Negative Schema and Rumination as Mediators of the Relationship Between Childhood Trauma and Recent Suicidal Ideation in Patients With Early Psychosis

Yin Cui, MD, PhD[a,b]; Sung-Wan Kim, MD, PhD[c]; Bong Ju Lee, MD, PhD[d]; Jung Jin Kim, MD, PhD[e]; Je-Chun Yu, MD[f]; Kyu Young Lee, MD, PhD[g]; Seunghee Won, MD, PhD[h]; Seung-Hwan Lee, MD, PhD[i]; Seung-Hyun Kim, MD, PhD[j]; Shi Hyun Kang, MD, PhD[k]; Euitae Kim, MD, PhD[l]; Yan Hong Piao, MD[b]; Nam-In Kang, MD, PhD[m]; and Young-Chul Chung, MD, PhD[b,n,*]

ABSTRACT

Objective: High rates of childhood trauma and adult suicidality have been reported in patients who have schizophrenia. This study sought to explore mediators between childhood trauma and suicidality in adulthood to help determine therapeutic approaches.

Methods: This study included 314 adult patients with early psychosis who were participants in the Korean Early Psychosis Cohort Study, which was a prospective naturalistic observational cohort study started in December 2014. *DSM-5* criteria were used to assign the diagnosis of schizophrenia spectrum and other psychotic disorders. Cross-sectional data obtained at baseline were used for analysis. The Early Trauma Inventory Self Report–Short Form and the Columbia Suicide Severity Rating Scale were employed to collect data on childhood trauma and suicidal ideation and attempts. Other measures were used to evaluate depression, empathy, psychopathology, and rumination.

Results: A total of 90.1% of the participants experienced at least 1 childhood traumatic event. The rates of significant` physical punishment, emotional abuse, and sexual events were 37.3%, 35.6%, and 6.4%, respectively. The rates of recent suicidal ideation and attempts were 32.0% and 10.0%, respectively. Independent predictors of recent suicidal ideation included depression, negative schema, and rumination. Furthermore, negative schema and rumination played partial or full mediating roles in the relationship between childhood trauma and recent suicidal ideation.

Conclusions: These findings highlight the importance of performing careful evaluations of childhood trauma and suicidality and of developing effective strategies to reduce mediating factors that may be amenable to psychosocial approaches.

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[a]Shanghai Mental Health Center, Shanghai Jiao Tong University School of Medicine, Shanghai, P. R. China.
[b]Department of Psychiatry, Chonbuk National University Medical School, Jeonju, Republic of Korea
[c]Department of Psychiatry, Chonnam National University Medical School, Gwangju, Republic of Korea
[d]Department of Psychiatry, Inje University Haeundae Paik Hospital, Inje University College of Medicine, Busan, Republic of Korea
[e]Department of Psychiatry, The Catholic University of Korea, Seoul St Mary's Hospital, Seoul, Republic of Korea
[f]Department of Psychiatry, Eulji University School of Medicine, Eulji University Hospital, Daejeon, Republic of Korea
[g]Department of Psychiatry, Eulji University School of Medicine, Eulji General Hospital, Seoul, Republic of Korea
[h]Department of Psychiatry, School of Medicine, Kyungpook National University, Daegu, Republic of Korea
[i]Department of Psychiatry, Inje University College of Medicine, Goyang, Republic of Korea
[j]Department of Psychiatry, Korea University College of Medicine, Guro Hospital, Seoul, Republic of Korea
[k]Department of Psychiatry, Seoul National Hospital, Seoul, Republic of Korea
[l]Department of Psychiatry, Seoul National University Bundang Hospital, Seongnam, Republic of Korea
[m]Department of Psychiatry, Maeumsarang Hospital, Wanju, Jeollabuk-do, Republic of Korea
[n]Research Institute of Clinical Medicine of Chonbuk National University-Biomedical Research Institute of Chonbuk National University Hospital, Jeonju, Republic of Korea
Corresponding author: Young-Chul Chung, MD, PhD, Chonbuk National University Medical School, Department of Psychiatry, 20, Geonjiro Deokjin-gu, Jeonju, Jeollabuk-do 561-756 South Korea (chungyc@jbnu.ac.kr).

A dverse childhood events that include trauma are a common experience worldwide. Evidence suggests that the effects of childhood trauma can induce a range of negative social outcomes in adulthood such as higher criminality,[1] a lower educational level,[2] lower general health and well-being, and a greater risk of psychiatric disorders.[3,4] Not surprisingly, there is a high rate of childhood trauma in psychotic patients. In samples of first-admission psychotic patients, the rates of childhood trauma range from 53%[5] to 68%.[6] An epidemiologic study of a first-episode psychosis (FEP) cohort[7] found that 83% of patients had been exposed to at least one stressful exposure and 34% had experienced sexual and/or physical abuse during their lifetime. Furthermore, childhood trauma in patients with FEP is linked to higher levels of positive symptoms,[8] significant decreases in cognitive function,[9] and poor social function.[10] Although the specificity of childhood trauma as a risk factor for psychosis remains controversial, a large number of studies support the link between childhood trauma and the development of psychosis.[11,12]

Suicidal behavior also frequently manifests in patients with psychosis. A comprehensive meta-analysis of 61 studies[13] found that the lifetime prevalence of completed suicide among FEP patients is 5.6%. Additionally, 15%–26% of FEP patients have made at least one suicide attempt by the time of their first treatment contact,[14] and the proportion of FEP patients reporting suicidal ideation ranges from 32%[15] to 67%[16] at treatment initiation. In general, current models of suicidality emphasize hopelessness,[17] perceived burdensomeness, and thwarted belongingness[18] as risk factors for suicide. Risk factors for suicide in patients with first-episode schizophrenia include a longer duration of untreated psychosis (DUP),

> ### Clinical Points
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> - Understanding of the mechanism of the relation between childhood trauma and suicidal ideation in patients with early psychosis has been lacking.
> - Early interventions of negative schema and rumination may effectively reduce the rate of suicidal ideation in patients with early psychosis who had experienced childhood trauma.

depressive symptoms, a greater sense of guilt, anxiety,[19–22] a young age, being female, and a history of suicide attempts.[23] Childhood trauma has been reported to be associated with suicidal attempts in patients with schizophrenia.[24,25] Only 3 studies have examined this association in FEP patients: 2[7,26] found significant associations between childhood trauma subtype and suicidal attempts while the other[27] found no associations. These inconsistent findings stress the need for further studies of this relationship, particularly in patients with FEP.

