to early maladaptive schemas, distress, and symptomatology but it has had a negative correlation with psychological well-being (Faustino, 2022). In this regard, Holding et al., (2013) in a self-esteem assessment that included two dimensions, negative evaluation of self (NES) and positive evaluation of self (PES) showed that high NES was significantly associated with a shorter time for recurrence and PES with a longer time. Fowler et al. (2006) also showed in their research that chronic psychotic patients have a more severe negative evaluation of themselves than the non-clinical population, but in terms of self-esteem levels, they are similar to non-clinical people. (Close, Garty, 1998) in cognitive-behavioral assessment of auditory hallucinations ('voices') in psychotic patients, they showed that these patients have very negative self-assessments, as well as negative emotional responses to common voice experience and had low self-esteem. Therefore, according to the mentioned materials and according to the fact

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that one of the transformational roots of schemas is self-governance, adequacy and identity. On the other hand, due to the fact that the enmeshment/undeveloped self, it is one of the early maladaptive schemas which is unchangeable (Young et al., 2003). Based on what was mentioned, one of the components of self is self-concept, and self-concept is actually self-esteem. Therefore, primary maladaptive schemas are able to change the symptoms of schizophrenia with changes in self-concept or in other words with changes in self-esteem.

According to the fifth hypothesis, dysfunctional attitudes predict the symptoms of schizophrenia patients through the mediation of self-esteem, which is confirmed according to the data obtained in this research. Therefore, the existence of dysfunctional cognitions about how people see themselves and others is a characteristic of psychopathology (Faustino, 2022). Lincoln et al. (2010) also determined the relationship between dysfunctional attitudes and psychosis in psychotic people compared to healthy people. They also stated that there is a relationship between negative self-concept and dysfunctional acceptance beliefs, and cognitive interventions for delusions should focus on interpersonal self-concepts. in a study of patients with schizophrenia and individuals at clinical high risk for psychosis, suggested that low global self- esteem (GSE) is primarily due to these patients' perceptions of work and interpersonal abilities (Benavides et al., 2018). Based on what was mentioned, in schizophrenia, certain areas of self-esteem, such as the value of work and social relationships, are preferentially affected (Garfield et al., 1987; Van Dongen, 1998). Social factors that lead to feelings of defeat can also trigger negative thoughts that reflect perceived feelings of

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loneliness or social comparison (Lincoln, 2014). Additionally, Social comparison theories about self-esteem, believe that individuals determine their own worth based on comparisons with others (Suls and Wills, 1991). Negative symptoms of schizophrenic patients are also related to low self-esteem and negative self-concept with interpersonal abilities and dysfunctional acceptance beliefs (Lincoln et al., 2011). It is known that people with Schizophrenia is more likely to confirm defeatist performance beliefs than healthy controls (Horan et al., 2010). Some support the notion that maladaptive beliefs play a role in the onset of psychosis, as negative beliefs mediate the relationship between social defeat and early symptoms in psychosis (Stowkowy and Addington, 2012). Beck et al. (2009) identified the role of negative expectations in schizophrenia, which refers to beliefs about the future that may reduce pleasure, acceptance, success, and perception of limited cognitive resources for daily tasks. Studies show that dysfunctional attitudes are generally Corresponding to the negative self-model, i.e. the image of self as helpless and unworth (Bowlby, 1988 and Bartholomew,1990). On the other hand, one of the underlying and important factors influencing the dysfunctional attitudes of individuals is self-esteem (Scott et al.,1995). Finally, Cognitive evaluation, schemas, beliefs and attitudes of people from a situation, affect their adaptation (Ciarochi, 2004). According to what was mentioned, schizophrenic patients experience feelings of worthlessness and helplessness in understanding their abilities and interpersonal relationships and comparing themselves with others. That these cases cause to be aroused dysfunctional attitudes and the feeling of worthlessness and which ultimately changes their symptoms. Based on the sixth hypothesis, early maladaptive schemas and dysfunctional attitudes predict

