Evaluation of the Relationship Between Psychopathology and Environmental Factors in Psychiatric Diseases by Nonrecursive Modeling

ABSTRACT

Background: In the field of psychiatry, environmental factors, disease status and severity, functionality, perceived social support, and social relations are variables that affect psychopathology. The aim of this study is to evaluate the relationship between environmental factors, disease diagnosis and severity with psychopathology using nonrecursive models included in structural equation modeling.

Methods: Within the scope of the study, 378 patients' demographic characteristics, as well as their responses to the Childhood Trauma Questionnaire, Rosenberg Self-Esteem Scale, Multidimensional Scale of Perceived Social Support, and Personal and Social Performance Scale were included. They were diagnosed with the International Classification of Diseases after assessment of the physician, severity of the symptoms were determined using the Clinical Global Impression Scale. The causal relationship between environmental factors and disease diagnosis with psychopathology was evaluated with the Stata program using the 3-stage least squares method within the scope of nonrecursive models.

Results: The mean age of the patients participating in the study was 37.3 (SD = 11.6); 61.6% were women, 58.8% had high school or lower education, 48.7% were married, and 72.1% had an income above the minimum wage. The mean score of support perceived by individuals from the environment (family, friend, partner) was 53.9 (SD = 18.9), the mean of self-esteem score was 22.8 (SD = 5.7), and the mean of trauma they experienced in their childhood due to abuse/neglect was 44.5 (SD = 12.1). It was concluded that age and Childhood Trauma Questionnaire neglect subheadings were effective in the self-esteem score, and Childhood Trauma Questionnaire neglect and abuse subheadings were effective in perceived social support ($P < .001$).

Conclusion: When the causality relationships between Rosenberg Self-Esteem Scale, Personal and Social Performance Scale, and Multidimensional Scale of Perceived Social Support scores were evaluated, childhood trauma and age were determined as significant variables for self-esteem, childhood trauma for perceived support, and disease severity and diagnosis in individual and social functionality.

Keywords: Psychiatry, environmental factors, psychopathology, structural equation modeling, nonrecursive models

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Introduction

Psychiatry is defined as the specialty that deals with mental, emotional and behavioral disorders, preventing, diagnosing and treating important incompatibilities in the person. Due to the nature of psychiatric diseases, a clear distinction cannot be made; there are transitions between diagnoses. The inability to classify the diseases precisely makes the treatment and diagnosis processes difficult. In the standard process, people are diagnosed using the Diagnostic and Statistical Manual of Mental Disorders, but the disease process and treatment effectiveness are observed in different ways in people with the same diagnosis. In this case, revealing the relationship between the disease and psychopathology and environmental

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factors is important both in terms of etiology research and treatment effectiveness.

Psychopathology is defined as the psychology of abnormal behavior and is evaluated in scopes such as deviation from norms, incompatibility, social relations, and functionality. Environmental factors, on the other hand, can be defined as situations that are not caused by the individual, but affect the disease process, such as the person''s use or experience of violence, and the severity of trauma experienced in his childhood.

Standard approaches in studies in the field of psychiatry often only allow general interpretations. In cases where the underlying causes of the disease cannot be revealed, nonrecursive models are used under structural equation modeling (SEM) in which the relations between the variables are also included in the equation, especially in the evaluation of cyclical/reciprocal causal relationships between latent variables.

Structural equation modeling is a comprehensive statistical analysis method that simultaneously reveals the direct and indirect relationships between observed and unobservable/latent variables, and evaluates the measurement errors and relationships that arise in this process in the model. The general representation of simultaneous equation models is $y = \beta y + \Gamma x + \zeta (error)$, with y denoting endogenous/dependent variables and x denoting exogenous/independent variables in the model.

Structural equation models, which are examined under 2 headings as "recursive" and "nonrecursive," are defined as nonrecursive if the following conditions are met[1]: (1) one of the result variables in the model affects the other/reciprocal relationship or equation in the presence of a feedback loop at some point in the system (e.g., the presence of a causal path returning to itself from a variable); (2) some ζ (error) values are correlated.