In terms of the prevention and treatment of suicidal ideation and attempts in patients with FEP, the factors that play a key role in the relationships between childhood trauma and suicidal ideation and attempts remain to be determined. In general, the reported mediators of these associations include depression, alcohol use, eating disorders,[28] rumination,[29] and psychosocial factors such as parental relationships, friendships, and low social support.[30] However, to the best of our knowledge, no studies have investigated the manner in which childhood trauma may lead to suicidal ideation in patients with FEP. The present study had a particular interest in negative schema and rumination as possible mediators of the relationships between childhood trauma and suicidal ideation. Depression was not considered because of its well-established role as a mediator[31,32] and relatively low depression scores in the subjects of the current study. Negative schema[33] and rumination[34] have been reported to be associated with suicidal ideation in psychosis. A schema is a strongly held belief that a person has about himself or herself, about other people, or about the world in general. Negative schemas are thought to be formed early in life and remain stable throughout adulthood.[35] Sexual and physical abuse experienced in childhood have been reported to result in the development of schemas related to the "hazard" theme, whereas childhood neglect may lead to the development of schemas related to "loss" and "insignificance" themes.[36] Rumination is a type of negative perseverative processing that maintains depressed mood[37] and is considered as a specific dimension of negative emotional schemas.[38] The relationship between rumination and negative schema has been confirmed in previous studies,[39,40] and these 2 factors have been extensively studied in patients with depression and in community samples with regard to their associations with psychological trauma and suicide.[41–43] However, only a few studies[33,34] have looked at the associations between the 2 factors and suicidality in psychosis. The 2 factors are also known to contribute to the formation of psychotic symptoms[44,45] and depressive[46] and negative[47] symptoms in schizophrenia.

On the basis of review of previous studies, we hypothesized that childhood trauma may lead to increased risk of suicidal ideation and that negative schema and rumination may play mediating roles between childhood trauma and suicidal ideation in psychosis. Thus, the present study aimed to determine the rate of childhood trauma and suicidal ideation in patients with early psychosis. Furthermore, predictors for suicidal ideation and mediating roles of negative schema and rumination in the relationship between childhood trauma and suicidal ideation were examined.

METHODS

Participants

The present study analyzed cross-sectional data at baseline from the Korean Early Psychosis Cohort Study, which is a prospective naturalistic observational cohort study of patients with early psychosis that is being conducted from December 2014 to August 2019. The inclusion criteria required that subjects (1) were between 18 and 45 years of age; (2) met the *Diagnostic and Statistical Manual of Mental Disorders*, Fifth Edition (*DSM-5*), criteria for schizophrenia spectrum disorders (schizophrenia, schizophreniform disorder, and schizoaffective disorder), delusional disorder, brief psychotic disorder, or other specified schizophrenia spectrum and psychotic disorders; and (3) had an IQ > 70. Diagnoses were established using the Korean version of the Mini-International Neuropsychiatric Interview.[48] Early psychosis was defined as first-episode patients whose duration of illness was less than 2 years. At the time of the present study, the total number of registered patients was 314. All participants provided written informed consent in accordance with a protocol approved by the Ethics Committee of the Chonbuk National University Hospital (approval number CUH 2014-11-002) and other participating hospitals.

Measures

The present study collected data regarding demographic characteristics (age, sex, and education) and DUP. Duration of untreated psychosis was defined as the amount of time from the appearance of the first psychotic symptoms for more than several days to the time when the first antipsychotic drug prescription was made. The severity of psychiatric symptoms was assessed using the Positive and Negative Syndrome Scale (PANSS),[49,50] and depressive features were evaluated using the Calgary Depression Scale for Schizophrenia (CDSS).[51,52] Detailed information about lifetime and recent (within 6 months) suicidal ideation and behaviors was assessed with the Columbia Suicide Severity Rating Scale (C-SSRS).[53,54] Well-trained psychiatrists rated all of the objective measures.

The present study also employed several self-rating scales, including the Brief Core Schema Scales (BCSS),[55,56]

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Table 1. Demographic and Clinical Characteristics of Study Participants[a]

