



# Development of the Delusional Interpretation Scale and examination of related variables

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## Abstract

**Aim:** Delusions are a common symptom in schizophrenia. Some scales have been developed to measure delusional tendencies in healthy people, and nonpathological delusional thinking can occur even among these individuals. The existing scales measure the presence and frequency of delusional thoughts, distress levels, and confidence levels. However, these scales are limited because they do not consider the context of the delusions (i.e., where, with whom, and when). In this study, we developed a new scale that presents detailed scenes using illustrations and sentences and measures the tendency toward delusional interpretations.

**Methods:** Factor analysis was conducted to confirm the factor structure of the new scale. To examine the validity of the scale, we analyzed the correlations between delusional tendencies and related variables and verified the consistency between the current scale and previously developed tools.

**Results:** Factor analysis confirmed that the new scale has a two-factor structure, including “internal attribution and paranoid tendency” and “external attribution tendency.” The new scale was found to have acceptable reliability and validity. The internal attribution and paranoid tendency factor was negatively correlated with self-esteem and decentering. Furthermore, the internal attribution and paranoid tendency factor showed a moderate positive correlation with depressive state and anxiety tendency and a very weak positive correlation with experiences of bullying or harassment.

**Conclusion:** The correlations between the new scale and related variables confirmed the construct validity and replicated the results reported in previous studies. This new scale enables the measurement of delusional tendencies in healthy subjects based on the social context.

## KEYWORDS

delusion, internal attribution, paranoid thinking

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## INTRODUCTION

Delusions are defined as “fixed beliefs that are not amenable to change in light of conflicting evidence.”<sup>1</sup> Schizophrenia is a psychiatric disorder that is widely known to include delusions among its symptoms; specifically, in schizophrenia, delusions are one of the positive symptoms.<sup>2</sup> While research is being conducted to elucidate the biological basis and pathophysiology of psychiatric disorders,<sup>3,4</sup> studies have also examined the factors and mechanisms that increase delusional interpretations. For example, projective attribution bias, self-targeting bias, and hasty conclusion bias are known to be barriers to reasoning and may generate delusions.<sup>5</sup> Regarding the associations between delusional tendencies and other variables, both studies with healthy subjects and with patients have reported a relationship between self-esteem and paranoid thinking.<sup>6–8</sup> Clinical delusional tendencies have also been found to be associated with bullying experiences<sup>9,10</sup> as well as depressive state and anxiety.<sup>10,11</sup> Since metacognitive interventions are sometimes used to deal with delusions in patients with schizophrenia,<sup>12</sup> metacognitive abilities may also be related to delusional interpretations. In fact, self-focus, which is closely related to metacognition, has been reported to be associated with paranoid thinking in healthy individuals.<sup>13</sup>

Unless an individual confesses delusional thoughts or cognitions to others or acts on these thoughts or cognitions, it is impossible to know whether an individual has delusional symptoms. Mild delusions occur not only in patients with psychiatric disorders but also in healthy subjects.<sup>14</sup> The degree of distress, mental occupation, and conviction of delusions are lower among healthy people than among patients with psychiatric disorders with delusional symptoms. However, the distribution of delusional experiences among healthy subjects is wide and overlaps with that of patients.<sup>15</sup> A study in Japan found that many healthy university students experience ideation similar to delusions; the proportion of students with such cognitions was higher than the frequency expected by psychiatrists.<sup>16</sup> Previous research has also found that paranoid thinking is hierarchical, ranging from pathological (e.g., severe threat) to relatively mild (e.g., ideas of reference and social evaluative concerns).<sup>17</sup>

Furthermore, there exist views that classify delusions as categories. For example, Jaspers<sup>18</sup> proposes primary and secondary delusions. Primary delusions, also called genuine delusions, are out of the ordinary and unintelligible, and this type of delusion is common in patients with schizophrenia. However, secondary delusions are delusions induced by a person's emotions or environment and are of the second-order occurrence type, meaning that they are, to some extent, understandable.

Many tools have been used to measure delusional tendencies among healthy subjects,<sup>15,16,19</sup> and several studies have examined these tools. Most of the scales that measure delusional tendencies present examples of delusions (e.g., feeling that everyone is talking bad about you) and ask about the presence or absence of delusions, frequency of delusions, degree of distress, and degree of certainty. Thus, existing scales do not consider the context of the social situation, such as other people or the situation. However, paranoid

thinking is a part of social cognitive abilities<sup>14</sup> and occurs in situations where there are other people. Therefore, it is important to measure delusional tendencies while considering the context, other people, the environment, and so on, that led up to the situation in question. It has been pointed out that questionnaire surveys cannot reveal whether the evaluated persecution experiences are unfounded, and some studies have used virtual reality (VR) to present scenes.<sup>20</sup> However, using VR equipment to measure delusional tendencies is more difficult than clarifying the context, partner, environment, and so on, leading up to the scene in a questionnaire.