While the models using SEM in the literature are mostly recursive, the number of studies aiming to reveal the feedback loop or mutual interaction between multiple outcome variables is also substantial. In this study, according to expert opinion, patients were divided into 2 groups considering their condition at the time of examination. The relationship between the individual's self-esteem, support from the environment and functionality were evaluated with non-recursive models within the scope of SEM.

MAIN POINTS

- *Reciprocal relations and feedback loops between psychopathology and environmental factors and severity of disease were evaluated with the methods that include nonrecursive simultaneous equations, especially used in the field of econometrics.*
- *The hypothesis that the diagnosis of the person causes worsening of social activities and relationships, and that this effect may cause a decrease in self-esteem and that all these may affect the diagnosis.*
- *Childhood trauma and age were determined as significant variables for Rosenberg self-esteem score, childhood trauma for perceived support, disease severity, and diagnosis for individual and social functionality.*

Material and Methods

The study was carried out by using the data of thesis in medicine, which was carried out with 378 people between May and June 2017 in the Department of Mental Health and Diseases of Ankara University Faculty of Medicine. The study was approved by the Ethical Committee of the Faculty of Medicine, Ankara University (date: April 10, 2017/number: 07-363-17). Written informed consent was obtained from all participants who participated in this study. In addition to demographic characteristics of individuals, responses to Childhood Trauma Questionnaire (CTQ), Rosenberg Self-Esteem Scale, Multidimensional Perceived Social Support Scale (MSPSS), Personal and Social Performance Scale (PSP) were obtained. Diagnoses were made using International Classification of Diseases (ICD-10) codes after the interview was carried out by the physician (Table 1); symptom severity was determined using the Clinical Global Impression Scale.

Childhood Trauma Questionnaire
The scale consists of 28 questions with a 5-point Likert response category; there are 5 subdimensions called sexual, physical, emotional abuse, and emotional and physical neglect. The sum of the 5 subdimension scores gives the total score of the scale. The scores obtained from the subgroups vary between 5 and 25, and a total of 25-125 points can be obtained. Score evaluations are made differently in each subtitle and total score. Turkish validity and reliability study of the scale would be carried out; the Cronbach's alpha value was calculated as 0.93 in the literature[2] and 0.84 in our study.

Multidimensional Scale of Perceived Social Support
The scale consists of 12 questions in total, consisting of 4 questions each from 3 subgroups (family, friend, partner). The questions evaluated with a 7-point Likert response category reveal the adequacy of social support. Scores range from 7 to 84, with high scores indicating high perceived social support. In the literature,[3] the reliability coefficient is 0.86, while we calculated it as 0.79.

Rosenberg Self-Esteem Scale
The scale consists of 63 questions with 4 Likert response categories and 12 subcategories. Within the scope of this study, the self-esteem category scores of the scale (first 10 questions) were used. In the scale where some questions are reverse coded, a score between 10 and 40 can be obtained. A high score on the scale indicates low self-esteem. It was stated that the reliability coefficient of the scale was 0.75.[4] But we calculated it as 0.80.

Personal and Social Performance Scale
The scale was developed to clearly demonstrate functionality and evaluate symptom severity. Six-point Likert assessments are made in 4 main categories (socially useful activities, personal and social relationships, self-care, and irritating/aggressive behaviors). After the detailed evaluation, the functionality of the person is scored between 1 and 10; a score of 1-3 indicates complete functionality or very mild impairment, a score of 4-6 indicates a clear or significant loss of functionality, and a score level of 8-10 is considered as indicating severe or extremely severe disability. It has been stated that PSP is very practical in practice and clearly reveals the differences. In the reliability analyses of the scale, the Cronbach's alpha internal consistency coefficient of the scale was calculated as 0.83.[5] In our study, this value was found as 0.88.