Variable	All (N = 314)	Low Childhood Trauma (n = 155)	High Childhood Trauma (n = 159)	P	Effect Size
Age, y	27.46 ± 7.21	27.47 ± 7.10	27.43 ± 7.36	.961	0.006
Sex, n (%)				.434	−4.400
Female	179 (57.0)	92 (59.3)	87 (54.7)		
Male	135 (43.0)	63 (40.7)	72 (45.3)		
Educational status, n (%)				.067	10.100
High school or lower	130 (41.4)	56 (36.4)	74 (46.5)		
University or higher	184 (58.6)	98 (63.6)	85 (53.5)		
DUP, mo	12.67 ± 21.28	12.94 ± 20.50	12.39 ± 22.14	.820	0.026
CDSS score	5.04 ± 4.63	4.27 ± 4.05	5.77 ± 5.03	.004	0.328
PANSS score					
Composite total	71.14 ± 23.29	72.28 ± 23.05	70.04 ± 23.53	.395	0.096
Positive total	16.88 ± 7.05	16.77 ± 7.06	16.98 ± 7.06	.793	0.030
Negative total	17.68 ± 6.79	18.50 ± 6.53	16.89 ± 6.97	.036	0.238
General total	36.58 ± 11.94	37.01 ± 11.85	36.16 ± 12.05	.5308	0.071
BCSS score					
Negative-self	6.96 ± 5.69	5.48 ± 5.18	8.25 ± 5.82	<.001	0.502
Positive-self	11.13 ± 5.43	11.82 ± 5.85	10.53 ± 4.99	.040	0.238
Negative-others	6.65 ± 5.91	4.50 ± 4.90	8.50 ± 6.10	<.001	0.722
Positive-others	9.11 ± 5.16	9.85 ± 5.59	8.48 ± 4.69	.025	0.266
BES total score	3.40 ± 0.51	3.35 ± 0.49	3.43 ± 0.53	.202	0.157
BS score					
Total	1.39 ± 0.74	1.09 ± 0.70	1.65 ± 0.68	<.001	0.812
Frustration	1.40 ± 0.89	1.04 ± 0.80	1.71 ± 0.85	<.001	0.811
Anger	1.45 ± 0.81	1.12 ± 0.78	1.72 ± 0.74	<.001	0.789
Foolishness	1.32 ± 0.72	1.10 ± 0.70	1.52 ± 0.69	<.001	0.604
Lifetime suicidal ideation, n (%)				<.001	−30.800
Yes	154 (49.84)	51 (34.0)	103 (64.8)		
No	155 (50.16)	99 (66.0)	56 (35.2)		
Age at first suicidal ideation	21.70 ± 7.17	22.47 ± 6.25	21.31 ± 7.58	.357	0.161
Lifetime suicidal attempt, n (%)				.002	−13.200
Yes	54 (17.5)	16 (10.7)	38 (23.9)		
No	255 (82.5)	134 (89.3)	121 (76.1)		
No. of total suicidal attempts	4.09 ± 9.00	2.94 ± 4.82	4.58 ± 10.28	.428	0.181
Recent suicidal ideation, n (%)				<.001	−23.400
Yes	99 (32.0)	30 (20.0)	69 (43.4)		
No	210 (68.0)	120 (80.0)	90 (56.6)		
Recent suicidal attempt, n (%)				.055	−6.500
Yes	31 (10.0)	10 (6.7)	21 (13.2)		
No	278 (90.0)	140 (93.3)	138 (86.8)		
ETISR-SF score					
Total	6.07 ± 4.91	1.82 ± 1.40	9.63 ± 3.85	<.001	2.679
General trauma	1.71 ± 1.99	0.50 ± 0.69	2.72 ± 2.16	<.001	1.375
Physical punishment	1.94 ± 1.62	0.74 ± 0.99	2.94 ± 1.34	<.001	1.863
Emotional abuse	1.82 ± 1.76	0.44 ± 0.78	2.98 ± 1.49	<.001	2.126
Sexual events	0.60 ± 1.08	0.14 ± 0.41	0.98 ± 1.30	<.001	0.866

[a]Values are presented as mean ± SD unless otherwise noted.
Abbreviations: BCSS = Brief Core Schema Scales, BES = Basic Empathy Scale, BS = Brooding Scale, CDSS = Calgary Depression Scale for Schizophrenia, DUP = duration of untreated psychosis, ETISR-SF = Early Trauma Inventory Self Report–Short Form, PANSS = Positive and Negative Syndrome Scale.

Basic Empathy Scale (BES),[57,58] Brooding Scale (BS; Y.-C.C., unpublished scale [in preparation]), and the Early Trauma Inventory Self Report–Short Form (ETISR-SF).[59] The BCSS contains 24 items concerning beliefs about the self and others that are assessed on a 5-point rating scale (0–4) from which 4 scores are obtained: negative-self (6 items), positive-self (6 items), negative-others (6 items), and positive-others (6 items). The BES includes 20 items evaluating affective and cognitive empathy that are assessed on a 5-point rating scale (0–4); only the total score was used in the present study. The Korean version of the BES showed a good internal consistency with a Cronbach α of .85.[58] The BS was developed by an author (Y.-C.C.) of the present study and standardized in patients with schizophrenia. It measures the degree of rumination about past negative events and has a Cronbach α of .93. It consists of 15 items divided into 3 subscales: frustration, anger, and foolishness (5 items each). The concepts for the subdomains were borrowed from Buddhist teachings, which state that pain in life or a life of agony comes from attachment to greed, anger, and ignorance/foolishness (ie, 3 mental toxins). A higher score on the BS indicates a greater degree of rumination. The ETISR-SF is a 27-item questionnaire evaluating physical (5 items), emotional (5 items), and sexual abuse (6 items) as well as general traumatic experiences (11 items) that may have occurred before the age of 18. Each of the items was

answered "yes" (coded as 1) or "no" (coded as 0), and total score was sum of the 4 domain scores. Its reliability and validity were confirmed in Korean patients with depression (Cronbach α of .87).[60] Additional information about other measures and the assessment schedule has been described in a previous study.[61]

Statistical Analysis

All statistical analyses were performed with SPSS version 21.0 (IBM Co; Armonk, New York), and P values < .05 were considered to indicate statistical significance. The subjects were divided into 2 groups based on the median score of the ETISR-SF, a low childhood trauma group (< 5) and a high childhood trauma group (≥ 5). Significant physical punishment, emotional abuse, and sexual events were defined as a score ≥ 3 in each domain based on the previous study.[62] Chi-square tests and t tests were conducted to compare the demographic and clinical characteristics of the groups. Suicidal ideation was used as a binary variable due to many missing data on the severity of suicidal ideation in the C-SSRS. A single logistic regression analysis was conducted to explore the association between the clinical variables of the subjects (n = 309) and recent suicidal ideation. Next, a stepwise multiple regression analysis that included the significant independent variables revealed by the single regression analysis was performed. Based on the recommendations of Baron and Kenny,[63] a mediation analysis was conducted to test the hypotheses that childhood trauma is related to recent suicidal ideation through negative schema and rumination. In addition, indirect effects were evaluated using the PROCESS for SPSS.[64]

RESULTS

The demographic and clinical characteristics of the study sample are described in Table 1. The diagnoses of the participants were schizophrenia (64.3%), schizophreniform disorder (15.6%), schizoaffective disorder (2.9%), other specified schizophrenia spectrum and psychotic disorders (13.4%), delusional disorder (1.3%), and brief psychotic disorder (2.5%). Most of the participants (90.1%) have experienced at least 1 childhood traumatic event. The rates of significant physical punishment, emotional abuse, and sexual events were 37.3%, 35.6%, and 6.4%, respectively. The rates of lifetime and recent suicidal ideation were 49.8% and 32.0%, respectively, whereas the rates of lifetime and recent suicidal attempts were 17.5% and 10.0%, respectively. In the comparison analysis, the high childhood trauma group had much higher CDSS scores ($P = .004$), lower PANSS negative scores ($P = .036$), more suicidal ideation (lifetime and recent, $P < .001$ and $P < .001$, respectively) and lifetime attempts ($P = .002$), higher scores for negative schema (negative-self and negative-others, both $P < .001$), lower scores for positive schema (negative-self and negative-others, $P = .04$ and $P = .025$, respectively), and higher BS scores (all $P < .001$) compared to the low childhood trauma group (Table 1). When we divided the subjects using the highest tertile

