

ORIGINAL ARTICLE

Reliability and validity of Information Literacy Self-Efficacy Report in individuals with schizophreniaRyota HAYASHI,^{1,2} Aika NAGAI,² Hiroyuki INADOMI,³ Ryouhei ISHII^{4,5}

¹Faculty of Rehabilitation, Kansai Medical University, ²Hannan Hospital, ³Kyoto University Graduate School of Medicine, ⁴Department of Psychiatry, Osaka University Graduate School of Medicine, ⁵Osaka Metropolitan University Graduate School of Rehabilitation Science

Correspondence: Ryota Hayashi OTR, PhD, Faculty of Rehabilitation, Kansai Medical University, 18-89, Uyamahigashi-cho, Hirakata, Osaka, Japan. Tel: 072-856-2448 E-mail: hayashir@makino.kmu.ac.jp

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INTRODUCTION

The jumping to conclusions (JTC) bias is the tendency to quickly reach conclusions based on limited information (Huq, 1988). More than 40% of individuals with schizophrenia have a JTC bias, and research has suggested that individuals with schizophrenia tend to make decisions based on little information (Falcone, 2015). Individuals with schizophrenia experience impaired social outcomes and difficulties with interpersonal relationships, daily life, and employment (Conture, 2006). The JTC bias and information-gathering in social interactions is critical for social functioning. For example, the JTC bias is associated with general functioning in individuals with schizophrenia (Hayashi, 2022), and individuals with schizophrenia who are prone to JTC bias have worse social outcomes and higher recovery than those who are not prone to JTC bias (Watanabe, 2021).

One study analyzed groups of individuals with schizophrenia, classifying group work into five steps: (1) setting the topic, (2) gathering relevant information, (3) organizing and drafting information, (4) reviewing and examining information, and (5) making judgments and decisions. Individuals with schizophrenia have been found to be more likely to make hasty judgments and decisions than healthy participants. In other words, individuals with schizophrenia may quickly draw conclusions without sufficient information-gath-

Abstract

This study aimed to develop a Japanese version of the Information Literacy Self-Efficacy Report (ILSER) and investigated its reliability and validity in a sample of individuals with schizophrenia. Overall, 61 individuals with schizophrenia and 59 healthy controls completed the ILSER and the WHO Disability Assessment Schedule (WHODAS 2.0). Individuals with schizophrenia scored significantly lower than healthy controls on several ILSERS items. The Cronbach's alpha was greater than 0.90 in each group, indicating high internal consistency. Significant correlations were found between the ILSER and several subscales of the WHODAS, supporting its external criterion validity. Factor analysis confirmed that the ILSER has a two-factor structure. These results suggest that the ILSER is a useful instrument for measuring self-efficacy in information literacy.

ering, consideration, and examination (Kameyama, 1982). However, while the authors analyzed group work with a small group of individuals with schizophrenia, no measures of information gathering were used.

Methods for assessing the JTC bias, such as the bead task, have previously been described (Huq, 1988). In this task, a bead color ratio of 85:15 was used to measure the JTC. After showing participants jars that contained colored beads in opposite ratios, participants were told that one of the jars would be chosen and that beads would be drawn from the jar one by one. The information-gathering variable was the number of beads drawn before the "decide jar" was chosen. However, the drawback of this task is its experimental nature and ability to assess information-gathering in daily life (Huq, 1988; Moritz, 2017). JTC affects social outcomes in schizophrenia and may be important for the prognosis of social life (Hayashi, 2022). Recently, the importance of gathering information and improving literacy has been emphasized. However, there are no scales to measure JTC in social life in individuals with schizophrenia.

