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Does negative-self-schema link the relationship between childhood trauma and psychotic symptoms in a community sample of Indonesians?

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Abstract
Childhood trauma is a risk factor that influences the development of psychotic symptoms. Negative-self-schema is a psychological response to trauma, which is known to have impact on psychotic symptoms' level, thus postulated as the underlying mechanism linking childhood trauma and psychotic symptoms together. This research used descriptive and correlational type of research. This study examined whether negative-self-schema mediates childhood trauma and psychotic symptoms, while controlling depressive symptoms as covariates. The study recruited 397 participants from community sample of Indonesians (25.4% male; M_{age} = 22.28, SD = 4.93) and was conducted through online survey. Through mediation analyses, results showed that negative-self-schema significantly mediated the relationship between childhood trauma and both positive (ab = 0.08; SE = 0.04; 95% CI [0.01, 0.17]), and negative (ab = 0.08; SE = 0.03; 95% CI [0.03, 0.14]) symptoms of psychosis. This explains the importance of considering schemas' role in translating the effect of childhood trauma to psychotic symptoms.

Keywords: Childhood trauma, negative-self-schema, psychotic, symptoms

Introduction

Mental health is still a significant health problem in Indonesia. This can be seen from the national baseline health survey (*Riset Kesehatan Dasar*) in 2013 which showed that the prevalence of severe mental disorders, such as schizophrenia, reached around 400,000 people or as many as 1.7 per 1,000 population (Kementrian Kesehatan, 2016). Schizophrenia is a disorder characterized by disturbances in thoughts, emotions, and behaviors (Kring, Johnson, Davison, & Neale, 2014). It is a severe mental disorder that can affect multiple aspects of one's life such as difficulty maintaining work, living independently, even in maintaining close relationships with others (Kring et al., 2014). To be diagnosed as schizophrenia, a person must experience more than one episode of psychosis, along with other symptoms for six months (Association, 2013).

Psychosis is a term used to describe significant impairments in reality testing and alterations in behavior (Organization, 2004). Symptoms of psychosis or what will be referred to as psychotic symptoms, actually may not only occur in those diagnosed with clinical disorders, but may also be experienced by the general population because it occurs on a continuum(Van Os, Linscott, Myin-Germeys, Delespaul, & Krabbendam, 2009). In this study, the authors utilize the community population, which consists of the general population (people who are not diagnosed with clinical disorders) to those who experience clinical disorders.

Psychotic symptoms manifests as positive or negative symptoms (Organization, 2004; van der Steen, 2018). A positive symptom is a collection of symptoms that distory the functioning of an individual (excessive behavior), which includes delusions, hallucinations, and confusion in speaking, thinking, or behaving. Meanwhile, negative symptoms include reduced or loss of normal functions (behavioral deficit), such as limited emotional expression and facial expressions, limited words and fluency in speech, difficulty expressing ideas or thoughts, reduced ability to start something, and reduced socialization and motivation. Psychotic symptoms might be caused by several factors, such as biological, environmental, to social factors. Among these factors, research has found that exposure to environmental stress plays an important role in the emergence and development of psychotic symptoms to psychotic disorders (Van Winkel, Stefanis, & Myin-Germeys, 2008). Environmental stress such as childhood trauma has been identified as a risk factor that has the potential to trigger psychotic symptoms (Varese et al., 2012).

Traumatic experiences are quite common. One third of the world's population has experienced a traumatic experience during his/her lifetime (Varese et al., 2012). Childhood trauma is a term used to refer to a series of negative experiences experienced in childhood that are dangerous and frightening, which include physical, sexual, psychological, and emotional abuse as well as physical and emotional neglect (Larkin & Read, 2008; Mash & Wolfe, 2012). Based on various studies, it was found that childhood trauma impacted on the formation of psychotic symptoms such as auditory hallucinations (Hardy et al., 2016), delusions (Bailey et al., 2018), and negative symptoms (Van Dam et al., 2015). Nevertheless, research on these two variables is less frequent, limited, and still has mixed results.