Table 2. Predictors of Recent Suicidal Ideation (n = 309)

Variable	OR	95% CI	P
Age	0.966	0.933–1.001	.056
Sex	0.891	0.549–1.447	.641
Educational status	0.781	0.482–1.267	.316
DUP	1.004	0.993–1.015	.463
CDSS score	1.182	1.117–1.252	< .001
PANSS score			
Composite total	1.002	0.992–1.013	.673
Positive total	1.019	0.985–1.054	.275
Negative total	0.981	0.946–1.017	.303
General total	1.008	0.988–1.028	.446
BCSS score			
Negative-self	1.123	1.073–1.175	< .001
Positive-self	0.890	0.846–0.937	< .001
Negative-others	1.095	1.049–1.143	< .001
Positive-others	0.925	0.879–0.973	.001
BES total score	0.992	0.617–1.596	.974
BS score			
Total	2.904	1.993–4.234	< .001
Frustration	2.079	1.547–2.795	< .001
Anger	2.470	1.761–3.465	< .001
Foolishness	2.823	1.936–4.118	< .001
ETISR-SF score			
Total	1.119	1.063–1.179	< .001
General trauma	1.219	1.078–1.378	.001
Physical punishment	1.305	1.118–1.524	< .001
Emotional abuse	1.337	1.160–1.542	< .001
Sexual events	1.285	1.032–1.600	.025

Abbreviations: BCSS = Brief Core Schema Scales, BES = Basic Empathy Scale, BS = Brooding Scale, CDSS = Calgary Depression Scale for Schizophrenia, DUP = duration of untreated psychosis, ETISR-SF = Early Trauma Inventory Self Report–Short Form, OR = odds ratio, PANSS = Positive and Negative Syndrome Scale.

Table 3. Stepwise Logistic Regression Analysis Predicting Recent Suicidal Ideation

Variable	OR	95% CI	P
CDSS score	1.122	1.053–1.196	< .001
BCSS positive-self score	0.911	0.862–0.963	< .001
BS total score	2.196	1.465–3.292	< .001

Abbreviations: BCSS = Brief Core Schema Scales, BS = Brooding Scale, CDSS = Calgary Depression Scale for Schizophrenia, OR = odds ratio.

(ETISR-SF score = 8) as a cutoff, the results were the same except those for sex.

In the single logistic regression analysis, CDSS, BCSS, BS, and ETISR-SF scores predicted recent suicidal ideation (Table 2). On the other hand, the stepwise multiple regression analysis revealed that CDSS score (odds ratio [OR] = 1.122, $P < .001$), positive-self score in the BCSS (OR = 0.911, $P < .001$), and BS total score (OR = 2.196, $P < .001$) independently predicted recent suicidal ideation (Table 3).

In the first set of the mediation analyses, the question of whether the direct effect of total ETISR-SF score on recent suicidal ideation was mediated by negative schema and rumination was examined. The results showed that negative-self and negative-others scores had positive association with suicidal ideation whereas positive-self and positive-others scores had negative associations. These findings suggest that negative schema is strongly associated with increased risk of suicidal ideation. In addition, the BCSS and BS scores reduced the direct effect of any type of childhood

Table 4. Mediating Effects of Negative Schema and Rumination in the Relationship Between Childhood Trauma and Recent Suicidal Ideation[a]

Independent Variable	Mediator	Path a β	Path a 95% CI	Path b OR	Path b 95% CI	Path c′ OR	Path c′ 95% CI	Indirect Effects β	Indirect Effects Bias-Corrected 95% CI
ETISR-SF total score	BCSS negative-self score	0.414***	0.289 to 0.539	1.110***	1.057 to 1.165	1.079**	1.021 to 1.141	0.043*	0.021 to 0.074
	BCSS positive-self score	−0.160*	−0.287 to −0.032	0.897***	0.851 to 0.946	1.110***	1.052 to 1.172	0.017*	0.003 to 0.039
	BCSS negative-others score	0.470***	0.341 to 0.599	1.074**	1.026 to 1.125	1.085**	1.027 to 1.147	0.034*	0.010 to 0.062
	BCSS positive-others score	−0.180**	−0.301 to −0.060	0.940*	0.892 to 0.991	1.110***	1.053 to 1.170	0.011*	0.001 to 0.025
ETISR-SF total score	BS total score	0.068***	0.052 to 0.084	2.503***	1.666 to 3.760	1.062*	1.003 to 1.125	0.062*	0.031 to 0.102
	BS frustration score	0.082***	0.063 to 0.100	1.773***	1.283 to 2.450	1.073*	1.014 to 1.137	0.047*	0.020 to 0.081
	BS anger score	0.072***	0.055 to 0.090	2.183***	1.510 to 3.155	1.067*	1.008 to 1.129	0.056*	0.029 to 0.092
	BS foolishness score	0.050***	0.033 to 0.066	2.474***	1.667 to 3.673	1.081**	1.023 to 1.142	0.045*	0.023 to 0.073

[a]Path a is ETISR-SF total score → mediator. Path b is mediator → recent suicidal ideation, adjusted for ETISR-SF total score. Path c′ is ETISR-SF total score → recent suicidal ideation, adjusted for mediator. Path c: ETISR-SF total score → recent suicidal ideation; OR = 1.119; 95% CI, 1.063 to 1.179; $P < .001$.
*$P < .05$. **$P < .01$. ***$P < .001$.
Abbreviations: BCSS = Brief Core Schema Scales, BS = Brooding Scale, ETISR-SF = Early Trauma Inventory Self Report–Short Form, OR = odds ratio.