In this study, we developed a new scale that uses the scene-assumption method to measure delusional tendencies by presenting detailed information about the relationship with other people and the scene's setting. In this study, to present scenes in more detail, scenes were presented using illustrations in addition to sentences. To examine the scale's validity, we analyzed the relationships between the scale and self-esteem, depressed mood, anxiety, past experiences of being bullied or harassed, and decentering, one of the metacognitive abilities (note that the decentering discussed in this paper is different from Piaget's decentering). We also investigated whether the results were consistent with those of existing scales.

## METHOD

### Subject

This study was conducted in two parts. Study 1 included 228 students attending Japanese universities or technical schools (89 males, 137 females, and two others). The mean age was 20.8 years ( $SD = 1.75$  years). Study 2 included 147 people aged 18 years and older (59 males, 86 females, and two individuals who did not specify their gender). The mean age was 22.79 years ( $SD = 2.41$  years). In Study 2, which was not limited to students, 70 participants were students, and 68 were company employees or civil servants. In both studies, subjects had to meet age requirements and had to be able to answer the questionnaire in Japanese. We set no exclusion criteria for mental disorders.

### Measurements

In Study 1, we developed the novel Delusional Interpretation Scale to measure delusional interpretations. This 27-item, 7-point tool was developed based on previous studies.<sup>15,16,19,21,22</sup> First, we collected situations that could evoke paranoid thinking based on items from existing scales. Then, we narrowed down the list to topics that seemed to apply to healthy subjects and selected 12 items. Next, we interviewed the healthy participants using the 12 items: we asked whether they had ever had such experiences, asked them to describe the situation (time, place, relationship with the other person, etc.), and asked them to describe why they thought they had had this experience. In addition to the 12 items, we asked participants to



report any other episodes of paranoid thinking. Based on the information collected from the interview, the first author, the fourth author, and several university students majoring in clinical psychology discussed the results. After examining content validity<sup>23-25</sup> (such as relevance [whether the question items are relevant to the area of interest], comprehensiveness [whether the constructs are present], and clarity), nine scenes were finally selected. In this scale, three attributional interpretations (i.e., "it is my fault," "it is the other person's or situation's fault," or "it is the other person's malice") were provided for each of the nine situations (e.g., "my friend is playing with his/her phone during a conversation"), and participants were asked to report the extent to which each attributional interpretation applied to the situation. Additionally, we attempted to make it easier for the participants to envision the situation by clearly stating the relationship with the other person (e.g., a friend who you just met) and the setting (e.g., having tea alone for the first time together) and by providing illustrations.

In Study 2, the Delusional Interpretation Scale was used to measure the tendency toward delusional interpretation, as in Study 1. The Delusional Interpretation Scale used in Study 1 was intended for students, and therefore, the situations presented were similar to those that students might encounter in their daily lives, such as at school or at their part-time jobs. In Study 2, we modified some instructions to broaden the target group and made slight modifications to make it easier for nonstudents to answer the questions. Additionally, we assessed anxiety, depressed mood, self-esteem, experiences of being bullied or harassed, and decentering as factors that could be related to the tendency toward delusional interpretation. The K6<sup>26,27</sup> was used to measure anxious-depressive tendencies; the K6 is a 6-item, 5-point scale, with higher scores indicating more severe depressive and anxious tendencies. The K6 was initially introduced as a general distress screening measure regardless of diagnosis for adults with "serious mental illness."<sup>26</sup> However, recent large-scale studies<sup>28</sup> have identified that clinically significant distress and treatment need cutoff scores and have reported that the K6 is also clinically valuable as a brief comprehensive screening for anxiety and depression. Thus, it was used in this study as a comprehensive screening tool for anxiety and depression. The Self-esteem Scale<sup>29,30</sup> was used to measure self-esteem. This scale is a 10-item, 5-point scale, with higher scores indicating stronger self-esteem. Experiences of being bullied or harassed were assessed by asking participants about the presence or absence of victimization experiences, such as being ostracized by peers or being talked about behind their back. The Experiences Questionnaire<sup>31,32</sup> was used to measure decentering. The questionnaire was a 15-item, 5-point scale with a two-factor structure consisting of a decentering factor and a rumination factor. Higher scores indicate stronger tendencies toward each factor.

