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Development and Validation of the Japanese-Translated Version of the Multiple-Choice Questionnaire of Depression Literacy (MCQ-DL)

Jun Kashihara[1,2,3], Shinji Sakamoto[1]

[1]Department of Psychology, College of Humanities and Sciences, Nihon University, Tokyo, Japan
[2]Melbourne School of Population and Global Health, The University of Melbourne, Melbourne, Australia
[3]Japan Society for the Promotion of Science, Tokyo, Japan
Email: better.days.ahead1121@gmail.com, kashihara.jun@nihon-u.ac.jp, jun.kashihara@unimelb.edu.au

Abstract

Although depression literacy plays a key role in encouraging people with depression to seek professional treatment, there exist no measures of depression literacy in Japan that are comparable to those validated in English-speaking countries. The present study therefore developed and validated a Japanese-translated version of the Multiple-Choice Questionnaire of Depression Literacy (MCQ-DL), which is rated as being of high quality by recent systematic reviews. We conducted an online two-wave survey (N_{T1} = 325, N_{T2} = 180) and examined the psychometric properties of the full-item (27 items) and short (10 items) versions of the Japanese-translated MCQ-DL. Results provide several points of validity evidence for both versions as measures that capture individuals' depression literacy profiles: 1) one-factor structures of these versions were supported by the data; and 2) the items used in both versions had a variety of difficulty and discrimination indices. Results also indicate several limitations of the Japanese-translated MCQ-DL for use in correlation-based and multivariate analyses: 1) internal consistencies seem insufficient (α = .68) and poor (α = .28) for the full-item and short versions, respectively; 2) the test-retest reliability was insufficient for the short version (r = .51, p < .001, 95% CI [.40, .60]), 3) both the full-item and short versions of the MCQ-DL exhibited only weak correlations ($|r| \leq .22$) with the other variables, including stigmatizing attitudes toward, and familiarity with, people with depression and components of empathy. The discussion highlights the usage of and further room for the validation of the Japanese-translated MCQ-DL we developed.

Keywords

1. Introduction

Depression affects 350 million people worldwide (World Health Organization, 2012a) and is estimated to be the largest factor in disease burden by 2030 (World Health Organization, 2008). Although early interventions are highly necessary for reducing the burden of depression, less than 30% of people with depression in most countries receive any professional treatment (World Health Organization, 2012b). To address this service gap for depression and other mental disorders, the previous research has frequently focused on mental health literacy, which indicates the presence of comprehensive knowledge and skills necessary for recognizing and managing one's own or others' mental health problems (Jorm, 2012). To improve mental health literacy, many educational programs has been conducted thus far, including the Defeat Depression Campaign (Paykel, Hart, & Priest, 1998; Paykel et al., 1997; Rix et al., 1999), the Time to Change Campaign (Evans-Lacko et al., 2013; Henderson & Thornicroft, 2009), and the Mental Health First Aid (MHFA) Programs (Jorm, Blewitt, Griffiths, Kitchener, & Parslow, 2005; Kitchener & Jorm, 2002a, 2002b, 2008).

Previous evaluation studies of these programs typically have utilized measures that focused only on one specific component of mental health literacy, including measures of: 1) the ability to recognize mental disorders (Kitchener & Jorm, 2002b), 2) the recognition of effective treatments for depression (Paykel et al., 1998; Paykel et al., 1997), 3) the etiology of depression (Paykel et al., 1998; Paykel et al., 1997), and 4) the knowledge needed to manage one's own depression (Rix et al., 1999). More recent studies, on the other hand, have developed and utilized measures that contain multiple components of mental health literacy. For example, Gabriel and Violato (2009) developed the Multiple-Choice Questionnaire of Depression Literacy (MCQ-DL), which includes the following components: i) knowledge of antidepressants and their delayed actions, ii) etiology of depression, iii) symptoms' responses to treatments, iv) knowledge about psychotherapy, v) subtle symptoms of relapse, vi) the differences between normal and abnormal mood states, and vii) knowledge of biological treatments and their side effects. Such measures could be helpful for capturing a detailed profile of an individual's mental health literacy and for examining the relationships between overall mental health literacy and other important outcomes, including stigmatizing attitudes and behavioral intentions toward people with mental disorders.