Table 1. Diagnosis Categories

Neurosis	F10—Alcohol-related disorders
	F32—Depressive episode
	F40—Social phobias
	F41—Other anxiety disorders
	F42—Obsessive-compulsive disorder
	F43—Reaction to severe stress, and adjustment disorders
	F44—Dissociative and conversion disorders
	F60—Specific personality disorders
	F63—Impulse disorders
	F80—Specific developmental disorders of speech and language
	F90—Attention-deficit hyperactivity disorders
Psychosis	F20—Schizophrenia
	F22—Delusional disorders
	F24—Shared psychotic disorder
	F25—Schizoaffective disorder
	F28—Other psychotic disorders not due to a substance or known physiological conditions
	F31—Bipolar disorders
	F33—Major depressive disorders, recurrent
	F34—Persistent mood [affective] disorders

After consultation by the physician for the diagnosis, ICD-10 (International Classification of Diseases) codes were used. In the Diagnosis categories created with expert opinion (Table 1); people with psychosis mean severe/advanced illnesses, and those with neurosis mean mild illness. Categorizing the diagnoses, handling each of the diagnoses in separate studies is to follow a different path than the clinical relationship with environmental factors. For symptom severity, the Clinical Global Impression Scale was used, and this value (no symptom, borderline, mild, moderate, noticeably, and severe/very severe) indicates how severe the individual's symptoms are. Exposure to violence was evaluated as present/absent after the questionnaire applied to the individuals.

The relationship between environmental factors and diagnosis with psychopathology was evaluated with the nonrecursive model whose causal structure/diagram is included in SEM. During the determination of the model, as a result of the expert opinion received, the hypotheses to be investigated clinically were established, the type and direction of the relationship between the variables were determined, and the diagram was drawn appropriately (Figure 1). The causality diagram and related equations investigated in this study are given below.

$$y_1 = \gamma_{11}x_1 + \gamma_{12}x_2 + \beta_{12}y_2 + \beta_{14}y_4 + \zeta_1$$

$$y_2 = \gamma_{21}x_1 + \gamma_{24}x_4 + \beta_{24}y_4 + \zeta_2$$

$$y_3 = \gamma_{31}x_1 + \gamma_{33}x_3 + \beta_{32}y_2 + \zeta_3$$

Reciprocal and/or feedback loop relations between the variables in the path diagram are expressed visually in Figure 1; it can be interpreted that knowing that the person has a psychiatric disorder after diagnosis causes worsening of social activities and relationships, and this effect may cause a decrease in self-esteem and all these may affect the diagnosis. The situation to be investigated within the scope of the study is whether complex causality is clinically and statistically significant.