Self-schema is defined as a cognitive understanding of oneself that comes from past experience to organize and guide the processing of information about oneself in a social context (Markus, 1977). Childhood trauma is thought to contribute to the emergence of negative-self-schema (Freeman & Fowler, 2009). The study further states that the understanding of oneself as bad might have an impact on the formation of negative schemas about other people (consider others unforgiving, rude, etc.). Negative schemas might be predictors of the formation of psychosis due to a decrease in social activities, such as resigning from work and social activities before the occurrence of psychosis (D. G. Fowler et al., 2010).

These findings clarify the mechanism that occurs from the traumatic experience towards the formation of psychotic symptoms although it still provides mixed results. Previous research conducted by (Appiah-Kusi et al., 2017) found that negative-self-schema results in the development of specific psychotic symptoms, namely paranoid ideas with different types of childhood trauma, for example emotional neglect. However, it was found that trauma of sexual violence in childhood associated with paranoia, psychotic symptoms, and self-schema (Freeman & Fowler, 2009), was not replicated in (Appiah-Kusi et al., 2017). On the other hand, there are also findings that found negative-self-schema as the most relevant mediators in bridging social defeat with all psychotic symptoms (Jaya, Ascone, & Lincoln, 2016). This is also supported by cognitive models that further confirm negative view of self as the source of content for positive and negative symptoms (Beck, Himelstein, & Grant, 2017). However until now, the mechanism that specifically explains the occurrence of negative symptoms of psychotic disorders is still lacking (Piskulic et al., 2012).

Following the assumption that negative-self-schema is a mechanism for the development of psychotic symptoms from childhood trauma, we hypothesize that people who had experienced more frequent childhood trauma will score higher on psychotic symptoms through the negative-self-schema. Mediation analyses were conducted to investigate this mechanism. This study will also control depressive symptoms as covariates due to the strong possibility of their effects on psychotic symptoms. This is due to a lot of reporting of psychotic symptoms by individuals diagnosed with the disorder (Wigman et al., 2012). To expand the reach of generalizations, research will be conducted on community populations consisting of adult samples, both people who do not experience it and people who experience clinical disorders, from various socioeconomic and educational backgrounds in Indonesia.

Method

Participants were recruited from November 2018 to January 2019 through online forum and social media as part of the Indonesian Longitudinal Survey on Mental Health and Social Situation. The inclusion criteria were being at least 18 years, fluent in Indonesian, had agreed to the informed consent, filled out the questionnaire completely, passed the seriousness check located at the end of the questionnaire, and had experienced at least one of the childhood trauma (including physical violence, sexual violence, psychological violence, or emotional neglect) before the age of 16. Total participants in this study were 1767 people who filled out the questionnaire, but only 432 participants completed the questionnaire. However, 35 of them were excluded because 3 participants did not pass the seriousness check and 32 participants did not meet the minimum age limit in the study. Thus, there were 397 participants who were included in this study were age before the age of 16. At the end of the study, we provided prizes in the form of 1 hard disk, 2 flash drives, and electronic money (Rp250,000.00; approximately US $20) for 10 lucky participants. Demographic characteristics and average scores of the sample are presented in Table 1.

Table 1 <Participants' Characteristics (n = 397)>

Characteristics	Total Sample (n = 397)	
	n/M	*%/SD*
Age (*M, SD*)	22.28	4.93
Sex (*n, %*)		
Male	101	25.4%
Female	296	74.6%
Highest educational attainment (*n, %*)		
Junior high school	1	0.3%
Senior or vocational high school	268	67.5%
Bachelor's degree	108	27.2%
Master's and doctorate's degree	20	5.0%
Mental health disorder diagnosis (*n, %*)		
Never	228	57.4%
Ever	169	42.6%

This study used four instruments to measure the variables; *Asesmen Komunitas terhadap Pengalaman Psikotik* for psychotic symptoms, self-report instrument translated from the NEMESIS study for childhood trauma, Brief Core Schema Scales for negative-self-schema, and Patient Health Questionnaire-9 for depressive symptoms. Community Assessment of Psychic Experiences (Stefanis et al., 2002), which has been translated into Indonesian by (Jaya, 2017) named as the *Asesmen Komunitas terhadap Pengalaman Psikotik* (AKPP), was used to measure the frequency of experiencing both positive and negative symptoms. There were 20 items about positive symptoms, 14 items about negative symptoms, and 8 items about depressive symptoms (Jaya, 2017) with a 4-point Likert scale (0 = never, 1 = sometimes, 2 = often, and 3 = almost always) in each of the subscale. Higher scores indicated more frequent psychotic symptoms. In this study, we only used the positive and negative symptoms subscales.