According to the systematic reviews conducted by Wei, McGrath, Hayden, and Kutcher (2015, 2016), there exist three measures written in English that capture multiple components of depression literacy, including those developed

by Gabriel and Violato (2009), Hart et al. (2014), and Kiropoulos, Griffiths, and Blashki (2011). Among these three measures, the MCQ-DL (Gabriel & Violato, 2009) is rated as being of the highest quality (Wei et al., 2016). In particular, internal consistency and structural evidence for validity of the MCQ-DL are rated as better than the other two measures of depression literacy (Wei et al., 2016). Moreover, it has been revealed that this questionnaire is usable in multivariate analyses. Foster, Elischberger, and Hill (2018), for example, picked 10 items from the questionnaire[1] and showed that depression literacy mediates the relationship between socioeconomic status and stigmatizing attitudes toward depression.

In Japan, however, there exist no measures of depression literacy comparable to those validated in English-speaking countries. Although Yamakawa et al. (2012) developed the first measure of depression literacy in Japanese, which was based on the information about depression provided to the public, this measure has two weak points in its items and format. First, they originally developed nine items without referring to the measures validated in English-speaking countries. Therefore, the cross-cultural comparability of the measure is limited. Second, they used a true-false response format. In such formats, participants are likely to provide a number of correct responses by chance, even when they are not confident at all in their choices. More robust formats, such as the four-choice format used by Gabriel and Violato (2009), are needed to accurately capture detailed profiles of participants' literacy.

The present study, therefore, developed a Japanese-translated version of the MCQ-DL (Gabriel & Violato, 2009) and conducted initial validation of the measure. We also examined whether the 10-item version adopted by Foster et al. (2018) has similar psychometric properties to the full 27-item measure. We expected the short version would be easily incorporated into the evaluation studies of educational programs regarding depression in Japan, including those focusing on stigma reduction (e.g., Kashihara, 2015; Kashihara & Sakamoto, 2018) and the promotion of helping behaviors toward people with mental health problems (Hashimoto et al., 2016; Kato et al., 2010; Suzuki et al., 2014). We conducted a two-wave survey to examine the psychometric properties—including internal consistencies, factor structures, item difficulty and discrimination indices, correlations with other related measures, and test-retest reliabilities—of the full-item and short versions of the translated questionnaire.

2. Method

2.1. Participants and Procedure

The protocol of the present study was approved by the Committee of Research Ethics at the College of Humanities and Sciences, Nihon University. A total of

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[1]S. D. Foster and colleagues (personal communication, November 28, 2017) picked up 10 items (Items 1, 2, 4, 5, 8, 10, 11, 22, 23, and 27; see **Appendix**) from the original version with the intention of capturing the variety of components included in the full-item version developed by Gabriel and Violato (2009).

461 Japanese people who registered with the online survey system of Cross Marketing Inc. (https://www.cross-m.co.jp/) answered the baseline questionnaire (T1), which included all measures described in the Measures subsection. We asked them to answer the follow-up questionnaire three weeks later (T2), and 355 of them participated in the T2 survey, which only included the Japanese-translated version of the MCQ-DL.

As pointed out by Krosnick (1991) and Krosnick, Narayan, and Smith (1996), some survey participants give careless answers without making deliberations concerning the items to save cognitive effort. This behavior, called satisficing, influences data quality and decreases statistical power (Maniaci & Rogge, 2014). Considering that satisficing is commonly observed in online surveys as well as other survey forms (e.g., telephone, paper-and-pencil) (Fricker, Galesic, Tourangeau, & Yan, 2005; Gosling, Vazire, Srivastava, & John, 2004), we embedded two trap items to detect satisficing in both the T1 and T2 questionnaires. Sample trap items included "In this item, please ignore the following question and simply tick the choice on the top of the screen. What is the risk of death by suicide among clinically depressed patients?" We removed 113 participants at T1 and 71 participants at T2 who gave at least one incorrect answer to these trap items from the following analyses.

We then removed 23 participants (13 of them participated in the T2 survey) who answered "I have depression" on the Level of Contact Report (mentioned later in the Measures subsection) at T1 from the analyses, considering that we aimed to examine the stigma held by people without depression. As a consequence, we used data from the remaining 325 participants (177 female, 148 male; M_{age} = 46.44, SD = 13.40) at T1 and 180 participants (98 female, 82 male; M_{age} = 48.31, SD = 12.79) at T2 for the further analyses.