After the process of determining the model within the scope of SEM, it was shown that the model was defined and then moved to model estimation phase. At this stage, 3-stage least squares (3SLS) method is used to solve nonrecursive systems. On the basis of the 3SLS method, the generalized least squares (GLS) method is applied to the 2-stage estimation equations in order to increase the efficiency. In short, residual values are first calculated from the 2-stage estimation equations, and then these values are used in the variance covariance matrix estimation of the equation errors. In the next step, the obtained matrix is used, like the sandwich matrix in the GLS estimation, after ranking the set of equations.[6] The method provides an advantage because it evaluates each equation separately. After obtaining the parameter estimates of the model, the model fit
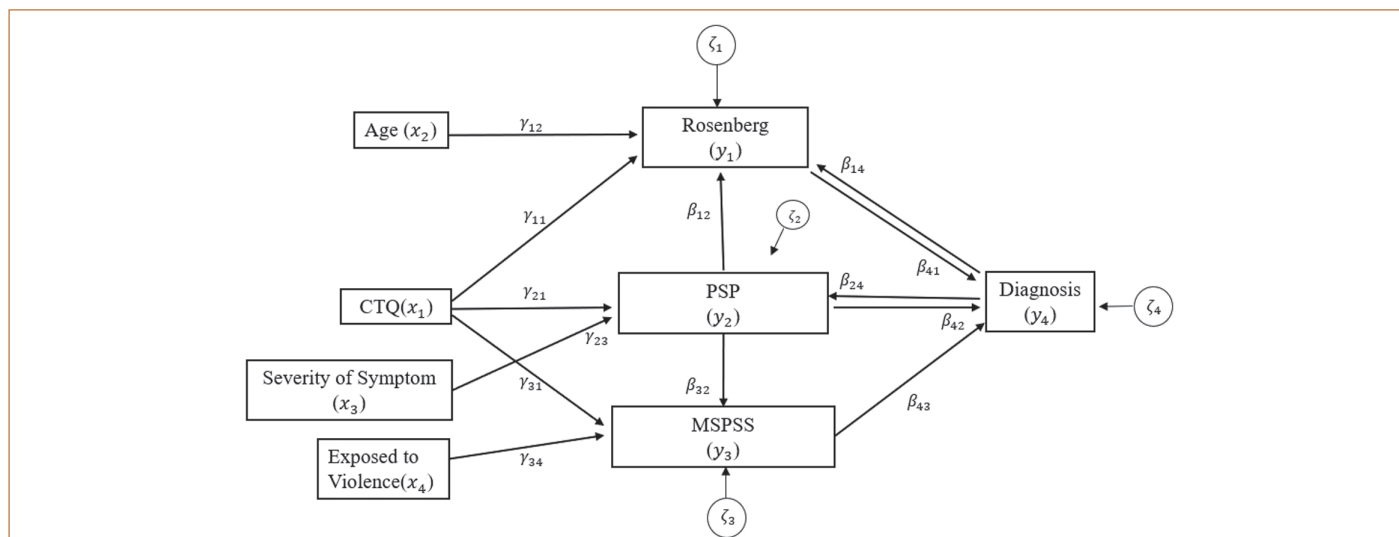
Figure 1. Nonrecursive model diagram—as a result of the expert opinion received, the hypotheses to be investigated clinically were established, the type and direction of the relationship between the variables were determined, and the diagram was drawn appropriately.

was evaluated. In this context, the direction of the coefficients and their compatibility with the literature were examined. The following fit-indices were considered as markers for an acceptable model fit[7,8]: (a) the comparative fit index (CFI) > 0.90; (b) Tucker–Lewis index (TLI) relative fit index > 0.95; and (c) the square root error of approximation (RMSEA) < 0.08. Descriptive statistics were given as mean (SD) or median (minimum–maximum) for normal or not normally distributed variables and frequencies with percentages for categorical variables. $P < .05$ was considered as statistically significant. Stata 12 (StataCorp. 2011. Stata Statistical Software: Release 12, College Station, Tex, USA: StataCorp LP) program was used to analyze the data.

Results

The distribution of demographic and clinical characteristics of the patients according to diagnosis is given in Table 2. The study consisted of 268 (70.9%) neurosis and 110 (29.1%) psychosis patients. 233 (61.6%) of the participants are women, 182 (48.7%) are married, 218 (58.8%) have high school or less education, and 245 (72.1%) have incomes above the minimum wage. Clinically, 132 (35.3%) of them showed moderate symptoms, 263 (69.6%) of the people stated that they were exposed to violence, and 293 (77.5%) of them reported that they were not exposed to violence.

The distribution of scale scores according to demographic and clinical characteristics is given in Table 3. While the mean age of the

patients participating in the study was 37.3 (SD = 11.6), it was 39.2 (SD = 12.3) in the psychosis group. While the perceived social support of men is lower than that of women, women have lower self-esteem and functionality, and the trauma value they experienced in their childhood is higher than men. In the psychosis group, all clinical features are worse than the neurosis group.