We believe developing a scale for information-gathering and literacy in daily life is necessary. We focused on the Information Literacy Self-Efficacy Report (ILSER; Brown, 2005). Brown (2005) developed the ILSER to investigate information literacy among

primary and secondary school students in New Zealand and validated it. The ILSER is a self-report instrument that comprises 11 items related to information literacy. Respondents complete each item of the ILSER by answering (a) “If you had to do this task, how sure are you that you could do it?” and (b) “If you had to do this task, how hard would it be for you to do?” (Brown, 2005). To date, few instruments that assess information-gathering in individuals with schizophrenia have been reported. We predicted that a significant association between the ILSER and function in life would exist (WHODAS 2.0; Üstün, 2010). The WHODAS 2.0 is a self-report instrument that comprehensively assesses health and disability and has demonstrated good reliability and validity for assessing life skills in individuals with schizophrenia (Üstün, 2010). The WHODAS 2.0 consists of six domains: cognition, mobility, self-care, interaction with others, daily activities, and social participation, rated on a 5-point scale based on the respondent’s

confidence in their ability to complete the activity. We hypothesized that the ILSER and WHODAS 2.0 have some commonalities as both instruments measure confidence with one’s daily functioning and would be significantly associated. Thus, we considered WHODAS 2.0 as an external criterion.

This study aimed to translate the ILSER into Japanese and examine its reliability and validity. Specifically, we first compared ILSER scores between individuals with schizophrenia and healthy controls. Second, we examined the scale’s reliability and external validity. Third, we analyzed the factors associated with the ILSER.

METHOD

Procedures for translating the ILSER into Japanese

The procedures for the translation and back-translation of the ILSER were conducted in accordance with the report by the ISPOR (International Society

Table 1. Items of the Information Literacy Self-Efficacy Report (ILSER)

Phase	Contents
1. Topic Preparation	Choose a topic that you would like to know more about. Think about what you already know, and write some clear questions to answer about this topic. Make a list of the key words that you could use in your search
2. Planning Work	Make a plan that shows the order in which you would do things and from where you would get your information. Write down all the things that you would have to do to answer the questions.
3. Managing Work	Plan how you would use your time, and the things that you have to do. Finish your work on time and make sure it is the best work that you can do.
4. Finding Information	Find information sources that would help answer your questions. You will find suitable sources in the library, or on the internet, or through people who know lots about your topic.
5. Choosing Information	Make sure you choose information that you can read easily and that helps answer your questions.
6. Getting Information	You have to find the important information in the books, articles, and printed information quickly without reading every word on every page.
7. Understanding Information	Make short notes on the information you have found about your questions. You might have to make notes from speakers, pictures, or writing.
8. Checking Information	Check that the writer is someone who knows a lot about the topic. Make sure that the information is new, not old.
9. Creating New Information	Put all the new information together with what you already know to decide on the answers to your questions. Now you should have some new ideas about your topic.
10. Presenting Information	Give a 2–5 minute talk to the class using pictures. Tell the class what your questions were about and what you learned. Write down where all your information came from.
11. Checking Your Work	Fill in a “How well did I do?” list, so that you can tell the quality of your work. Do this so you find out what information skills you still need to work on.

for Pharmaco-economics and Outcomes Research) Task Force (Wild, 2005) after obtaining permission or its translation and back-translation from the original author (Brown, 2005). Next, three psychiatric experts familiar with English translated the manuscript to create the forward translation. The instrument creator, Brown, reviewed the translated version of the scale, and we further revised it based on Brown’s feedback. Subsequently, as a cognitive debriefing, ten individuals with schizophrenia who were admitted to Hannan Hospital completed the scale. These individuals assisted with checking the appropriateness of the items’ meaning and their understanding of the concepts. Finally, we checked the Japanese language and grammar and completed the Japanese version of the ILSER. The items on the scale are listed in Table 1.

The participants’ demographic data are presented in Table 2. In the group of individuals with schizophrenia (SC group), participants had been diagnosed with F2 (schizophrenia) according to the diagnostic criteria of the International Classification of Diseases, Tenth Revision (World Health Organization, 1992), and were recruited from the Hannan Hospital in Japan. The exclusion criteria were: (A) a Global Assessment of Functioning (GAF) score of 30 or less, (B) participating in the cognitive debriefing when we created the Japanese version, and (C) a primary diagnosis of an intellectual disability, an organic mental disorder, or a mental or behavioral disorder due to substance use or dementia. The healthy control group (HC) was

recruited from those without a history of psychiatric visits or hospitalizations.