2.2. Measures

2.2.1. Depression Literacy

The items of the original English version of the MCQ-DL (Gabriel & Violato, 2009) are shown in the **Appendix** section. We developed a Japanese-translated version of the questionnaire that was semantically equivalent to the original one by following a translation/back-translation procedure, as detailed in Brislin (1970, 1980) and Brislin, Lonner, and Thorndike (1973). First, two professional translators translated the original version into Japanese. Second, the authors of the present research modified some words and phrases used in the draft of the Japanese-translated version (explained in detail in the next paragraph). Third, two professional translators and a professional proofreader, who did not participate in the Japanese translation, back-translated the modified Japanese version into English. Fourth and finally, the authors of the original questionnaire compared the original and back-translated versions and confirmed that the two versions were semantically equivalent.

In the process of developing the Japanese-translated version, we modified two items of the original questionnaire. First, we changed the query of Item 3 from

"What are the lifetime chances of becoming clinically depressed?" to "Which of the following is closest to the lifetime chances of becoming clinically depressed (i.e., the proportion of people who get depression at least once in their lives)?" We added an instruction for the participants to choose the closest choice, considering that the lifetime prevalence of clinical depression is estimated to be around 16% in the *Diagnostic and Statistical Manual of Mental Disorders, 5th ed.* (American Psychiatric Association, 2013) and is lower than the rate of "one in three" that was regarded as the correct choice in the original questionnaire. We also explained the phrase "lifetime chances" in parentheses to ensure the participants would understand the meaning of this phrase. Second, we changed one of the choices in Item 18 ("Which is NOT a recognized treatment for clinical depression?") from "Kiekie therapy" to "Herbal medicine," considering that the plant Kiekie is unfamiliar to Japanese people.

The participants ticked one out of four choices for each item listed in the questionnaire. The scoring procedure and α coefficients are detailed later in the Results section. The authors are glad to share the Japanese-translated version of the questionnaire upon request.

2.2.2. Stigmatizing Attitudes toward Depression

Previous studies frequently showed that stigmatizing attitudes toward depression can be reduced by educational programs and contents aimed at improving depression literacy (Finkelstein & Lapshin, 2007; Griffiths, Christensen, Jorm, Evans, & Groves, 2004; Griffiths et al., 2006; Kashihara, 2015; Kashihara & Sakamoto, 2018; Rusch, Kanter, & Brondino, 2009). In addition, Foster et al. (2018) showed that the short version of the MCQ-DL (Gabriel & Violato, 2009) was negatively correlated with stigma of depression. We therefore anticipated that both the full-item and short versions of the MCQ-DL should exhibit significant negative correlations with stigmatizing attitudes toward depression.

To assess stigmatizing attitudes toward depression, we used the Japanese-translated version (Nakane, Yoshioka, & Nakane, 2006) of the Personal Stigma Subscale of the Depression Stigma Scale (Griffiths et al., 2004). This measure consists of two nine-item subscales: the personal stigma subscale assessing participants' negative attitudes toward people with depression, including sample items such as "Depression is a sign of personal weakness."; and the perceived stigma subscale assessing participants' beliefs about the attitudes of the public, including sample items such as "Most people believe that depression is a sign of personal weakness." We used only the personal stigma subscale to examine the correlation between depression literacy and participants' stigmatizing attitudes. This subscale used a 5-point Likert scale with the anchors 1: *disagree* to 3: *neither agree nor disagree* to 5: *agree*; it was found to have sufficient internal consistency (α = .80).

2.2.3. Familiarity with People with Depression

As shown in a previous systematic review (Corrigan & Shapiro, 2010) and me-

ta-analysis (Corrigan, Morris, Michaels, Rafacz, & Ruesch, 2012) on the effectiveness of educational programs for mental disorders, plenty of educational programs have utilized contact-based approaches. Moreover, contact-based education has produced positive outcomes, including the reduction of stigma. It is also reasonable to suppose that people obtain more opportunities to learn about depression as they get familiar with those who have depression. We therefore anticipated that both the full-item and short versions of the Japanese-translated MCQ-DL should exhibit significant positive correlations with familiarity with people with depression.

We assessed participants' levels of familiarity with people with depression using the Japanese-translated version (Kashihara, 2015) of the Level-of-Contact Report (Holmes, Corrigan, Williams, Canar, & Kubiak, 1999). This checklist includes 12 statements reflecting different levels of contact with people with depression, ranging from the least ("I have never observed a person that I was aware had major depression"; rank order score = 1) to the most ("I have depression"; rank order score = 12) intimate contact. Participants ticked every statement that corresponded to their experience. Each participant's level of familiarity was scored by taking the highest rank order score of the statements she or he ticked.