The CTQ score was evaluated in terms of clinical and demographic factors, as abuse and neglect, and on the basis of all subdimensions (emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect). When the values were evaluated under 2 main headings, mean scores of abuse and neglect were found to be 23.0 (SD = 8.2) and 22.4 (SD = 7.5), respectively. In the abuse dimension, women [23.7 (SD = 8.9)] and in neglect dimension men [22.5 (SD = 7.3)] had a higher mean. According to the total score averages, it was determined that the patients were mostly exposed to emotional neglect and abuse in childhood ($P = .010$). When all the titles were examined, the highest mean of 13.8 (SD = 5.4) was observed for the emotional neglect subdimension. The average childhood neglect (physical) and abuse (physical and sexual) of people with

Table 2. Demographic and Clinical Characteristics of the Patients According to Diagnosis [n (%)]

Variable	Category	Neurosis	Psychosis	Total
		Diagnosis		
Gender	Male	100 (SD = 37.3)	45 (SD = 40.9)	145 (SD = 38.4)
	Female	168 (SD = 62.7)	65 (SD = 59.1)	233 (SD = 61.6)
Marital status	Single	106 (SD = 39.6)	44 (SD = 41.5)	150 (SD = 40.1)
	Married	132 (SD = 49.3)	50 (SD = 47.2)	182 (SD = 48.7)
	Widow	30 (SD = 11.2)	12 (SD = 11.3)	42 (SD = 11.2)
Education	High School	159 (SD = 60.0)	59 (SD = 55.7)	218 (SD = 58.8)
	University	106 (SD = 40.0)	47 (SD = 44.3)	153 (SD = 41.2)
Income	Above minimum wage	60 (SD = 24.9)	35 (SD = 35.4)	95 (SD = 27.9)
	Minimum wage or more	181 (SD = 75.1)	64 (SD = 64.6)	245 (SD = 72.1)
Severity of symptom	No symptom	7 (SD = 2.7)	2 (SD = 1.8)	9 (SD = 2.4)
	Borderline	16 (SD = 6.1)	6 (SD = 5.5)	22 (SD = 5.9)
	Mild	57 (SD = 21.6)	23 (SD = 20.9)	80 (SD = 21.4)
	Moderate	95 (SD = 36.0)	37 (SD = 33.6)	132 (SD = 35.3)
	Noticeably	77 (SD = 29.2)	33 (SD = 30.0)	110 (SD = 29.4)
	Severe	12 (SD = 4.5)	9 (SD = 8.2)	21 (SD = 5.6)
Comorbidity	No	221 (SD = 82.5)	92 (SD = 83.6)	313 (SD = 82.8)
	Yes	47 (SD = 17.5)	18 (SD = 16.4)	65 (SD = 17.2)
Exposed to violence	No	88 (SD = 32.8)	27 (SD = 24.5)	115 (SD = 30.4)
	Yes	180 (SD = 67.2)	83 (SD = 75.5)	263 (SD = 69.6)
Use of violence	No	214 (SD = 79.9)	79 (SD = 71.8)	293 (SD = 77.5)
	Yes	54 (SD = 20.1)	31 (SD = 28.2)	85 (SD = 22.5)
Psychosis history	No	232 (SD = 91.0)	67 (SD = 63.2)	299 (SD = 82.8)
	Last year	13 (SD = 5.1)	18 (SD = 17.0)	31 (SD = 8.6)
	Lifetime	10 (SD = 3.9)	21 (SD = 19.8)	31 (SD = 8.6)

Values in cells are expressed as mean (SD).

Table 3. Demographic and Clinical Characteristics of the Patients According to Questionnaires