## Statistical analysis

We used SPSS Ver. 28 (IBM, USA) for analysis. The significance level was set to 0.05. Factor analysis was conducted to confirm the factor

structure, and Pearson's product moment correlation analysis was performed to examine the relationships between each variable. The presence or absence of bullying or harassment experiences was dummy coded, with presence = 1 and absence = 0.

## Ethical considerations

The participants answered the surveys anonymously, and we clearly stated at the beginning of the survey form that respondents could withdraw from the study at any time, that their answers would be processed by computer, and that they would not be personally identified. Study 1 was conducted in compliance with the Ethical Review Checklist for Humanities and Social Sciences Research by Undergraduate Students of Ochanomizu University, and Study 2 was reviewed and approved by the Humanities and Social Sciences Research Ethics Committee of Ochanomizu University.

## RESULTS

The mean total score on the Delusional Interpretation Scale was 107.4 ( $SD = 16.3$ ) (Table 1). We conducted exploratory factor analysis on the 27 items and used the maximum likelihood method. We then performed promax rotation because we assumed that there was a correlation between the factors (Table 2). A two-factor structure was determined to be optimal based on eigenvalue attenuation and interpretability.

The items that loaded heavily on Factor I included items interpreted as "because I did something to offend the other person" or "because of malice toward me" in response to the other person's behavior. These interpretations can be characterized as having strong internal attributional tendencies and paranoid thinking. Therefore, we named Factor I the "internal attribution and paranoid tendency factor." Factor II, which had a large loading, included items that were interpreted as the reason for the partner's behavior, such as because of the partner's personality or habits. These interpretations can be characterized as external attributions. Therefore, we named Factor II the "external attribution tendency factor."

We used the sum of the scores of the subscale items as the scale scores in our analysis. The reliability coefficient of the internal attribution and paranoid tendency factor was  $\alpha = 0.88$ , and that of the external attribution tendency factor was  $\alpha = 0.80$  (Table 2). Thus, the reliability of the scale was confirmed to be adequate.

We calculated correlation coefficients to assess the associations of depressive and anxious tendencies, self-esteem, past traumatic experiences, and decentering with the internal attribution and paranoid tendency factor (Table 3). The internal attribution and paranoid tendency factor showed weak negative correlations with self-esteem and decentering ( $r = -0.28$ ,  $p = 5.24 \times 10^{-4}$ , and  $r = -0.21$ ,  $p = 1.01 \times 10^{-2}$ , respectively). Furthermore, the internal attribution and paranoid tendency factor showed a moderate positive correlation with depressive and anxious tendencies ( $r = 0.43$ ,  $p = 6.50 \times 10^{-8}$ )

**TABLE 1** Mean and standard deviation for each item.

Items	Mean (SD)
1. The other person clacks his/her pen.	
(1) Because I made him/her uncomfortable	2.61 (1.69)
(2) Because of the personality and quirks of the other person <sup>a</sup>	5.91 (1.16)
(3) The other party is trying to harass me	2.49 (1.58)
2. The other person is fiddling with his/her phone during the conversation.	
(1) Because my story is boring or lacks charm	4.72 (1.72)
(2) Because of the personality and quirks of the other person <sup>a</sup>	5.10 (1.52)
(3) The other person is sending/posting bad things about me	1.98 (1.26)
3. I said hello and got no response.	
(1) Because I did something that made him/her uncomfortable	3.67 (1.87)
(2) Because of the other party's personality or situation <sup>a</sup>	5.33 (1.46)
(3) Maybe the other person was mean and ignored me	2.84 (1.63)
4. The other person is listening to me with his/her arms crossed.	
(1) Because I am saying something wrong	2.34 (1.37)
(2) Because of the personality and quirks of the other person <sup>a</sup>	5.98 (1.15)
(3) The other party may be disrespecting me	2.33 (1.50)
5. The other person is more than 1 h late for an appointment	
(1) Because he/she doesn't feel comfortable meeting with me.	2.72 (1.70)
(2) Because of the other person's personality or situation <sup>a</sup>	6.01 (1.13)
(3) The other person is trying to shirk his/her promise to me	2.76 (1.67)
6. Complaints about someone are posted on social networking sites.	
(1) Because I did something that made him/her uncomfortable	4.52 (1.76)
(2) Because of the other person's personality or situation <sup>a</sup>	4.86 (1.63)
(3) He/she may have posted this as a snide remark to me.	4.64 (1.67)
7. The other person is shaking his/her leg.	
(1) Because I did something that made him/her uncomfortable	3.04 (1.69)
(2) Because of the personality and quirks of the other person <sup>a</sup>	6.24 (1.03)
(3) Maybe he/she is doing it on purpose out of malice toward me.	2.26 (1.31)