2.2.4. Empathy

As indicated by Jorm (2012), mental health literacy includes skill in recognizing the early signs of mental health problems and others' depressive moods and in expressing their empathic concerns. Foster et al. (2018) also showed that the short version of the MCQ-DL (Gabriel & Violato, 2009) was positively correlated with participants' empathy levels. We therefore anticipated that both the full-item and short versions of the Japanese-translated MCQ-DL should exhibit significant positive correlations with components of empathy.

Participants' levels of empathy were assessed using the Japanese-translated version (Sakurai, 1988) of the 28-item Interpersonal Reactivity Index (Davis, 1980, 1983). This measure consists of four seven-item subscales that reflect different dimensions of empathy. The perspective-taking subscale (α = .72) reflects a tendency to understand situations from others' perspectives, and sample items include "I sometimes try to understand my friends better by imagining how things look from their perspective." The empathic concern subscale (α = .53) reflects a tendency to feel sympathy for others, and sample items include "I often have tender, concerned feelings for people less fortunate than me." The fantasy subscale (α = .72) reflects a tendency to become involved in a fictitious world depicted in books, movies, etc.; sample items include "I really get involved with the feelings of the characters in a novel." The personal distress subscale (α = .76) reflects a negative aspect of empathy, in terms of being sensitive and reactive to situational stressors; sample items include "Being in a tense emotional situation scares me." This 28-item measure used a 4-point Likert scale with the anchors 1: *disagree* to 4: *agree*; it has a sufficient internal consistency overall (α = .77).

2.3. Data Analysis

To validate the Japanese-translated MCQ-DL, we examined the psychometric properties of both the full-item and short versions of the questionnaire based on various kinds of analyses. Using the data obtained at T1, we conducted the following analyses: 1) calculation of coefficients α to examine internal consistencies, 2) confirmatory factor analyses to examine factor structures, 3) item response theory analyses to examine item difficulty and discrimination indices in detail, and 4) correlational analyses to obtain convergent evidence of validity. Moreover, we examined the test-retest reliabilities of the two versions using both the T1 and T2 datasets. In conducting these analyses, we kept in mind the importance of not applying binary judgements concerning whether these versions were valid or invalid but rather clarifying the purposes for and the extent to which these versions could be usable by following the recommendation of Kane (2006) regarding the process of scale development and validation. We used Mplus version 7 (Muthén & Muthén, 1998-2012) to conduct confirmatory factor analyses and R version 3.3.3 (R Development Core Team, 2017) to perform item response theory analyses. All the other analyses were performed using Stata version 14 (StataCorp, 2015).

3. Results

3.1. Internal Consistencies

On average, the participants provided 17.27 correct answers ($SD = 5.73$) for the full-item version (27 items) of the MCQ-DL and 3.81 correct answers ($SD = 1.64$) for the short version (10 items). Compared to the cutoff criteria for reliability coefficients (>.70) proposed by Nunnally & Bernstein (1994), the Cronbach's alpha coefficients were not as large for the full-item version (.68), and they were extremely small for the short version (.28).

3.2. Factor Structures

Next, we examined factor structures for both the full-item and short versions. Considering that model fit indices become worse, in general, as indicators of latent variables increase (Bandalos, 2002; Coffman & MacCallum, 2005; Gribbons & Hocevar, 1998; Little, Cunningham, Shahar, & Widaman, 2002; Little, Rhemtulla, Gibson, Schoemann, 2013; Marsh, Hau, Balla, & Grayson, 1998), we used parceling techniques to conduct a series of confirmatory factor analyses. To test the one-factor model of the full-item version, 27 items were randomly assigned to the following four parcels[2]: Parcel 1 comprised Items 1, 2, 13, 16, 17, 21, and 23; Parcel 2 comprised Items 7, 10, 14, 20, 24, 25, and 26; Parcel 3 comprised Items 4, 5, 6, 11, 15, 19, and 22; and Parcel 4 comprised Items 3, 8, 9, 12, 18, and 27. The fit indices for this one-factor model were as follows: $\chi^2(2) = 1.05$, p

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[2]We decided to assign items to four parcels here, because any models with 3 indicators loaded on one factor become saturated models (i.e., models with zero degrees of freedom) and cannot be evaluated by model fit indexes.