trauma on recent suicidal ideation, but path c′ remained significant (Table 4), suggesting both negative schema and rumination partially mediated the relationship between childhood trauma and recent suicidal ideation. Indirect effects were also confirmed to be significant. The second set of mediation analyses explored the effects of the mediators on the relationships between childhood trauma subtype and recent suicidal ideation. BCSS scores played full mediating roles in only 3 results: (a) negative-self scores fully mediated the relationship between general trauma and recent suicidal ideation, and (b) negative-self and negative-others scores also fully mediated the relationship between sexual events and recent suicidal ideation. For other remaining results, BCSS scores played partially mediating roles (Figure 1A). For the BS, only 3 results were found to have a partially mediating role for scores on the foolishness subscale of the BS. Other results showed full mediating roles between BS scores and recent suicidal ideation (Figure 1B). There were significant associations between childhood trauma subtypes and recent suicidal ideation (path c): ORs for general trauma, physical punishment, emotional abuse, and sexual events were 1.219 ($P = .001$), 1.305 ($P < .001$), 1.337 ($P < .0001$), and 1.285 ($P = .025$), respectively.

DISCUSSION

The careful assessment of childhood trauma history and the prevention of possible suicidal ideation and attempts remain highly critical issues when treating patients with early psychosis. Thus, the present study investigated the rates of childhood trauma and suicidal ideation and attempts, predictors for recent suicidal ideation, and the mediating roles of negative schema and rumination between childhood trauma and recent suicidal ideation. Depression, low positive-self schema scores, and rumination independently predicted recent suicidal ideation, and negative schema and rumination played partial or full mediating roles in the relationship between childhood trauma and recent suicidal ideation.

The rate of childhood trauma in the present study was very similar to the rates reported in studies of first-episode

patients. However, considering that different methodologies for reporting childhood trauma were used in different studies, a simple comparison of the data does not have much value. An assessment of the rates of different childhood trauma subtypes revealed that the rate of physical punishment (37.3%) in the present study was substantially higher than the rates (13.6%–23.7%) reported in previous first-episode studies[5,26] that adopted similar reporting methods (self-report questionnaire rather than interviews). This discrepancy may be due to cultural differences or different content of items addressing physical abuse (eg, the content of the ETISR-SF items seems to capture mild and broad levels of physical punishment).

Compared to the low childhood trauma group, the characteristics of the high childhood trauma group included higher levels of depression and suicidal ideation and attempts, a strong negative schema, and high levels of rumination. In addition, the PANSS negative score was significantly lower in the high childhood trauma group, which is in line with the previous study in schizophrenia.[65] The present findings provide further evidence supporting the associations of childhood trauma with suicidal ideation and attempts in patients with early psychosis. The rates of suicidal ideation and attempts in the present study were similar to those reported in previous first-episode studies.[14–16] Given that the greatest risk of suicide in FEP patients occurs shortly before and after hospitalization[14,66] or in the first 2 years of the disorder,[67] the need to carefully evaluate the presence of suicidal ideation or attempts in patients with early psychosis should be emphasized. Taken together, the high rates of childhood trauma and suicidal ideation and attempts reported in the present study suggest that clinicians have an obligation to ask[68] about these features because patients are unlikely to disclose traumatic events or suicidality without being encouraged.
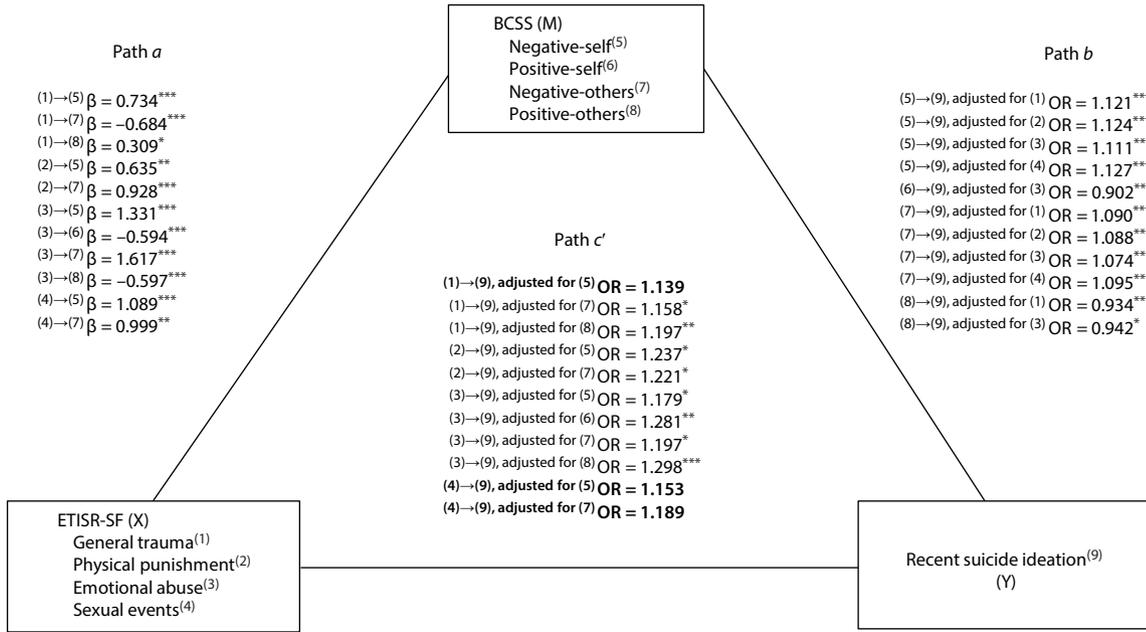
The present study identified 3 independent predictors of recent suicidal ideation: depression, positive-self schema, and rumination. Because the predictive role of depression in suicide has been well documented, the latter 2 factors deserve additional discussion.
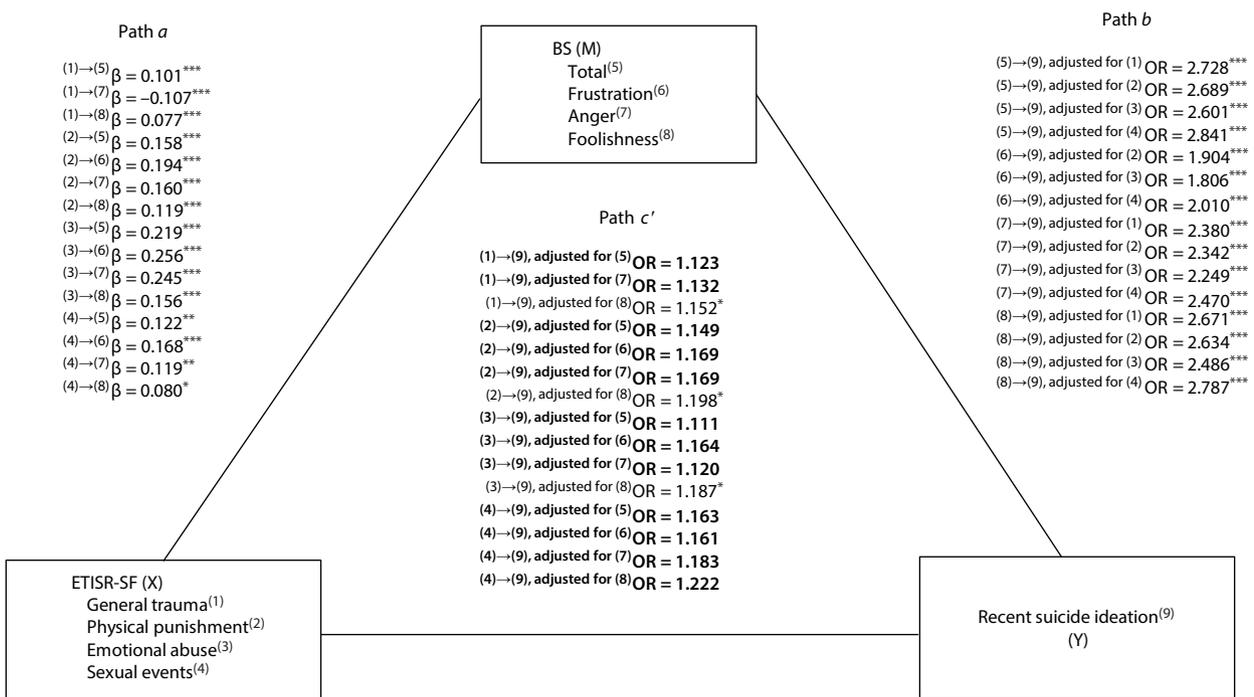
Figure 1. Mediating Effects of (A) Negative Schema and (B) Rumination in the Relationship Between the Subtypes of Childhood Trauma and Recent Suicidal Ideation[a]