**TABLE 1** (Continued)

Items	Mean (SD)
8. The other person does not make eye contact with me during the dinner.	
(1) Because I did something that made him/her uncomfortable	3.33 (1.80)
(2) Because of the personality and quirks of the other person <sup>a</sup>	5.52 (1.49)
(3) Because the other person is hiding or attempting to hide something bad	2.55 (1.54)
9. I walk into a room and everyone is suddenly quiet.	
(1) Because of my own inappropriate behavior.	4.94 (1.72)
(2) Because of their personalities and circumstances <sup>a</sup>	4.31 (1.76)
(3) They may have been bad-mouthing me.	4.40 (1.91)
Total	107.4 (16.26)

<sup>a</sup>External attribution tendency factor. Items without a symbol loaded onto the internal attribution and paranoid tendency factor.

and a very weak positive correlation with victimization experiences ( $r = 0.18, p = 3.67 \times 10^{-2}$ ).

## DISCUSSION

In this study, we developed a new scale that presents scenes using illustrations, clearly states the scene setting, and clarifies the relationship with other people. Using this scale, we examined the relationship between delusional tendencies and various variables. Factor analysis revealed that the Delusional Interpretation Scale had a two-factor structure. Each factor was found to be sufficiently reliable. The internal attribution and paranoid tendency factor was negatively correlated with both self-esteem and decentering. Furthermore, this factor showed a moderate positive correlation with depressed mood and anxiety and a very weak positive correlation with experiences of bullying or harassment. These correlations confirmed construct validity of the Delusional Interpretation Scale and replicated the results of existing scales.

The Delusional Interpretation Scale, which includes the internal attribution and paranoid tendency factor and the external attribution factor, was found to have acceptable reliability and validity. This scale assesses the extent to which each of three attributions applies to a particular situation. The "my fault" interpretation includes thoughts such as "I wonder if it is because I made the other person uncomfortable" and "I wonder if it is because I acted inappropriately." These interpretations can be characterized as internal attributions, that is, attributing the other person's behavior to oneself. Interpreting the other person's behavior as malicious is a paranoid interpretation, and the tendency toward internal attribution and paranoid thinking were concentrated on the same factor. Schizophrenia is a psychiatric disorder in which delusions are a major symptom.<sup>2</sup> Studies that

**TABLE 2** Results of the Delusional Interpretation Scale factor analysis (maximum likelihood method and promax rotation).

Items	I	II
<b>I. Internal attribution and paranoid tendency (<math>\alpha = 0.884</math>)</b>		
6-1:Complaints about someone are posted on social networking sites. –Because I did something that made him/her uncomfortable	<b>0.742</b>	0.236
6-3:Complaints about someone are posted on social networking sites. –He/she may have posted this as a snide remark to me	<b>0.741</b>	0.215
3-1:I said hello and got no response. –Because I did something that made him/her uncomfortable	<b>0.623</b>	0.007
3-3:I said hello and got no response. –Maybe the other person was mean and ignored me	<b>0.606</b>	0.038
9-1:I walk into a room and everyone is suddenly quiet –Because of my own inappropriate behavior	<b>0.585</b>	0.137
7-1:The other person is shaking his/her leg. –Because I did something that made him/her uncomfortable	<b>0.577</b>	–0.157
8-1:The other person does not make eye contact with me during the dinner –Because I did something that made him/her uncomfortable	<b>0.574</b>	–0.063
9-3:I walk into a room and everyone is suddenly quiet –They may have been bad-mouthing me	<b>0.555</b>	0.089
7-3:The other person is shaking his/her leg. –Maybe he/she is doing it on purpose out of malice toward me	<b>0.552</b>	–0.139
4-3:The other person is listening to me with his/her arms crossed –Because I am saying something wrong	<b>0.527</b>	–0.105
2-3:The other person is fiddling with his/her phone during the conversation –The other person is sending/posting bad things about me	<b>0.504</b>	–0.124
4-1 The other person is listening to me with his/her arms crossed –Because I am saying something wrong	<b>0.476</b>	–0.179
5-1:The other person is more than 1 h late for an appointment –Because he/she doesn't feel comfortable meeting with me.	<b>0.474</b>	–0.075
1-3:The other person clacks his/her pen –The other party is trying to harass me	<b>0.457</b>	–0.119
1-1:The other person clacks his/her pen –Because I made him/her uncomfortable	<b>0.422</b>	–0.180
8-3:The other person does not make eye contact with me during the dinner –Because the other person is hiding or attempting to hide something bad	<b>0.418</b>	–0.052
2-1:The other person is fiddling with his/her phone during the conversation –Because my story is boring or lacks charm	<b>0.389</b>	0.042