= .592; the comparative fit index (CFI) = 1.000; the Tucker-Lewis index (TLI) = 1.016; the standardized root mean square residual (SRMR) = .010; the root mean square error of approximation (RMSEA) = .000, 90% CI = [.000, .091]. These indices met the cutoff criteria (CFI > .95, TLI > .95, SRMR < .08, RMSEA < .06) proposed by Hu & Bentler (1999); therefore, the assumption that all the items in the full-version reflected the same concept of depression literacy seemed to be supported by empirical data.

We then conducted similar analyses to test the one-factor model of the short version. Ten items from the short version were randomly assigned to the following four parcels: Parcel 1 comprised Items 10, 22, and 23; Parcel 2 comprised Items 1, 5, and 11; Parcel 3 comprised Items 2 and 27; and Parcel 4 comprised Items 4 and 8. The fit indices for this one-factor model were as follows: $\chi^2(2)$ = 1.86, p = .396; CFI = 1.000; TLI = 1.021; SRMR = .019; RMSEA = .000, 90% CI = [.000, .107]. Again, these indices met the cutoff criteria proposed by Hu & Bentler (1999).

3.3. Item Difficulty and Discrimination

We then conducted item response theory analyses based on the two-parameter logistic model (Birnbaum, 1968) to examine item difficulty and the discrimination indices for both the full-item and short versions. As shown in Table 1, except for Item 3 ("What are the lifetime chances of becoming clinically depressed?"), which had extremely high difficulty (35.34), the item difficulty indices for the full-item version was distributed around the zero-point[3]. Although most of the item discrimination indices had positive values, those for Items 5 ("Which of the following, about sex differences in clinical depression is TRUE?") and 24 ("Which is NOT a common occurrence during treatment with antidepressants?") were negative. These negative values indicate that the participants with higher depression literacy were more likely to provide incorrect answers to these items. Items 5 and 24, therefore, seemingly functioned as trick questions.

Similar trends for item difficulty and discrimination indices were found in the short version. As shown in Table 2, except for Item 27 ("Psychotherapy can help many people with clinical depression. Which of the following statements about psychotherapy is FALSE?"), which had extremely high difficulty (42.78), the item difficulty indices for the short version were distributed around the zero-point. Although most of the item discrimination indices had positive values, those for Items 2 ("What is the risk of death by suicide among clinically depressed patients?") and 5 had negative values.

3.4. Correlations with Related Variables

Next, we examined correlations between the variables measured at T1 to show convergent evidence for the validity of the full-item and short versions. As

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[3]The zero-point in item difficulty indices indicate that exactly half of the participants have a latent ability to answer the corresponding items correctly.

Table 1. Detailed profile for the items of the Multiple-Choice Questionnaire of Depression Literacy (MCQ-DL) (full-item version).

Item No.	% Correct[a]	Difficulty	Discrimination	Item No	% Correct[a]	Difficulty	Discrimination
1	80.92	−1.39	1.39	15	91.08	−2.11	1.45
2	41.54	3.34	.10	16	78.15	−1.08	1.79
3	29.85	35.34	.02	17	94.15	−2.74	1.25
4	55.08	−.43	.50	18	49.23	.07	.45
5	39.69	−2.88	−.15	19	23.69	2.21	.57
6	72.31	−1.16	.99	20	82.77	−1.75	1.09
7	69.54	−.83	1.32	21	93.23	−2.31	1.51
8	88.00	−1.89	1.38	22	40.31	1.00	.41
9	62.46	−.83	.67	23	90.46	−2.01	1.50
10	34.77	1.48	.44	24	33.23	−1.95	−.37
11	58.77	−.61	.64	25	68.31	−.80	1.23
12	80.31	−1.25	1.59	26	71.08	−1.29	.79
13	80.62	−1.18	1.84	27	43.69	1.11	.23
14	73.54	−1.28	.94				

[a]Percentage of correct answers.

Table 2. Detailed profile for the items of the Multiple-Choice Questionnaire of Depression Literacy (MCQ-DL) (short version).