The SC group consisted of 61 participants (28 men, 33 women; mean age = 38.1 years, *SD* = 13.3), and the HC group consisted of 59 participants (32 men, 27 women; mean age = 39.6 years, *SD* = 15.1). Written informed consent was obtained prior to the start of the study. This study was approved by the Research Ethics Committee of the Graduate School of Comprehensive Rehabilitation Science, Osaka Prefecture University (approval number: 2019–214) and the Research Ethics Committee of Hannan Hospital. Participants provided their signed informed consent after the researchers explained the study and the participants’ rights.

Measures

Information Literacy Self-Efficacy Report (ILSER)

The ILSER was designed to investigate the information literacy self-efficacy of primary and secondary school students in New Zealand. Its validity has been verified (Brown, 2005; see Part A of the ILSER in the Appendix) and includes 11 items related to information literacy. Participants were asked to rate items to indicate (a) their confidence in their ability to perform the item and (b) how difficult they found it. The items were on a 6-point scale from 1 (*Very Unsure*) to 6 (*Very Sure*) for their confidence in the item and from 1 (*Very Hard*) to 6 (*Very Easy*) for the level of their difficulty with the item. Higher scores indicated greater confi-

Table 2. Demographic Data

	SC group (n = 61)	HC group (n = 59)	<i>p</i> -value	Effect Size (<i>r</i> /Cramer’s <i>V</i>)
Age (years), Mean (SD)	38.1 (13.3)	39.6 (15.1)	.669	.039
Gender (male / female)	28 / 33	32 / 27	.361	.083
Education (years), Mean (SD)	13.6 (3.0)	16.2 (2.3)	<.001**	.510
Disease duration (years), Mean (SD)	10.5 (9.6)	-	-	-
Chlorpromazine equivalent (mg / day), Mean (SD)	612.2 (430.7)	-	-	-
BPRS scores , Mean (SD)				
Positive Symptoms	11.8 (5.6)	-	-	-
Negative Symptoms	6.6 (4.0)	-	-	-
Dysphoria	6.8 (3.1)	-	-	-
Manic Symptoms	2.3 (2.8)	-	-	-
Hypochondriacal Symptoms	2.8 (1.9)	-	-	-

Notes. SC group: patients with schizophrenia group; HC group: the healthy control group; a Mann-Whitney’s U test evaluated Age, Education; a χ^2 test assessed gender (male/female); **p*<.05, ***p*<.01

dence or greater ease.

The World Health Organization Disability Assessment Schedule (WHODAS 2.0)

WHODAS 2.0 is a comprehensive assessment of health and disability that was developed by the World Health Organization (WHO). The self-report assessment measures a participant's life functions and has been shown to have good reliability and validity (Üstün, 2010). It consists of 36 items, measuring the level of function across six domains—Cognition, Mobility, Self-Care, Interactions with Others, Daily Activities, and Social Participation. Participants responded to each item on a scale of 1 (*no problem at all*) to 5 (*cannot do anything at all*). The greater the severity of an illness, the higher the scores.

Statistical analysis

We compared the ILSER scores of the SC group and HC group after testing for normality using the Mann–Whitney *U* test. The effect sizes were calculated using *r* or Cramer's *V* (small = 0.1, medium = 0.3,

large = 0.5 effect sizes). Cronbach's alpha coefficients were obtained for each group to test the scale's internal consistency. We also analyzed the association between ILSER and WHODAS2.0 in the SC group, using Spearman's rank correlation coefficient (ρ) to assess criterion-related validity. We performed a factor analysis (Promax rotation-maximum likelihood method) in the SC group. We used IBM SPSS Ver. 26 to conduct the statistical analyses, with a significance level set at $p < .05$.

RESULTS

ILSER scores for the two groups

The ILSER scores of the SC and HC groups are shown in Table 3. For Items 1, 3, 7, and 10 of the Confidence scale (Part A), the SC group scored significantly lower than the HC group ($p < .05$). For Items 1, 2, 3, 5, 7, 8, 9, 10, and 11 of Difficulty scale (Part B), the SC group scored significantly lower than the HC group ($p < .05$).