AKPP had shown good internal consistency for positive symptom subscales ($\alpha = 0.888$) and negative symptom subscales ($\alpha = 0.890$) (Jaya, 2017). AKPP had also shown good construct validity (CFI = 0.852, RMSEA = 0.055, SRMR = 0.060). We re-tested the AKPP reliability value and obtained the internal reliability coefficient $\alpha = 0.895$ for the positive symptom subscale and $\alpha = 0.897$ for the negative subscale. This indicates that the AKPP had a good reliability index and high internal consistency (Kaplan & Saccuzzo, 2017).

Childhood trauma self-report instrument used in (Jaya, 2017) which has been translated into Indonesian and is based on semi-structured interviews from the NEMESIS study (Janssen et al., 2004) were used to measure the frequency of childhood trauma. The scale consisted of 4 items for participants to answer whether they have experienced emotional, psychological, physical, or sexual neglect before the age of 16 years (yes/no) based on the definition that has been described in the scale. Afterwards, participants will be asked to answer the frequency of each experience based on a 6-point Likert scale (0 = never, 1 = once, 2 = sometimes, 3 = routinely, 4 = often, 5 = very often). Higher scores indicated more frequent childhood trauma. The internal reliability coefficient of the complete scale is $\alpha = 0.598$. This value is an acceptable reliability value, especially if the scale in the measuring instrument has only a few items (Hair, Black, Babin, Anderson, & Tatham, 2006).

Negative-self-schema subscale from Brief Core Schema Scales (BCSS) (D. Fowler et al., 2006), which has been translated into Indonesian in (Jaya et al., 2016), was used to measure negative-self-schema. The negative-self-schema subscale consists of 6 items regarding negative-self-schema with a 5-point Likert scale (0 = no, I do not believe it, 1 = yes, I believe it slightly, 2 = yes, I believe it moderately, 3 = yes, I believe it very much, 4 = yes, I believe it totally). Higher scores indicated more negative-self-schema in participants. Indonesian version of BCSS has been tested for reliability and validity and has shown good internal consistency ($\alpha = 0.936$) for the negative-self-schema subscale. This subscale has good validity (CFI = 0.997, RMSEA = 0.026, SRMR = 0.029) and measurement invariant across participants from Germany, Indonesia, and the United States. The scale had good internal consistency in this study ($\alpha = 0.888$).

Depressive symptoms as the covariates from this study were measured by the Patient Health Questionnaire-9 (PHQ-9) scale by (Kroenke, Spitzer, & Williams, 2001) consisting of 9 items with a 4-point Likert scale (0 = not at all, 1 = several days, 2 = more than half the days, 3 = nearly every day). In this study, we use the Indonesian version that has been used in (Jaya et al., 2016) . Higher scores indicate the more severe depressive symptoms. The PHQ-9 had good internal consistency in this study($\alpha = 0.894$).