Item No.	% Correct[a]	Difficulty	Discrimination	Item No	% Correct[a]	Difficulty	Discrimination
1	80.92	−1.54	1.18	10	34.77	1.03	.67
2	41.54	−2.99	−.12	11	58.77	−.92	.40
4	55.08	−.37	.60	22	40.31	.66	.66
5	39.69	−2.37	−.18	23	90.46	−1.96	1.57
8	88.00	−1.54	2.08	27	43.69	42.78	.01

[a]Percentage of correct answers.

displayed in Table 3, the correlation coefficient between the full-item and short versions was relatively strong ($r = .77$, $p < .001$, 95% CI [.72, .80]), indicating that the scoring trends for these two versions were similar to each other. Moreover, both the full-item and short versions had weak, but significant, correlations with other related variables, as predicted. Both the full−item and short version had: negative correlations with stigmatizing attitudes toward depression ($r = −.22$, $p < .001$, 95% CI [−.32, −.11]; $r = −.21$, $p < .001$, 95% CI [−.31, −.10], respectively); positive correlations with familiarity with people with depression ($r = .14$, $p = .010$, 95% CI [.04, .25]; $r = .15$, $p = .008$, 95% CI [.04, .25], respectively); and positive correlations with the empathy scale ($r = .15$, $p = .008$, 95% CI [.04, .25]; $r = .12$, $p = .028$, 95% CI [.01, .23]) and the perspective-taking subscale ($r = .12$, $p = .037$, 95% CI [.01, .22]; $r = .11$, $p = .043$, 95% CI [.00, .22]). Neither

Table 3. Descriptive statistics and correlations for the variables assessed by the baseline questionnaire (T1).

Table	1	2	3	4	5	6	7	8	9
1. Depression Literacy: 27 items	—								
2. Depression Literacy: 10 items	.77***	—							
3. Stigmatizing attitudes toward depression	−.22***	−.21***	—						
4. Familiarity with people with depression	.14**	.15**	−.25***	—					
5. Empathy: Total	.15**	.12*	−.25***	.14*	—				
6. Empathy: Perspective-taking	.12*	.11*	−.21***	.11	.51***	—			
7. Empathy: Empathic concern	.12*	.07	−.31***	.17**	.70***	.41***	—		
8. Empathy: Fantasy	.07	.07	−.16**	.22***	.75***	.18**	.36***	—	
9. Empathy: Personal distress	.07	.06	.00	−.12*	.54***	−.19***	.14**	.27***	—
M	17.27	3.81	2.53	4.95	2.61	2.71	2.80	2.53	2.38
SD	5.73	1.64	0.68	2.84	.28	.42	.36	.49	.50
α	.68	.28	.80	—	.77	.72	.53	.72	.76

Note. $N = 533$; *$p < .05$, **$p < .01$, ***$p < .001$. The scores of depression literacy reflect the number of correct answers on the Multiple-Choice Questionnaire of Depression Literacy (MCQ-DL).

the full-item nor the short version had significant correlations with the fantasy or personal distress subscales (rs < .08, ps > .182). There was, however, a significant positive correlation between the empathic concern subscale and the full-item version alone ($r = .12$, $p = .037$, 95% CI [.01, .22]). Although there were some exceptions regarding these subscales, most of the correlations were in line with our predictions.

3.5. Test-Retest Reliability

Finally, using both the T1 and T2 datasets, we examined the test-retest reliabilities of the full-item and short versions. For the full-item version, the correlation coefficient between the T1 ($M = 0.66$, $SD = 0.13$, α = .64) and T2 ($M = 0.69$, $SD = 0.14$, α = .70) scores exhibited sufficient test-retest reliability ($r = .73$, $p < .001$, 95% CI [.67, .78]). By contrast, the correlation coefficient between T1 ($M = 0.60$, $SD = 0.16$, α = .19) and T2 ($M = 0.61$, $SD = 0.17$, α = .32) scores was relatively small ($r = .51$, $p < .001$, 95% CI [.40, .60]) for the short version.