Variable	Category	MSPSS	Rosenberg*	CTQ	PSP
Gender	Male	51.3 (SD = 19.4)	22.5 (SD = 5.7)	43.8 (SD = 11.7)	5 (1-9)
	Female	55.7 (SD = 18.5)	23.1 (SD = 5.8)	44.9 (SD = 12.4)	4 (1-8)
Marital status	Single	54.2 (SD = 17.8)	23.6 (SD = 6.0)	44.8 (SD = 12.5)	5 (1-8)
	Married	54.9 (SD = 19.6)	22.2 (SD = 5.2)	43.7 (SD = 12.0)	4 (1-9)
	Widow	50.7 (SD = 19.2)	23.0 (SD = 6.4)	46.2 (SD = 11.3)	5 (3-8)
Education	High School	53.2 (SD = 18.8)	23.0 (SD = 5.3)	45.6 (SD = 12.6)	5 (1-9)
	University	55.3 (SD = 19.1)	22.7 (SD = 6.2)	42.9 (SD = 11.4)	4 (1-8)
Income	Above minimum wage	53.5 (SD = 18.7)	23.0 (SD = 5.1)	47.2 (SD = 14.5)	5 (1-9)
	Minimum wage or more	54.6 (SD = 19.2)	22.8 (SD = 6.0)	43.4 (SD = 11.3)	5 (1-8)
Diagnosis	Neurosis	53.8 (SD = 18.4)	22.8 (SD = 5.5)	44.0 (SD = 12.1)	5 (1-8)
	Psychosis	54.3 (SD = 20.5)	23.0 (SD = 6.2)	45.7 (SD = 12.2)	5 (1-9)
Severity of symptom	No symptom	67.2 (SD = 11.3)	20.1 (SD = 6.8)	37.9 (SD = 12.7)	1 (1-4)
	Borderline	61.1 (SD = 18.2)	20.4 (SD = 5.5)	43.2 (SD = 9.9)	3 (1-7)
	Mild	54.0 (SD = 17.0)	22.0 (SD = 5.8)	42.1 (SD = 9.3)	3 (1-8)
	Moderate	50.6 (SD = 19.5)	23.6 (SD = 5.2)	45.4 (SD = 12.0)	4 (1-8)
	Noticeably	54.9 (SD = 19.3)	23.4 (SD = 5.7)	46.1 (SD = 14.2)	6 (3-8)
	Severe	53.9 (SD = 21.0)	23.7 (SD = 7.4)	44.0 (SD = 11.0)	7 (4-9)
Comorbidity	No	54.4 (SD = 19.2)	22.6 (SD = 5.8)	44.5 (SD = 12.0)	5 (1-8)
	Yes	51.9 (SD = 18.1)	24.2 (SD = 5.2)	44.5 (SD = 13.0)	5 (1-9)
Exposed to violence	No	57.7 (SD = 18.9)	22.2 (SD = 5.2)	40.2 (SD = 9.4)	5 (1-8)
	Yes	52.2 (SD = 18.8)	23.2 (SD = 5.9)	46.4 (SD = 12.7)	5 (1-9)
Use of violence	No	56.2 (SD = 18.5)	22.6 (SD = 5.9)	43.1 (SD = 11.7)	5 (1-8)
	Yes	46.9 (SD = 18.9)	23.8 (SD = 5.0)	49.2 (SD = 12.4)	5 (1-9)
Psychosis history	No	54.1 (SD = 18.7)	22.9 (SD = 5.7)	44.0 (SD = 11.7)	5 (1-8)
	Last year	58.4 (SD = 19.9)	22.2 (SD = 5.3)	42.5 (SD = 12.7)	5 (1-8)
	Lifetime	50.5 (SD = 18.8)	22.3 (SD = 6.8)	49.8 (SD = 16.0)	5 (3-9)
Total		53.9 (SD = 18.9)	22.8 (SD = 5.7)	44.5 (SD = 12.1)	5 (1-9)

Values in cells are expressed as mean (SD) or median (minimum–maximum).
*A high score from the Rosenberg Self-Esteem Scale indicates low self-esteem.
CTQ, Childhood Trauma Questionnaire; MSPSS, Multidimensional Scale of Perceived Social Support Scale; PSP, Personal and Social Performance Scale.