The minimum number of samples needed in this study was measured used G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) with a priori power analysis. The statistical analysis technique used is linear multiple regression: fixed model, R2 deviation from zero. This resulted in a minimum sample size of 119 participants. In practice, there were 397 participants whose data were used for analysis. Descriptive analysis and mediation analysis with covariates of depressive symptoms were conducted to analyze the mediating effects of negative-self-schema in the relationship between childhood trauma and psychotic symptoms. In this study, mediation analysis was computed using regression techniques to test the effects of mediation using (Hayes, 2018). The predictor variable was childhood trauma, the outcome variable was psychotic symptoms, and the mediator variable was negative-self-schema. Unstandardized regression coefficient was reported.
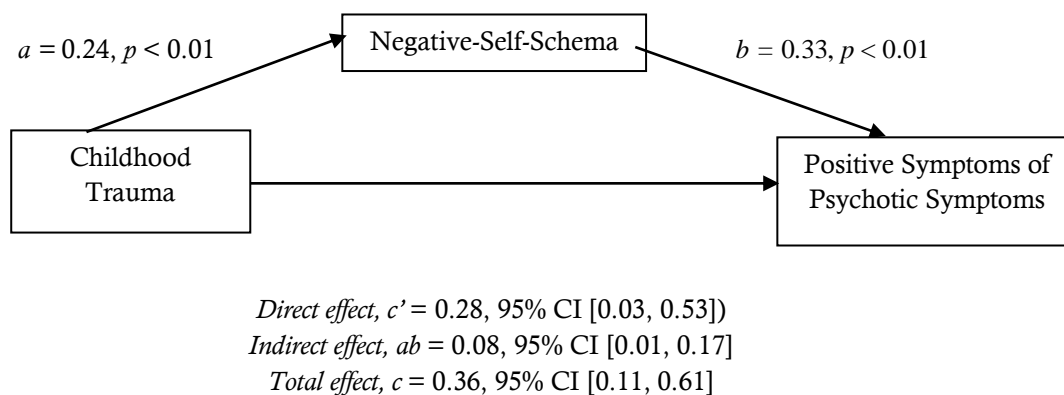
Results and Discussion

The mean, standard deviations, and score range for positive symptoms, negative symptoms, childhood trauma, negative-self-schema, and depressive symptoms are presented in Table 2.

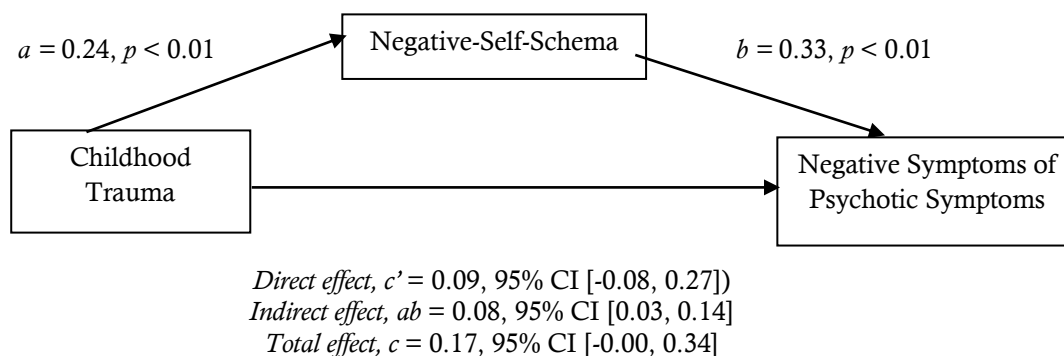| Table 2 <Mean, Standard Deviations, and Score Range of All Variables Measured (n = 397)>			
	M	*SD*	Range
Positive Symptoms	15.74	9.51	0-56
Negative Symptoms	19.17	8.04	0-41
Childhood Trauma	5.21	3.38	1-18
Negative-self-schema	7.60	5.74	0-24
Depressive Symptoms	11.37	6.69	0-27

Based on Figure 1. a significant direct effect was found between childhood trauma and positive symptoms with $c' = 0.28$ (t (390) = 2.19, $SE = 0.13$; 95% CI [0.03, 0.53]). The result of the indirect effect of the first mediation model ($ab = 0.55$; $SE = 0.09$; 95% CI [0.38, 0.75]) was found to be significant. When

depressive symptoms ($d = 0.53$, $p<0.001$) were entered as covariate for the positive symptoms, significant indirect effect was found in this model($ab = 0.08$; $SE = 0.04$; 95% CI [0.01, 0.17]). The total effect of this model was significant ($c = 0.36$, $t(392) = 2.80$, $SE = 0.13$; 95% CI [0.11, 0.61]).