Table 3. ILSER values for patient group and healthy group

	Items	SC group	HC group	<i>p</i> value	effect size (<i>r</i>)
Confidence Subscale (Part A)	1	2.9 (1.3)	3.4 (1.1)	.035*	-.192
	2	3.0 (1.3)	3.4 (1.0)	.055	-.175
	3	2.7 (1.2)	3.5 (1.1)	<.001**	-.366
	4	3.6 (1.4)	3.8 (1.1)	.351	-.085
	5	3.3 (1.3)	3.6 (1.5)	.180	-.123
	6	3.2 (1.3)	3.1 (1.2)	.647	.042
	7	3.0 (1.3)	3.4 (0.9)	.021*	-.211
	8	3.1 (1.4)	3.4 (1.0)	.129	-.139
	9	3.1 (1.3)	3.2 (1.0)	.349	-.086
	10	2.8 (1.4)	3.2 (1.1)	.026*	-.205
	11	2.7 (1.4)	2.8 (1.1)	.333	-.089
	Mean	3.0 (1.0)	3.3 (0.8)	.057	-.174
	Total	33.3 (11.4)	36.7 (9.3)	.058	-.173
Difficulty Subscale (Part B)	1	2.5 (1.3)	3.0 (1.1)	.025*	-.204
	2	2.7 (1.2)	3.2 (1.1)	.008**	-.242
	3	2.6 (1.2)	3.2 (1.1)	.001**	-.311
	4	3.3 (1.3)	3.7 (1.2)	.076	-.162
	5	3.1 (1.4)	3.5 (1.2)	.041*	-.186
	6	2.9 (1.3)	3.0 (1.2)	.633	-.044
	7	2.8 (1.3)	3.3 (1.0)	.010*	-.235
	8	2.9 (1.3)	3.3 (1.0)	.023*	-.207
	9	2.6 (1.2)	3.0 (1.0)	.043*	-.185
	10	2.4 (1.4)	3.1 (1.1)	<.001**	-.319
	11	2.5 (1.3)	2.8 (1.1)	.047*	-.182
	Mean	2.8 (1.0)	3.2 (0.8)	.006**	-.252
	Total	30.3 (10.6)	35.0 (9.1)	.007**	-.246

* $p < .05$, ** $p < .01$

Internal consistency of the ILSER

We obtained Cronbach’s alpha coefficients to examine the scale’s internal consistency. The results showed that for the Confidence scale (Part A), the internal consistency was $\alpha = 0.937$ for the SC group and $\alpha = 0.937$ for the HC group. For the Difficult scale (Part B), the internal consistency for the SC group was $\alpha = 0.925$ and $\alpha = 0.923$ for the HC group.

External criterion validity of ILSER

The correlations between the ILSER and WHODAS, both the mean and total scores for both parts of the ILSER, are shown in Table 4 and were negatively correlated with the Cognition, Mobility, Interaction with

Others, Daily Activities, Social Participation, and Total Scores of the WHODAS; only the Self-Care score did not show a significant correlation.

Factor structure of the ILSER

The results of the factor analysis of ILSER-A are presented in Table 5. We set a factor loading of 0.4 or higher as the criterion. The first factor, consisting of items such as obtaining and checking information, was named “Obtaining and Organizing Information,” and the second factor, consisting of items such as planning and management of information-gathering, was named “Preparing and Planning for Information-Gathering.” In Part B of the ILSER (i.e., difficulty),