4. Discussion

The present study developed a Japanese-translated version of the MCQ-DL and examined the properties of both the full-item (27 items) and short (10 items) versions of the questionnaire. The results provide several points of validity evidence for both the full-item and short versions of the MCQ-DL. The results from confirmatory factor analyses indicate that items from both versions examined the same concept of depression literacy. Moreover, both versions had some of the same related variables (stigmatizing attitudes toward depression, familiarity with people with depression, the empathy scale, and the perspec-

tive-taking subscale). It is also noteworthy that the items used in both versions exhibited a variety of difficulty and discrimination indices. Although it is desirable for Likert-scale based measures (e.g., measures of personality) to show consistency in item scoring trends (e.g., participants with high extroversion should provide high scores on every item of extroversion), knowledge tests should include items with various scoring trends to capture individuals' levels and provide detailed profiles of knowledge. For example, if the items of the MCQ-DL had very similar difficulty and discrimination indices to each other, the distribution of the summed scores would be biased severely; therefore, the profile of each participant would become nearly flat (i.e., each participant would provide correct answers to each item with a similar rate, regardless of the content of each item.). Therefore, the variety of difficulty and discrimination indices can be regarded as one piece of validity evidence for the MCQ-DL as a knowledge test. Considering also that the full-item and short versions had strong correlations to each other (r = .77, p < .001, 95% CI [.72, .80]), it seems safe to conclude that both versions of the Japanese-translated MCQ-DL properly measure the concept of depression literacy and are usable for capturing detailed profiles of depression literacy.

It should also be noted that the Japanese-translated MCQ-DL—the short version, in particular—seems to have limitations for use in correlation-based and multivariate analyses. As Cronbach's alpha coefficients indicate, the internal consistencies seem insufficient (α = .68) and poor (α = .28) for the full-item and short versions, respectively. Moreover, the test-retest reliability was insufficient for the short version (r = .51, p < .001, 95% CI [.40, .60]). Although it is inevitable that these reliability coefficients become smaller as the variety and numbers of items increase and decrease, respectively (Sijtsma, 2009), it becomes more difficult to capture individual differences accurately by using overall scores as the reliabilities of the measures worsen. Fluctuations in overall scores weaken the correlations with other variables, as is the case in the present study. Both the full-item and short versions of the MCQ-DL exhibited only weak correlations ($|r| \leq .22$) with stigmatizing attitudes toward and familiarity with people with depression, and components of empathy. It is therefore advisable to use the Japanese-translated MCQ-DL not to closely examine the relationships between the variables but to capture individuals' detailed depression literacy profiles.

Interestingly, issues with low reliability have not been reported in previous studies in North American countries using the original MCQ-DL (e.g., Foster et al., 2018; Gabriel & Violato, 2009). Considering that Foster et al. (2018) reported a good reliability coefficient (α = .81) even with the short version and that the participants in the present study frequently made mistakes on some items of the MCQ-DL (see Table 1 and Table 2 for details), it is possible that some items of the MCQ-DL function differently in North American countries and Japan. As indicated by the lack of well-validated measures of depression literacy (see the Introduction section for details) and by the cross-culturally high level of stigma

concerning depression (Griffiths et al., 2006), Japanese people possibly do not have as much detailed knowledge about depression as do North Americans. It is therefore possible that some items concerning "basic knowledge about depression" in North American countries (e.g., Item 19: "Which is NOT a common side effect antidepressant drugs?") are regarded by the Japanese as covering information that is much too detailed.

Limitations and Future Implications

Although the present study provides several points of validity evidence for the Japanese-translated MCQ-DL as a measure for capturing individuals' depression literacy profiles, there remains more room for validation. Future research should use the Japanese-translated MCQ-DL in educational programs related to depression that are especially focused on the components of depression literacy that seem unfamiliar to the Japanese. Such programs would be helpful for examining whether the Japanese-translated MCQ-DL demonstrates reactivity to interventions. It is also advisable for future research to administer the MCQ-DL among samples of healthcare providers as well as samples of the general public. If healthcare providers provide higher rates of correct answers for all the items than does the general public, this would provide strong evidence that the MCQ-DL has the potential to distinguish between people with higher and lower depression literacy.

The ideas presented above are merely examples of further validation methods. Future research should use the Japanese-translated MCQ-DL on a broad range of occasions and should store the relevant data regarding the questionnaire. Such stores of data would provide more detailed information about the psychometric properties of the MCQ-DL and would clarify the usage of the questionnaire in more detail.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

The Items of the Original Multiple-Choice Questionnaire of Depression Literacy (MCQ-DL) Validated by Gabriel and Violato (2009)

1. Which of the following statements about clinical depression is FALSE?[†]

a. It is a medical disorder.

b. It is a weakness of character.*

c. It is a common psychiatric disorder.

d. It affects both males and females.