Table 4. Three-Stage Least Square Results

		Coefficient	SE	z	P	95% CI Lower	95% CI Upper
PSP	Constant	−0.053	0.412	−0.13	.898	−0.860	0.754
	CTQ	0.003	0.007	0.47	.642	−0.010	0.016
	Severity of symptom	0.120	0.075	14.85	*<.001*	0.972	1.267
	Diagnosis	0.314	0.182	1.73	.084	−0.042	0.671
Rosenberg	Constant	20.525	2.266	9.06	*<.001*	16.083	24.968
	Age	−0.128	0.033	−3.89	*<.001*	−0.192	−0.128
	CTQ	0.109	0.033	3.33	*.001*	0.045	0.109
	PSP	0.500	0.326	1.53	.125	−0.140	0.500
	Diagnosis	−0.038	0.868	−0.04	.965	−1.739	−0.038
MSPSS	Constant	89.828	6.076	14.78	*<.001*	77.919	101.737
	Exposed to violence	−0.955	2.617	−0.36	.715	−6.083	4.174
	CTQ	−−0.766	0.103	−7.43	*<.001*	−0.968	−0.564
	PSP	−0.202	0.976	−0.21	.836	−2.116	1.711

CTQ, Childhood Trauma Questionnaire; MSPSS, Multidimensional Scale of Perceived Social Support Scale; PSP, Personal and Social Performance Scale. The values written in italics and bold in the table are statistically significant (p<0.05).

psychosis disease is higher than the neurosis group. While the symptom severity of people who are more exposed to abuse is moderate or higher, the same situation is observed as "borderline" for neglect. Patients who have been abused and neglected (especially emotionally) in their childhood are exposed to and perpetrate more violence. People who have had the disease for many years have higher scores on all subdimensions of CTQ than those who have been diagnosed recently or in the last year.

The fit indices are interpreted using breakpoints for acceptability of the model. Considering the model fit indices in the literature,, according to the CFI = 0.97 and TLI = 0.92 values, the model fit is high and RMSEA = 0.052 < 0.08 (CI: 0.000-0.092) indicates an acceptable fit.

After the descriptive results of the variables, the data were evaluated with advanced analysis methods. The coefficients obtained for each internal variable and their significance as a result of the analysis performed using the 3SLS method to test the causal relationships between Rosenberg Self-Esteem Scale, PSP, and MSPSS score are given in Table 4. In terms of demographic and clinical variables, analyses were made on the basis of subdimensions for 3 scales. During the modeling phase, different scenarios were applied and the results are given below.

It was concluded that the severity of symptoms was effective on the PSP score (*P* < .001). As the severity of the person's symptoms increases, it is expected that their individual and social functionality will worsen. The effect of diagnosis on functionality was not statistically significant (*P*=.084). Childhood Trauma Questionnaire score and age were effective on Rosenberg Self-Esteem Scale score (*P*=.001; *P* < .001). Based on these results, being young and increased severity of childhood trauma reduce self-esteem. The effect of diagnosis on self-esteem was not found statistically significant (*P*=.965). The severity of the trauma experienced in childhood is significant in the evaluation of the support received by the person from his/her environment. (*P* < .001). The fact that people have been traumatized at a high level in their childhood reduces the level of support they think they receive from their environment.

It was concluded that the CTQ neglect subdimension score and age were effective on the Rosenberg Self-Esteem Scale score (*P*=.023).

Based on this result, a 1-unit decrease in a person's age and a high rate of emotional and physical neglect in childhood reduce self-esteem. On the MSPSS score, CTQ neglect and abuse subdimension score were effective (*P* < .001; *P*=.001). Based on this result, the high severity of both "emotional and physical neglect" and "emotional, physical, and sexual abuse" suffered by the person in childhood indicates that the support that he/she thinks he/she has or perceives from his/her environment will decrease.

When emotional, physical, and sexual abuse, emotional and physical neglect subdimension scores were included in the model instead of the CTQ total score, it was concluded that emotional abuse (*P* < .001), physical abuse (*P*=.011), emotional neglect (*P*=.024), and age (*P* < .001) were effective on Rosenberg Self-Esteem Scale score. Based on this, a 1-unit decrease in age and a high level of emotional abuse and neglect in childhood reduce self-esteem. On the MSPSS score, CTQ emotional neglect subdimension score (*P* < .001) and emotional abuse subdimension score (*P* < .001) were effective. The increase in emotional neglect and abuse decreases the level of support that the person thinks she/he receives from those around her/him.