**TABLE 2** (Continued)

Items	I	II
5-3:The other person is more than 1 h late for an appointment –The other person is trying to shirk his promise to me	<b>0.378</b>	0.002
<b>II. External attribution tendency (<math>\alpha = 0.800</math>)</b>		
4-2:The other person is listening to me with his/her arms crossed –Because of his/her personality and quirks	0.067	<b>0.714</b>
7-2:The other person is shaking his/her leg. –Because of the personality and quirks of the other person	0.018	<b>0.665</b>
5-2:The other person is more than 1 h late for an appointment –Because of the other person's personality or situation	0.119	<b>0.626</b>
3-2:I said hello and got no response. – Because of the other party's personality or situation	–0.066	<b>0.545</b>
1-2:The other person clacks his/her pen –Because of the personality and quirks of the other person	–0.088	<b>0.519</b>
2-2:The other person is fiddling with his/her phone during the conversation –Because of the personality and quirks of the other person	0.090	<b>0.504</b>
8-2:The other person does not make eye contact with me during the dinner –Because of the personality and quirks of the other person	–0.011	<b>0.503</b>
6-2:Complaints about someone are posted on social networking sites. – Because of the other person's personality or situation	–0.084	<b>0.353</b>
9-2:I walk into a room and everyone is suddenly quiet –Because of their personalities and circumstances	–0.194	<b>0.307</b>
Interfactor correlation		–0.358

**TABLE 3** Correlation between the internal attribution and paranoid tendency factor and related variables.

	<i>r</i>	<i>p</i> value
Self-esteem <sup>a</sup>	–0.283	$5.24 \times 10^{-4}$
Decentering <sup>b</sup>	–0.212	$1.01 \times 10^{-2}$
Depression/anxiety <sup>c</sup>	0.428	$6.50 \times 10^{-8}$
Experiences of being bullied or harassed <sup>d</sup>	0.179	$3.67 \times 10^{-2}$

Note: Raw *p* value was shown.

<sup>a</sup>Self-esteem was assessed using the Self-esteem Scale.

<sup>b</sup>Decentering was assessed using the decentering score from the Experiences Questionnaire

<sup>c</sup>Depression/anxiety was assessed using the K6.

<sup>d</sup>The experience of being bullied or harassed was estimated by asking whether or not the respondent had experienced victimization, with the dummy variable set to 1 if yes and 0 if no.

investigated attributional tendencies in patients with schizophrenia have found that patients have a strong tendency toward external attribution.<sup>33,34</sup> The results of the factor analysis in this study contradict the results of previous research. This inconsistency may be because what was treated as “delusional thinking” in this study is a secondary delusion and also due to the characteristics of the sample. A secondary delusion is a concept proposed by Jaspers<sup>18</sup> in conjunction with primary delusions. Primary delusions, also known as genuine delusions, are delusions that are out of the ordinary and unintelligible; this type of delusion is common in patients with schizophrenia. However, secondary delusions, also called delusional ideations, are delusions that are induced by a person's emotions and environment and are secondarily generated, meaning that they can be understood to some extent. Therefore, the delusions treated in this study differ from those commonly seen in schizophrenia, which could have resulted in findings inconsistent with previous studies. Participants in this study were general students (Study 1) and a general sample aged 18 years and older (Study 2). The K6 score in this study was 8.06 ( $SD = 5.25$ ), which is lower than the cutoff score of 10 that indicated clinically significant distress and need for treatment in the previous study.<sup>28</sup> These sample characteristics also likely led to inconsistencies with the findings of studies in patients with schizophrenia.

“The external attribution tendency factor” was negatively correlated with the “internal attribution factor and the paranoid tendency factor.” The items included in this study as external attribution tendency factors were all “external situation attribution” items. We set up this item as an attribution of “the other person has their own circumstances” as opposed to an attribution of self-blame. Therefore, although this item is an external attribution, it is an attribution style that can be appropriately attributed to the environment or situation, rather than blame others in an other-punitive way. In other words, being able to attribute to external circumstances to an appropriate degree may be associated with a tendency to be less delusional.