$a = 0.24$, $p < 0.01$ Negative-Self-Schema $b = 0.33$, $p < 0.01$

Childhood Trauma   Positive Symptoms of Psychotic Symptoms

Direct effect, c' = 0.28, 95% CI [0.03, 0.53])
Indirect effect, ab = 0.08, 95% CI [0.01, 0.17]
Total effect, c = 0.36, 95% CI [0.11, 0.61]

Figure 1. Mediation model analysis of negative-self-schema to the relationship of childhood traumatic experiences and positive symptoms using depressive symptoms as covariates.

In the second mediation model, no significant direct effect was found between childhood trauma and negative symptoms with $c' = 0.09$ ($t(390) = 1.08$, $SE = 0.09$; 95% CI [-0, 08, 0.27]). The result of the indirect effect of the second mediation model was significant ($ab = 0.63$; $SE = 0.08$; 95% CI [0.48, 0.79]). When we entered depressive symptoms ($d = 0.66$, $p<0.001$) as a covariate for negative symptoms, a significant indirect effect was found in this model ($ab = 0.08$; $SE = 0.03$; 95% CI [0.03, 0.14]). The total effect of this mediation model was not significant ($c = 0.17$, t(392) = 1.94, $SE = 0.09$; 95% CI [-0.00, 0.34]). Figure 2 shows the second mediation model.

$a = 0.24$, $p < 0.01$ Negative-Self-Schema $b = 0.33$, $p < 0.01$

Childhood Trauma   Negative Symptoms of Psychotic Symptoms

Direct effect, c' = 0.09, 95% CI [-0.08, 0.27])
Indirect effect, ab = 0.08, 95% CI [0.03, 0.14]
Total effect, c = 0.17, 95% CI [-0.00, 0.34]

Figure 2. Mediation model analysis of negative-self-schema to the relationship of childhood traumatic experiences and negative symptoms using depressive symptoms as covariates.

The results of additional analyzes were conducted to see the relationship between each type of childhood trauma with psychotic symptoms through negative-self-schema as a mediator. By taking depressive symptoms as covariates into account, a significant mediating model was found between emotional neglect ($ab = 0.16$; $SE = 0.08$; 95% CI [0.02, 0.34]), psychological violence($ab = 0.15$; $SE = 0.08$; 95% CI [0.03, 0.35]), and physical violence ($ab = 0.17$; $SE = 0.09$; 95% CI [0.03, 0.39]) with negative-self-schema acted as the mediator for the relationship of each variable with positive symptoms. In the second mediation model, significant results were found between emotional neglect ($ab = 0.14$; $SE = 0.06$; 95% CI [0.03, 0.28]), psychological violence ($ab = 0.14$; $SE = 0.07$; 95% CI [0.04, 0.29]), and physical violence ($ab = 0.18$; $SE = 0.08$; 95% CI [0.04, 0.35]), with negative symptoms that were mediated by negative-self-schema.

Based on the analysis, it was found that the results support the hypothesis in which the negative-self-schema acted as a mediator for the relationship between childhood trauma and psychotic symptoms, with

and without controlling for depressive symptoms. These results indicate that childhood trauma might urge negative thoughts about self which in turn lead to excessive suspicion of others and cause psychotic symptoms such as paranoia, delusions, and social withdrawal. Negative-self-schema is very closely related to withdrawal from social contact, because of the thought that oneself is weak and powerless, paranoid thoughts arise (Freeman, 2007).

We found that only positive symptoms have a significant direct relationship with childhood trauma. The finding was possibly caused by flashes of past memory or symbolic representations of unpleasant memories when seeing or experiencing things that could trigger memories of negative events that have been experienced in the past (Read, van Os, Morrison, & Ross, 2005). Therefore, it is possible that the relationship between these two variables might occur even without the effect of mediator variables. In relation to negative symptoms, the insignificant results in the direct relationship between childhood trauma and negative symptoms support the findings of (Dominguez, Saka, Lieb, Wittchen, & van Os, 2010) that also examined the relationship between the two variables in community sample. This is expected to occur because the emergence of positive symptoms was suspected to be associated with environmental risk factors, such as childhood trauma (Dominguez et al., 2010). Meanwhile, the appearance of negative symptoms was more frequently found to be associated with developmental disorders, such as problems related to brain development (Kirkpatrick, Buchanan, Ross, & Carpenter, 2001) or neurocognitive disorders (Domininguez, Viechtbauer, Simons, van Os, & Krabbendam, 2009). The interesting fact from this finding is the similarity of the results compared to the population of other countries, which also shows significant relationship of childhood trauma with psychotic symptoms (Varese et al., 2012). These results indicate that negative-self-schema and childhood trauma as social factors are suspected to be highly correlated with patterns of community interaction, and are not bound by cultural and demographic influences.