Discussion

In psychiatry, where people's life events, their reactions to events, emotions/thoughts, and expressions have a complex structure, it is not possible to reveal this complex structure with classical statistical analyses. In cases where there is a reciprocal feed or feedback relationship between the variables, unbiased estimates of the coefficients showing the relationships and their statistical significance can be obtained by using nonrecursive models within the scope of SEM. A 2-year follow-up study was conducted to measure the effects of social support, flexibility of opinion, and self-esteem variables on mental health in adolescents, and the scales were administered to 1015 individuals 5 times over a 6-month period. The hypothesis that there is a reciprocal relationship between self-esteem and flexibility of opinion was evaluated with the nonrecursive model.[9] The effects of childhood neglect and abuse were evaluated, and similar to our study, it was revealed that people were mostly exposed to emotional neglect and abuse. It has been stated that women are

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exposed to all kinds of neglect and abuse more than men in childhood.[10] In the study, in which the structure of childhood trauma with perceived support and gratitude was examined, SEM was used, considering that childhood trauma would affect perceived social support, similar to the diagram researched within the scope of this study. Similar to our results, trauma and support values were found to be higher in women than in men.[11] In New Zealand, scales were applied at certain intervals from birth to 25 years of age on about a thousand people, and it was aimed to reveal the factors affecting the self-esteem of the person. In the investigation of causality, it was stated that the models within the scope of SEM should be used and should be examined for cases where there are mutual causal paths. The low socio-economic level of young people who were subjected to physical and sexual abuse in their childhood reduces their self-esteem. The results obtained are in parallel with ours. At the end of the study, it is stated that there are mostly cross-sectional studies in the literature and the selected sample is mostly selected from the clinic and is composed of those with behavioral problems, which creates bias.[12] In their study involving 348 people living in Nepal, the relationship between the well-being of the people and the social support they received was examined. Considering the relationship between self-esteem and perceived social support in the study, it was concluded that people with high self-esteem received more social support.[13] In a study conducted with 80 schizophrenia patients in Taiwan, the responsiveness levels of the individuals were examined according to their PSP values, and the relationship between symptom severity and individual and social performance functionality was found to be significant, in parallel with our study results.[14]

The use of SEM models in structures where the relationships between variables are more complex (like pyschiatry) provides additional information to existing diagnostic methods and provides detailed information about causality. It was mentioned that the standard method would be faulty if there was a mutual relationship in the system, and the necessity of multiequation models was emphasized. With regard to the 3SLS method, they showed that it emerged with the development of 2-stage least squares and that it is more effective if the sample size is larger than 60, using the data produced by simulation.[15]

In this study, based on the analysis of the information obtained from people with psychosis and neurosis psychiatric diseases, demographic information, clinical characteristics and scales, the causal relationships between psychopathology and environmental factors, and severity of disease were evaluated with the methods that include nonrecursive simultaneous equations, used especially in the field of econometrics. In this context, the hypothesis that the diagnosis of the person causes worsening of social activities and relationships, and that this effect may cause a decrease in self-esteem and that all these may affect the diagnosis. According to the results obtained, childhood trauma and age were determined as significant variables for the Rosenberg self-esteem score, childhood trauma for the MSPSS score, and disease severity and diagnosis for the PSP score.

Childhood abuse causes a decrease in self-esteem and perception of support, and especially educators and parents should be made aware of this issue. It is thought that providing the necessary psychological support to these patients will have positive effects on the well-being of the patient in terms of psychopathology, since the disease status and severity affect social functionality.

Obtaining information based on statements from individuals, the ability to analyze the model with different scenarios, and changes that can be made in the categorization of diagnoses were considered as limitations of the study.

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