Correlation analysis showed that the internal attribution and paranoid tendency factor was weakly negatively correlated with self-esteem and decentering. This suggests that people with higher self-esteem and those who are more likely to engage in decentering are less likely to experience paranoid thinking. The relationship between self-esteem and paranoid thinking has been discussed since the 1970s<sup>6</sup> and has been reported in numerous studies.<sup>7,8</sup> The results of the present study support this relationship. Recently, cognitive interventions, such as metacognitive training, have been used as interventions for patients' delusions in patients with schizophrenia. These interventions are based on the claim that metacognition, including the acquisition of another person's perspective, is necessary to overcome patients' delusions.<sup>12,35,36</sup> Decentering, which is a metacognitive ability, is a state in which thoughts and emotions are recognized as temporary events that occur in the mind.<sup>37</sup> Decentering has been thought to play an important role in mental health.<sup>38</sup> Consistent with previous studies, the results of the present study suggest that improving metacognition leads to a reduction in

delusional interpretations. Previous studies of metacognitive training in healthy subjects have also reported that training reduced participants' increased anxiety and improved their self-esteem.<sup>39</sup> The relationship between self-esteem and delusional tendencies has already been confirmed in both patients and healthy subjects,<sup>7,8,13,40</sup> and the present study supports this. It is possible that interventions aimed at enhancing both metacognition and self-esteem may be useful in overcoming delusional interpretations.

Furthermore, the internal attribution and paranoid tendency factor was positively correlated with depressive and anxious tendencies as well as with experiences of being bullied or harassed. This suggests that people who tend to be depressed or anxious are more likely to experience paranoid thinking. There have been numerous studies on the association between depressed mood and paranoid thinking in both healthy subjects and patients,<sup>11,13,41,42</sup> and the results of the present study support this association. Additionally, it was found that those who had experiences of harassment or bullying were more likely to experience paranoid thinking. Previous studies have reported that negative social experiences, such as being bullied, lead to paranoid experiences,<sup>9,10</sup> and the results of the present study support this finding. Regarding the association between persecution experiences and delusions, it has been suggested that the experience of being persecuted may induce delusions, while patients with persecutory delusions may selectively focus their attention on information about threats, which may promote delusional ideation.<sup>43</sup> Since the current study did not examine causal relationships, the results should be interpreted with caution.

## LIMITATIONS

This study used a one-shot design and does not address causal relations. Furthermore, only construct validity could be measured herein; convergent validity was not assessed herein but should be examined in future studies. Furthermore, the internal and external attributions addressed in this study were only external situational and internal personal attributions. In future studies, we expect to develop a scale that includes internal situational and external personal attribution. The subjects in the present study answer how they would feel in imagined situations. In many psychological experiments, subjects imagining a situation and those brought into the actual situation show different responses. The experimental method used in this study, the scene-assumption method, also has limitations.

## CONCLUSION

In this study, the Delusional Interpretation Scale was developed to measure delusional tendencies among healthy subjects. To control stimuli in the scene-assumption method, the scene setting and the relationships among characters were specified in the presented scenes, and scenes were visually presented using illustrations.

The results of factor analysis and correlation analysis confirmed the reliability and validity of the scale. This scale enables the measurement of delusional tendencies in healthy subjects based on the social context.

#### AUTHOR CONTRIBUTIONS

Satsuki Ito collected the data, performed statistical analyses and wrote the manuscript. Keiichiro Ishimaru supervised conceptualization and supported data collection, statistical analysis, and manuscript writing. Junya Matsumoto and Ryota Hashimoto supervised manuscript writing and statistical analysis. All authors approved the final draft and agreed with the submission to this journal.

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#### CONFLICT OF INTEREST STATEMENT

N/A.

#### DATA AVAILABILITY STATEMENT

Research data are not shared. The participants did not consent for their data to be made publicly available.

#### ETHICS APPROVAL STATEMENT

Study 1 was conducted in compliance with the Ochanomizu University Ethics Review Checklist for Humanities and Social Sciences Research by Undergraduate Students (primarily for thesis research). Study 2 was reviewed and approved by the Humanities and Social Sciences Research Ethics Committee of Ochanomizu University (Approval No. 2020-96).

#### PATIENT CONSENT STATEMENT

At the beginning of the questionnaire form, it was clearly stated that respondents could withdraw their answers at any time, that the answers would be processed by computer, and that participants would not be identifiable.

#### CLINICAL TRIAL REGISTRATION

N/A.