A. Negative Schema

BCSS (M)
Negative-self[5]
Positive-self[6]
Negative-others[7]
Positive-others[8]

Path a

$(1) \rightarrow (5)$ β = 0.734***
$(1) \rightarrow (7)$ β = −0.684***
$(1) \rightarrow (8)$ β = 0.309*
$(2) \rightarrow (5)$ β = 0.635**
$(2) \rightarrow (7)$ β = 0.928***
$(3) \rightarrow (5)$ β = 1.331***
$(3) \rightarrow (6)$ β = −0.594***
$(3) \rightarrow (7)$ β = 1.617***
$(3) \rightarrow (8)$ β = −0.597***
$(4) \rightarrow (5)$ β = 1.089***
$(4) \rightarrow (7)$ β = 0.999**

Path b

$(5) \rightarrow (9)$, adjusted for (1) OR = 1.121***
$(5) \rightarrow (9)$, adjusted for (2) OR = 1.124***
$(5) \rightarrow (9)$, adjusted for (3) OR = 1.111***
$(5) \rightarrow (9)$, adjusted for (4) OR = 1.127***
$(6) \rightarrow (9)$, adjusted for (3) OR = 0.902***
$(7) \rightarrow (9)$, adjusted for (1) OR = 1.090***
$(7) \rightarrow (9)$, adjusted for (2) OR = 1.088***
$(7) \rightarrow (9)$, adjusted for (3) OR = 1.074**
$(7) \rightarrow (9)$, adjusted for (4) OR = 1.095***
$(8) \rightarrow (9)$, adjusted for (1) OR = 0.934**
$(8) \rightarrow (9)$, adjusted for (3) OR = 0.942*

Path c′

$(1) \rightarrow (9)$, **adjusted for (5)** OR = 1.139
$(1) \rightarrow (9)$, adjusted for (7) OR = 1.158*
$(1) \rightarrow (9)$, adjusted for (8) OR = 1.197**
$(2) \rightarrow (9)$, adjusted for (5) OR = 1.237*
$(2) \rightarrow (9)$, adjusted for (7) OR = 1.221*
$(3) \rightarrow (9)$, adjusted for (5) OR = 1.179*
$(3) \rightarrow (9)$, adjusted for (6) OR = 1.281**
$(3) \rightarrow (9)$, adjusted for (7) OR = 1.197*
$(3) \rightarrow (9)$, adjusted for (8) OR = 1.298***
$(4) \rightarrow (9)$, **adjusted for (5)** OR = 1.153
$(4) \rightarrow (9)$, **adjusted for (7)** OR = 1.189

ETISR-SF (X)
General trauma[1]
Physical punishment[2]
Emotional abuse[3]
Sexual events[4]

Recent suicide ideation[9]
(Y)

B. Rumination

BS (M)
Total[5]
Frustration[6]
Anger[7]
Foolishness[8]

Path a

$(1) \rightarrow (5)$ β = 0.101***
$(1) \rightarrow (7)$ β = −0.107***
$(1) \rightarrow (8)$ β = 0.077***
$(2) \rightarrow (5)$ β = 0.158***
$(2) \rightarrow (6)$ β = 0.194***
$(2) \rightarrow (7)$ β = 0.160***
$(2) \rightarrow (8)$ β = 0.119***
$(3) \rightarrow (5)$ β = 0.219***
$(3) \rightarrow (6)$ β = 0.256***
$(3) \rightarrow (7)$ β = 0.245***
$(3) \rightarrow (8)$ β = 0.156***
$(4) \rightarrow (5)$ β = 0.122**
$(4) \rightarrow (6)$ β = 0.168***
$(4) \rightarrow (7)$ β = 0.119**
$(4) \rightarrow (8)$ β = 0.080*