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schizophrenia symptoms with the mediation of self-esteem. the Dysfunctional Attitudes Questionnaire (DAS) and the Young's Early Maladaptive Schema Questionnaire (YSQ) are relatively stable vulnerability markers for depression and deep-rooted mental disorders. Dysfunctional Attitudes Questionnaire (DAS) and Young's Early Maladaptive Schema Questionnaire (YSQ) are well-established as relatively stable vulnerability indicators for depression and mental disorders (Wang et al., 2010). Also negative self-schemas contain dysfunctional attitudes (Beck, 1967, 1987). On the other hand, early maladaptive schemas are also described as long-term core beliefs that are significantly inefficient (Scott and Crino, 2014). Therefore, what the Young's schema questionnaire evaluates are the underlying beliefs that are in the scale of ineffective attitudes (Wang et al., 2010). On the other hand, self-esteem is a negative or positive attitude that people have towards themselves (Rosenberg, 1979). According to the first, second, and third hypotheses, early maladaptive schemas, dysfunctional attitudes, and self-esteem predict schizophrenia symptoms. Also, according to the fourth and fifth hypotheses, early maladaptive schemas and dysfunctional attitudes with the mediating role of self-esteem are able to predict schizophrenia symptoms. Based on what was mentioned, schizophrenic patients in stressful conditions experience schemas and dysfunctional attitudes that are aroused which actually cause changes in the self-esteem of these patients and subsequently cause changes in the symptoms of these patients. Therefore, according to all confirmed hypotheses, early maladaptive schemas and dysfunctional attitudes with the mediating role of self-esteem are predictors of schizophrenia symptoms.

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This study has some limitations. The first limitation is that this study may not be generalizable to other patients due to its cross-sectional nature. Other limitations are that in this research, self-report questionnaires were used, which may be that the information given by the patients is not accurate, and it is necessary to interpret the results with caution. On the other hand, the stigma internalized in these patients may affect the symptoms, and it is better to investigate the internal stigma of these patients in the future studies. In samples of people with first-episode schizophrenia, the relationship between positive and negative symptoms may be clearer and this clarity of symptoms is due to the complete lack of drug effect on the symptoms (Emsley et al., 2013). While our study sample was not in the early stages of schizophrenia and the possibility of connecting positive symptoms with negative symptoms weakens. Therefore, it is suggested that in future research, it is better for our study sample to include people with first episode schizophrenia. In addition, childhood trauma is an important factor that determines the impact of maladaptive schemas, dysfunctional attitudes, and self-esteem on schizophrenia which was not evaluated in our study. The strength of this study is that so far no research has been done that examines the effect of early maladaptive schemas and dysfunctional attitudes on schizophrenia symptoms with the mediating role of self-esteem. Second, heterogeneous samples were used in this study, which examines the variables in a sample with a different disease history.

The results of this study indicate the role of self-esteem mediator in the relationship between maladaptive schemas and dysfunctional attitudes to predict the symptoms of schizophrenia. The findings of this study show that early

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maladaptive schemas and dysfunctional attitudes directly affect self-esteem and self-esteem directly and indirectly affects symptoms of schizophrenia and exacerbates the patient's symptoms. In this study, only overt self-esteem was measured, in later studies, it is better to measure covert self-esteem. It is suggested to measure the variables of this study for two groups of schizophrenic patients with very different medical history in the next studies. It is also better to evaluate childhood trauma and life stress in these patients in future studies.

Assessing the association of early maladaptive schemas, dysfunctional attitudes, and self-esteem with the symptoms of schizophrenia may prevent the mechanisms that cause the disease from recurring. The results of this study can be used for psychological interventions in psychosis, such as cognitive-behavioral therapy for maladaptive schemas, dysfunctional attitudes, and self-esteem in psychotic patients. Another application of the results of this study is informing the families of these patients to improve their interaction with these them and prevent recurrence. We appreciate all the participants in this study.

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