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#### REFERENCES

- American Psychiatric Association, DSM-5 Task Force. Diagnostic and statistical manual of mental disorders: DSM-5™ (5th ed.). Washington, DC. 2013.
- Onitsuka T, Hirano Y, Nakazawa T, Ichihashi K, Miura K, Inada K, et al. Toward recovery in schizophrenia: current concepts, findings, and future research directions. *Psychiatry Clin Neurosci.* 2022;76(7):282–91.
- Wolf A, Ueda K, Hirano Y. Recent updates of eye movement abnormalities in patients with schizophrenia: a scoping review. *Psychiatry Clin Neurosci.* 2021;75(3):82–100.
- Hashimoto R. Do eye movement abnormalities in schizophrenia cause Praeox Gefühl? *Psychiatry Clin Neurosci.* 2021;75(3):79–80.
- Garety PA, Freeman D. Cognitive approaches to delusions: a critical review of theories and evidence. *Br J Clin Psychol.* 1999;38(2):113–54.
- Roskin G, Rabiner CJ, Blum MH, Oliver H. Three types of paranoid processes. *Dis Nerv Sys.* 1977;38(4):269–71.
- Valiente C, Cantero D, Sánchez Á, Provencio M, Wickham S. Self-esteem and evaluative beliefs in paranoia. *J Behav Ther Exp Psychiatry.* 2014;45(2):297–302.
- Kesting ML, Lincoln TM. The relevance of self-esteem and self-schemas to persecutory delusions: a systematic review. *Compr Psychiatry.* 2013;54(7):766–89.
- Lataster T, van Os J, Drukker M, Henquet C, Feron F, Gunther N, et al. Childhood victimisation and developmental expression of non-clinical delusional ideation and hallucinatory experiences: victimisation and non-clinical psychotic experiences. *Soc Psychiatry Psychiatr Epidemiol.* 2006;41(6):423–8.
- Bird JC, Waite F, Rowsell E, Fergusson EC, Freeman D. Cognitive, affective, and social factors maintaining paranoia in adolescents with mental health problems: a longitudinal study. *Psychiatry Res.* 2017;257:34–9.
- Mackinnon K, Newman-Taylor K, Stopa L. Persecutory delusions and the self: an investigation of implicit and explicit self-esteem. *J Behav Ther Exp Psychiatry.* 2011;42(1):54–64.
- Moritz S, Klein JP, Lysaker PH, Mehl S. Metacognitive and cognitive-behavioral interventions for psychosis: new developments. *Dialogues Clin Neurosci.* 2019;21(3):309–17.
- Freeman D, Dunn G, Garety PA, Bebbington P, Slater M, Kuipers E, et al. The psychology of persecutory ideation I: a questionnaire survey. *J Nervous Mental Dis.* 2005;193(5):302–8.
- Raihani NJ, Bell V. An evolutionary perspective on paranoia. *Nature Human Behav.* 2019;3(2):114–21.
- Peters ER, Joseph SA, Garety PA. Measurement of delusional ideation in the normal population: introducing the PDI (Peters et al. Delusions Inventory). *Schizophr Bull.* 1999;25(3):553–76.
- Tanno Y, Ishigaki T, Sugiura Y. Construction of scales to measure thematic tendencies of paranoid ideation. *Jpn J Psychol.* 2000;71(5):379–86.
- Freeman D, Garety PA, Bebbington PE, Smith B, Rollinson R, Fowler D, et al. Psychological investigation of the structure of paranoia in a non-clinical population. *Br J Psychiatry.* 2005;186(5):427–35.
- Jaspers K. *Allgemeine Psychopathologie.* Berlin: Springer; 1913.
- Kaneko H. The relationship among persecutory ideation, other-consciousness, and self-consciousness. *Jpn J Personal.* 1999;8(1):12–22.
- Freeman D, Garety PA, Bebbington P, Slater M, Kuipers E, Fowler D, et al. The psychology of persecutory ideation II: a virtual reality experimental study. *J Nervous Mental Dis.* 2005;193(5):309–15.
- Fenigstein A, Scheier MF, Buss AH. Public and private self-consciousness: assessment and theory. *J Consult Clin Psychol.* 1975;43:522–7.
- Tsuda H. Development and validation of the Emotions with Persecutory Delusions Scale (EPDS). *Jpn J Personal.* 2011;19(3):245–54.
- Caroline B, Terwee CAP, Chiarotto A, de Vet HCW, Bouter LM, Alonso J, et al. COSMIN methodology for assessing the content validity of PROMs User manual version 1.0. Available from: <https://>