Path b

$(5) \rightarrow (9)$, adjusted for (1) OR = 2.728***
$(5) \rightarrow (9)$, adjusted for (2) OR = 2.689***
$(5) \rightarrow (9)$, adjusted for (3) OR = 2.601***
$(5) \rightarrow (9)$, adjusted for (4) OR = 2.841***
$(6) \rightarrow (9)$, adjusted for (2) OR = 1.904***
$(6) \rightarrow (9)$, adjusted for (3) OR = 1.806***
$(6) \rightarrow (9)$, adjusted for (4) OR = 2.010***
$(7) \rightarrow (9)$, adjusted for (1) OR = 2.380***
$(7) \rightarrow (9)$, adjusted for (2) OR = 2.342***
$(7) \rightarrow (9)$, adjusted for (3) OR = 2.249***
$(7) \rightarrow (9)$, adjusted for (4) OR = 2.470***
$(8) \rightarrow (9)$, adjusted for (1) OR = 2.671***
$(8) \rightarrow (9)$, adjusted for (2) OR = 2.634***
$(8) \rightarrow (9)$, adjusted for (3) OR = 2.486***
$(8) \rightarrow (9)$, adjusted for (4) OR = 2.787***

Path c′

$(1) \rightarrow (9)$, **adjusted for (5)** OR = 1.123
$(1) \rightarrow (9)$, **adjusted for (7)** OR = 1.132
$(1) \rightarrow (9)$, adjusted for (8) OR = 1.152*
$(2) \rightarrow (9)$, **adjusted for (5)** OR = 1.149
$(2) \rightarrow (9)$, **adjusted for (6)** OR = 1.169
$(2) \rightarrow (9)$, **adjusted for (7)** OR = 1.169
$(2) \rightarrow (9)$, adjusted for (8) OR = 1.198*
$(3) \rightarrow (9)$, **adjusted for (5)** OR = 1.111
$(3) \rightarrow (9)$, **adjusted for (6)** OR = 1.164
$(3) \rightarrow (9)$, **adjusted for (7)** OR = 1.120
$(3) \rightarrow (9)$, adjusted for (8) OR = 1.187*
$(4) \rightarrow (9)$, **adjusted for (5)** OR = 1.163
$(4) \rightarrow (9)$, **adjusted for (6)** OR = 1.161
$(4) \rightarrow (9)$, **adjusted for (7)** OR = 1.183
$(4) \rightarrow (9)$, **adjusted for (8)** OR = 1.222

ETISR-SF (X)
General trauma[1]
Physical punishment[2]
Emotional abuse[3]
Sexual events[4]

Recent suicide ideation[9]
(Y)

[a]Significant results are presented only; superscripted numbers correspond to the subscales of the measures. Path a is X → M. Path b is M → Y, adjusted for X. Path c′ is ETISR-SF subscale scores → recent suicidal ideation, adjusted for mediator; Path c: ETISR-SF subscale scores → recent suicidal ideation: OR (general trauma) = 1.219, $P < .01$; OR (physical punishment) = 1.305, $P < .001$; OR (emotional abuse) = 1.337, $P < .001$; OR (sexual events) = 1.285, $P < .05$. Boldface type indicates full mediation.
*$P < .05$. **$P < .01$. ***$P < .001$.
Abbreviations: BCSS = Brief Core Schema Scales, BS = Brooding Scale, ETISR-SF = Early Trauma Inventory Self Report–Short Form, OR = odds ratio.

The BCSS scores in the present study indicate that lower scores for positive-self are associated with a greater risk of suicidal ideation; furthermore, it is interesting to note that negative beliefs, formed due to trauma, could lead to psychotic experiences.[45,69] Therefore, it seems that a negative schema may contribute to the formation of psychotic symptoms as well as suicidal ideation. The BS total score had the highest OR (2.196): for every 1 point increase in the total score, the likelihood of having suicidal ideation increased by approximately 2-fold. In addition, roles of hopelessness and 3 variables related to interpersonal-psychological theory of suicide (perceived burdensomeness, thwarted belongingness, and the acquired capability for suicide) need to be explored in patients with FEP.

The first set of mediation analyses revealed the partial mediating roles of negative schema and rumination between childhood trauma and recent suicidal ideation. Regarding the BCSS results, positive-self and positive-others had negative β values, which is indicative of an inverse relationship with suicidal ideation. This finding suggests that, on the whole, a negative schema affects the relationship between childhood trauma and recent suicidal ideation. Only a few studies have investigated the mediating role of early maladaptive schemas on the relationships between childhood trauma and depression[43] and interpersonal styles[42] in non-clinical samples, but no studies have investigated these issues in patients with psychosis. These findings suggest that further research on the role of negative schema or early maladaptive schemas with regard to childhood trauma and suicide will be necessary.

Rumination can be viewed as a stable individual trait[70] that is characterized by "the tendency to repetitively analyze one's problems, concerns and feelings of distress without taking actions to make positive changes."[37(p596)] The mediating role of rumination in the relationships between stressful life events and anxiety and depression has been extensively studied[71–73] in community samples; relatively few studies have investigated the associations of rumination with positive and negative symptoms[47,74] and increased suicidality[34] in patients with psychosis. The present findings regarding BS scores suggest that rumination may be a proximal factor for suicidal ideation and an ideal target for clinical intervention that may reduce the frequency and impact of this pernicious thought pattern. In sum, the present results from the mediation analyses indicate that clinicians should skillfully assess the degrees of negative schema and rumination in patients with early psychosis and subsequently offer therapeutic interventions that target these 2 factors to prevent the devastating influence of childhood trauma on suicide.

The results of the second set of analyses revealed that a full mediation of BS score was manifested in all childhood trauma subscales, whereas a full mediation of BCSS score was shown only in terms of general trauma and sexual events. This finding indicates that the mediating roles of schema were greater for general trauma and sexual events. In other words, general trauma and sexual events rather than variables measured by other subscales are more likely to cause negative schema, and subsequently lead to suicidal ideation. However these findings were different from those in the previous literature.[75,76] We further conducted the structural equation model to test the mediation effects of negative schema and rumination in the relation between childhood trauma and suicidality. However, only negative schema was found to mediate the relation between childhood trauma and suicidality (Supplementary Figure 1). Inconsistent results may be because in the structural equation model, 4 categorical variables (recent and lifetime suicidal ideation and attempt) were transformed to a continuous variable.