Table 4. Correlation between ILSER and WHODAS

		WHODAS						
		Cognition	Mobility	Self care	Interaction with others	Daily activities	Social Participation	Total
ILSER	A	-.522**	-.355**	-.174	-.479**	-.393**	-.318*	-.496**
	Mean	(<.001)	(.005)	(.180)	(<.001)	(.002)	(<.001)	(<.001)
	B	-.532**	-.370**	-.224	-.515**	-.461**	-.437**	-.553**
	Mean	(<.001)	(.003)	(.083)	(.000)	(.000)	(<.001)	(<.001)
	A	-.535**	-.350**	-.167	-.471**	-.384**	-.305*	-.491**
	Total	(<.001)	(.006)	(.199)	(.000)	(.002)	(.017)	(<.001)
B	-.532**	-.370**	-.224	-.515**	-.461**	-.437**	-.553**	
Total	(<.001)	(.003)	(.083)	(<.001)	(<.001)	(<.001)	(<.001)	

Note. Correlation coefficients are shown in Spearman’s ρ ; values in the upper row are Spearman’s rank correlation coefficients ρ ; values in parentheses are p-values; * $p < .05$, ** $p < .01$

Table 5. Factor analysis results for ILSER-A

Items	Factor loadings	
	Factor 1	Factor 2
	Obtaining and Organizing Information	Preparing and Planning for Information-Gathering
8. Checking Information	0.999	-0.136
9. Creating New Information	0.946	-0.010
6. Getting Information	0.673	0.062
11. Checking Your Work	0.581	0.219
10. Presenting Information	0.566	0.322
5. Choosing Information	-0.113	1.024
1. Topic Preparation	0.041	0.772
3. Managing Work	-0.036	0.678
4. Finding Information	0.182	0.620
7. Understanding Information	0.353	0.525
2. Planning Work	0.280	0.501

Note. Bolded numbers indicate factor loadings of 0.4 or higher

all items loaded onto one factor.

DISCUSSION

In this study, we created a Japanese version of the ILSER and compared the scores between SC group and HC group. We then evaluated the scale's internal consistency, external criterion validity, and factor analyses.

A comparison of the two groups ILSER scores

In this study, the SC group had significantly lower confidence than the HC group for Items 1 (Topic Preparation), 3 (Managing Work), 7 (Understanding Information), and 10 (Presenting Information). Similarly, the results showed that individuals with schizophrenia experienced greater difficulty in gathering information. Individuals with schizophrenia find it difficult to prepare, manage, and understand, and significant differences were found in this report (Kameyama, 1982). Common to all these items is that patients think proactively and creatively. It has been reported that individuals with schizophrenia have difficulty with self-awareness and holistic understanding of things (Kim, 2021). It has also been reported that individuals with schizophrenia have impaired divergent thinking, in which they search for information related to certain stimuli (Nemoto, 2005). They may have experienced difficulties with divergent thinking and processes that require creative thinking, such as theme preparation, management, and presentations. These points, demonstrated in previous studies, highlighted that ILSER also significantly differed between individuals with schizophrenia and healthy controls, suggesting that ILSER is sensitive. In the Beads Task, a JTC measure, individuals with schizophrenia make decisions with less information than healthy controls (Huq, 1988). The results of the ILSER also indicate that individuals with schizophrenia tend toward the JTC when making decisions with little information (Falcone, 2015). It is important to note that there were also significant differences between individuals with schizophrenia and healthy controls in scales measuring information gathering in life, such as the ILSER.

Internal consistency of the ILSER

In the present study, the Cronbach's alpha coefficient of the ILSER was 0.90 or higher, for both groups, indicating that the scale had acceptable internal consistency and reliability. Our finding of high internal consistency is novel.

External criterion validity of the ILSER

The present study found significant associations between ILSER and Cognition, Mobility, Interaction with Others, Daily Activities, and Social Participation scales on the WHODAS 2.0. No association was observed between the ILSER and WHODAS Self-Care scores. Social Interactions and Social Participation with others on the WHODAS assess participants' ability to interact and socialize confidently. The ability to ask questions, share information, and present information to others is also required for the ILSER's information gathering. Similarities may exist between being able to interact with others and society and being able to gather information from others. We theorized that there would be an association between ILSER and WHODAS cognition, as research has indicated that information-gathering is related to cognitive function (Falcone, 2015). Similarly, JTC and cognitive function have been found to be related, making our finding important. In addition, for each item on the WHODAS, participants were asked to indicate whether they thought they could complete the item, indicating their confidence. The ILSER is a scale assessing one's confidence, and the mobility and daily activities measured on the WHODAS also ask about the respondents' confidence. To complete daily activities, information-gathering may be similar to interactions with others. Additionally, self-care on WHODAS 2.0 is a very simple self-care competency item. As the participants provided homogeneous responses, the differences in the scores may not have been identified.