- [www.cosmin.nl/wp-content/uploads/COSMIN-methodology-for-content-validity-user-manual-v1.pdf](http://www.cosmin.nl/wp-content/uploads/COSMIN-methodology-for-content-validity-user-manual-v1.pdf)
24. Sato H, Tsuchiya M. Up to date COSMIN guidelines for a study of measurement. *Jpn J Behav Cogn Therap.* 2022;48(2):123–34.
  25. Terwee CB, Prinsen CAC, Chiarotto A, Westerman MJ, Patrick DL, Alonso J, et al. COSMIN methodology for evaluating the content validity of patient-reported outcome measures: a Delphi study. *Qual Life Res.* 2018;27(5):1159–70.
  26. Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, et al. Screening for serious mental illness in the general population. *Arch Gen Psychiatry.* 2003;60(2):184–9.
  27. Furukawa TA, Kawakami N, Saitoh M, Ono Y, Nakane Y, Nakamura Y, et al. The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. *Int J Methods Psychiatr Res.* 2008;17(3):152–8.
  28. Lace JW, Merz ZC, Grant AF, Emmert NA, Zane KL, Handal PJ. Validation of the K6 and its depression and anxiety subscales for detecting nonspecific psychological distress and need for treatment. *Curr Psychol.* 2020;39(5):1552–61.
  29. Rosenberg M. *Society and the adolescent self-image.* Princeton University Press; 1965.
  30. Sakurai S. Investigation of the Japanese version of Rosenberg's Self-esteem Scale. *Bullet Tsukuba Develop Clin Psychol.* 2000;12: 65–71.
  31. Fresco DM, Moore MT, van Dulmen MHM, Segal ZV, Ma SH, Teasdale JD, et al. Initial psychometric properties of the experiences questionnaire: validation of a self-report measure of decentering. *Behav Ther.* 2007;38(3):234–46.
  32. Kurihara A, Hasegawa A, Nedate K. Development of the Japanese version of the experiences questionnaire and examination of its reliability and validity. *Jpn J Personal.* 2010;19(2):174–7.
  33. Murakami T, Morimoto T, Nishiyama K, Ikeda N. The influences of three dimensions of persecutory ideation on causal attribution, depression and anxiety in patients with schizophrenia. *Jpn J Personal.* 2018;27(1):42–52.
  34. Dewangan RL, Singh P, Mahapatra T, Mahapatra S. Demographic and clinical correlates of social cognition in schizophrenia: observation from India. *Indian J Psychol Med.* 2018;40(2):143–55.
  35. van Oosterhout B, Smit F, Krabbendam L, Castelein S, Staring ABP, van der Gaag M. Metacognitive training for schizophrenia spectrum patients: a meta-analysis on outcome studies. *Psychol Med.* 2016;46(1):47–57.
  36. Moritz S, Menon M, Balzan R, Woodward TS. Metacognitive training for psychosis (MCT): past, present, and future. *Eur Arch Psychiatry Clin Neurosci.* 2022;273(4):811–7.
  37. Teasdale JD, Moore RG, Hayhurst H, Pope M, Williams S, Segal ZV. Metacognitive awareness and prevention of relapse in depression: empirical evidence. *J Consult Clin Psychol.* 2002;70(2):275–87.
  38. Bernstein A, Hadash Y, Lichtash Y, Tanay G, Shepherd K, Fresco DM. Decentering and related constructs: a critical review and metacognitive processes model. *Perspect Psychol Sci.* 2015;10(5):599–617.
  39. Katsushima M. Preliminary study in which a metacognitive training intervention was conducted for occupational therapy students awaiting clinical training. *J Teikyo Heisei Univ.* 2020;31:207–14.
  40. Kesting ML, Mehl S, Rief W, Lindenmeyer J, Lincoln TM. When paranoia fails to enhance self-esteem: explicit and implicit self-esteem and its discrepancy in patients with persecutory delusions compared to depressed and healthy controls. *Psychiatry Res.* 2011;186(2–3):197–202.
  41. McAusland L, Buchy L, Cadenhead KS, Cannon TD, Cornblatt BA, Heinssen R, et al. Anxiety in youth at clinical high risk for psychosis. *Early Interv Psychiatry.* 2017;11(6):480–7.
  42. Salokangas RKR, Schultze-Lutter F, Hietala J, Heinimaa M, From T, Ilonen T, et al. Depression predicts persistence of paranoia in clinical high-risk patients to psychosis: results of the EPOS project. *Soc Psychiatry Psychiatr Epidemiol.* 2016;51(2):247–57.
  43. Bentall RP, Corcoran R, Howard R, Blackwood N, Kinderman P. Persecutory delusions: a review and theoretical integration. *Clin Psychol Rev.* 2001;21(8):1143–92.

#### SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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