The insignificant result of sexual violence in childhood with psychotic symptoms is most likely due to the low number of sexual violence cases reported by participants in terms of frequency. This leads to low variance on this variable, and thus possibly induces a floor effect. Therefore, neither direct correlation nor the mediation model were significant in terms of its relationship with psychotic symptoms. This difference might also be explained by the possibility of other mechanisms that might explain better the relationship between sexual violence and psychotic symptoms, for example the adaptation of maladaptive affect regulation strategies such as increased sensitivity to stress (Gibson et al., 2014), hyperarousal, avoidance, and numbing (Alsawy, Wood, Taylor, & Morrison, 2015).

There are several limitations found in this study. First, online data retrieval forms can limit research participants, e.g. only those who have internet access that could participate. Therefore, it might influence the variability of research participants. In addition, the characteristics of the participants tended to be dominated by individuals who had experienced less frequent violence in childhood. Thus, stronger research results might be found if the study sample came from those who experienced more frequent childhood trauma, particularly in relation to sexual violence. Second, the instrument used to measure childhood trauma has not shown high reliability index, although it is sufficient and acceptable to be used. This is presumably due to the nature of the item that asks only one question for each type of the childhood trauma. Although in general, the form of such items is commonly used, further research might consider the use of other instruments that are not only based on self-report, for example by conducting structured interviews by psychologists.

In addition, there are possible biases such as misremembering the frequency of traumatic experienced during childhood or social desirability in answering the childhood trauma scale. This might result in lower reporting of violence experienced in the past compared to the fact due to the feeling of shame. Therefore, further caution is needed in interpreting these results even though the reporting of childhood trauma has proven to be stable over the long term (Dvir, Denietolis, & Frazier, 2013). Third, due to cross-sectional study design, the results may only act as a general explanation for people with psychotic symptoms and cannot be generalized to the individual level. Finally, it is still unknown whether the age of onset in childhood trauma plays a role in influencing the appearance of psychotic symptoms or not.

Conclusion

This study aims to examine whether negative-self-schema mediate the relationship between childhood trauma with psychotic symptoms, both positive symptoms and negative symptoms. Based on the findings, it was found that childhood trauma has a negative impact on self-schema, which leads to negative-self-schema that triggers the occurrence of psychotic symptoms, both positive and negative symptoms. Thus, the more negative a person's self-schemais, the more frequent positive symptoms and negative symptoms may be experienced. The main results and analysis underline that negative-self-schema mediate the relationship between childhood trauma with positive symptoms and negative symptoms. Further research might be carried out using additional instruments, such as interviews, or the use of Adverse Childhood Experiences, as it is able to identify a large number of negative experiences in childhood (violence and household dysfunction). In terms of data collection, further research can target the distribution of specific questionnaires to a population of people who have experienced childhood trauma to obtain stronger and more accurate research results. In addition, subsequent studies might use the longitudinal study design to gain a deeper understanding of the development of positive and negative symptoms over time. Efforts to determine the effect of age of onset in childhood trauma to obtain specific findings may also be done. From a practical point of view, the results of the study show that childhood trauma might influence the emergence of psychotic symptoms in the future through a negative-self-schema. This shows the importance of conducting violence prevention programs for children as early as possible on families, especially through psychoeducation for parents about proper parenting and the negative impact of violence, both physical and emotional that may occur. In addition, this study also shows the importance of childhood trauma screening that has been experienced by patients. Finally, emphasizing cognitive techniques that target directly to the negative-self-schema during the therapy process for psychotic symptoms in a manualized therapy such as Cognitive Behavioral Therapy for Psychosis may be beneficial.

Acknowledgment

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