The present study has several limitations that should be noted. First, because this study employed a cross-sectional design, causality cannot be ascertained from the results, and these issues should be addressed in a prospective study. Second, because the present findings regarding childhood trauma and suicidal ideation and attempts relied on retrospective self-reports, the recall bias may have led to an underestimation of these events due to a reluctance to disclose this information. Additionally, dividing the participants based on the median ETISR-SF score was an arbitrary decision. Third, the present sample included patients who were admitted to university hospitals and who were typically hospitalized during the first episode; thus, the results cannot be generalized to schizophrenia in general. Taken together, all these factors limit the generalizability of the present findings. Furthermore, because there was no control group in the present study, it was impossible to determine whether the findings were specific to patients with schizophrenia. Finally, although the Baron and Kenny method allows for the testing of simple mediations, it would be advantageous to use a structural equation model to develop more dynamic and complex mediation models.[77]

Despite these limitations, the present findings provide crucial data about the rates of childhood trauma and suicidal ideation and attempts in Korean patients with early psychosis. More importantly, the present study was the first to investigate the mediating roles of negative schema and rumination. In conclusion, the present study demonstrated that scores on the CDSS, the positive-self schema subscale of the BCSS, and the foolishness subscale of the BS independently predicted recent suicidal ideation in patients with early psychosis. Moreover, the BCSS and BS scores played partial or full mediating roles in the relationship between childhood trauma and recent suicidal ideation. These findings highlight the importance of careful evaluation of the relationship between childhood trauma and suicidality and the provision of therapeutic interventions to reduce amenable mediating factors.

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Supplementary Material

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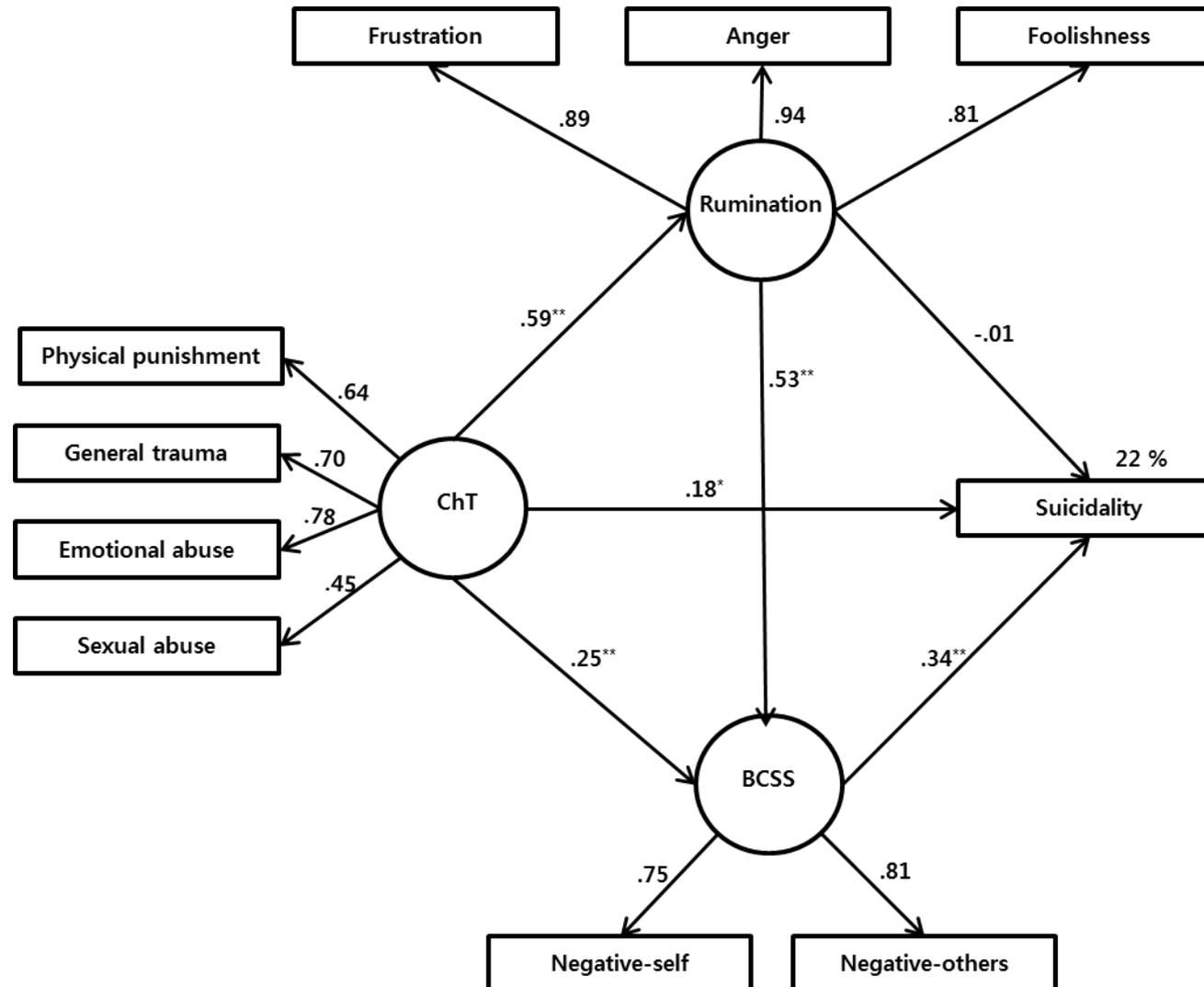
Supplementary Figure 1. Rumination and negative schema as moderators of the association between ChT and suicidality. Structural equation modeling: rectangles represent observed variables; circles, unobserved variables. Numbers by single-headed arrows reflect standardized path efficiency. The percentage values represent the amount of explained variance by predictors. Structural model fit indices: chi-square = 68.35; D.F = 30; CFI = 0.97; TLI = 0.96; RMSEA = 0.07; SRMR = 0.05; p < 0.001. BCSS, Brief Core Schema Scales; ChT, Childhood trauma. * p < 0.05, ** p < 0.01.