In summary, the ILSER is an instrument to assess participants' confidence in their information literacy in their daily lives. The WHODAS measures the participants' confidence in their functioning and is related to external criteria for measuring life.

The factor structure of the ILSER

In this study, two factors were extracted for Confidence/Part A on the ILSER were identified as "Preparing and Planning for Information-Gathering" and "Obtaining and Organizing Information." Eisenberg (1990) categorized problem-solving strategies regarding information and suggested that strategies for gathering, organizing, and using information are considered separately. In this study, the factors were similarly divided into the "Preparing and Planning" stage and the "Obtaining and Organizing Information" stage. Information-gathering and preparatory actions may be critical for JTC bias among individuals with schizophrenia, which is important for the ILSER. Pre-

viously used JTC measurement methods, such as beads task, cannot be evaluated in the preparation stage of information gathering. However, only one factor was identified for the Difficulty/Part B ILSER. Confidence and difficulty are qualitatively different, and the difficulty of self-monitoring in individuals with schizophrenia may also represent an influence. In the present study, the total scores for Confidence/Part A were higher than those of Difficulty/Part B for both groups, and the standard deviations were larger. Therefore, participants showed more variability in their responses to Confidence/Part A, potentially revealing the factor structure. Additionally, individuals with schizophrenia perceive their disability more positively as they become less aware of the declines in cognitive and daily functioning (Kim, 2021). Such difficulties in self-monitoring may have resulted in decreased patient difficulty scores and increased self-confidence scores. This issue was addressed in the current study.

LIMITATIONS

We used the WHODAS 2.0, which measures life functioning, for our external criterion validation. However, we believe that the ILSER is better suited to measure information-gathering. In addition, the study participants were hospitalized individuals with schizophrenia who reported on their information literacy and information-gathering as a part of their social life. Future participants who would be community-dwelling with provide further support for our findings. In this study, the relationship between the psychiatric symptoms of schizophrenia and the ILSER was not examined, and the influence of psychiatric symptoms on the results cannot be ruled out. However, further validation is required.

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Appendix. A part of ILSER

Information Literacy Self-Efficacy Report

Date : _____

Name : _____

Assume that you will perform the 11 prompts or scenario. For each prompt or scenario, answer 2 questions about confidence and difficulty.

1. Topic Preparation: "Choose a topic that you would want to know more about. Think about what you already know, and write some clear questions to answer about the topic. Make a list of the key words that you could use in your search."

(a) If you had to do this task, how sure are you that you could do it?

Very Unsure | Unsure | A Little Bit Sure | Fairly Sure | Sure | Very Sure

(b) If you had to this task, how hard would it be for you to do?

Very Hard | Hard | A Little Bit Easy | Fairly Easy | Easy | Very Easy

2. Planning Work: "Make a plan that shows the order you would do things and from where you would get your information. Write down all the things that you would have to do to answer your questions."

(a) If you had to do this task, how sure are you that you could do it?

Very Unsure | Unsure | A Little Bit Sure | Fairly Sure | Sure | Very Sure

(b) If you had to this task, how hard would it be for you to do?

Very Hard | Hard | A Little Bit Easy | Fairly Easy | Easy | Very Easy

3. Managing Work: " Plan how you would use your time, and the things that you have to do. Finish your work on time and make sure it is the best that you can do."

(a) If you had to do this task, how sure are you that you could do it?

Very Unsure | Unsure | A Little Bit Sure | Fairly Sure | Sure | Very Sure

(b) If you had to this task, how hard would it be for you to do?

Very Hard | Hard | A Little Bit Easy | Fairly Easy | Easy | Very Easy

[Numbers 4 to 11 are omitted below.]