2. What is the risk of death by suicide among clinically depressed patients?[†]

a. The risk is very minimal.

b. The risk is between 15% and 50%.*

c. The risk is below 15%.

d. The risk is above 50%.

3. What are the lifetime chances of becoming clinically depressed?

a. One in 1000.

b. One in 50.

c. One in 3.*

d. One in 1.

4. Which of the following is TRUE about the age of onset of clinical depression?[†]

a. Depression does not begin in adolescence.

b. Depression can start in childhood or adolescence.*

c. Depression appears for the first time in middle-aged people.

d. Depression does not affect young children.

5. Which of the following, about sex differences in clinical depression is TRUE?[†]

a. Only women get depressed.

b. Clinical depression is more common in women than men.*

c. Clinical depression is more common in men than women.

d. Only men get depressed.

6. Which of the following is FALSE about the relapse of clinical depression?

a. The number of previous episodes of clinical depression increases the chances of subsequent episodes.

b. After the first episode of clinical depression, there is an increased risk of a second episode.

c. Maintenance treatment can reduce the chances of relapse.

d. After recovery, there is zero risk for recurrence. *

7. Which of the following behavior is associated with poor outcome?

a. Taking antidepressant treatments regularly.

b. Being involved in talk therapy (psychotherapy).

c. Staying sober.

d. Stopping antidepressant medications if feeling well.*

8. What factors may trigger the onset of clinical depression?†

a. Biological factors, such as genes.

b. Psychological factors such as having marital problems.

c. Social factors such as losing a job.

d. All of the above.*

9. Depression may be triggered by all the following EXCEPT:

a. Prolonged severe grief over loved ones.

b. Taking antidepressants. *

c. Certain medical conditions.

d. The birth of a new baby.

10. The following are indications of clinical depression EXCEPT:†

a. Changes in sleep patterns.

b. Poor concentration.

c. Frequent crying for no obvious reasons.

d. Occasional sadness.*

11. Which is NOT true about the differences between clinical depression and a passing blue mood?†

a. People with depression can "pull themselves together."*

b. Depression can be much more disabling in day-to-day functioning.

c. Patients who are clinically depressed look sad.

d. Without treatment, symptoms of clinical depression can last for weeks, months, or years.

12. All of the following are recognized symptoms of clinical depression EXCEPT:

a. Marked loss of interests.

b. Excessive sleep.

c. Loss of energy.

d. Good concentration.*

13. Which of the following is NOT a symptom of clinical depression?

a. Restlessness.

b. Changes in appetite.

c. Good decisions making.*

d. Lack of energy.

14. All of the following are typical of patients suffering from clinical depression EXCEPT:

a. Negative thinking that can lead to self-defeating or suicidal behavior.

b. Mental fatigue and the inability to solve complicated problems.

c. Marked forgetfulness.

d. Normal memory.*

15. Which is NOT a common symptom of clinical depression?

a. Poor motivation.

b. Normal energy. *

c. Guilty thoughts.

d. Fatigue.

16. Which of the following statements about the speed of response to the treatment with antidepressants is FALSE?

a. Symptoms improve immediately after treatment is begun.*

b. Many antidepressants may take several weeks to start to work.

c. It is important to continue taking medication even if there is initial improvement.

d. Not all symptoms respond to antidepressants at the same rate.

17. If medication does not improve depressive symptoms, one should:

a. Stop taking all medication.

b. Talk to a health care professional.*

c. Double the pills.

d. Ask friends about what to do.

18. Which is NOT a recognized treatment for clinical depression?

a. Medication.

b. Talk therapy.

c. Light therapy (photo-therapy).

d. Kiekie therapy.*

19. Which is NOT a common side effect antidepressant drugs?

a. Upset stomach.

b. Sleep disturbances.

c. Sexual side-effects (e.g. problems with sexual desire or orgasm).

d. Feelings of depression.*

20. Which is FALSE about the effectiveness of antidepressant medications?

a. About 30% - 40% of patients do not respond to the initial treatment.

b. Moderate symptom improvement may take few weeks to be achieved in those who will respond.

c. Using more than one antidepressant may be necessary for some patients.

d. Recovery of symptom can be achieved in all depressed patients. *

21. What should one do if one's first antidepressant medication fails?

a. Consult one's doctors.*

b. Take sleeping pills.

c. Drink more alcohol.

d. Use magnetic therapy.

22. Which is FALSE about Electric Convulsive Therapy (ECT) for treating clinical depression?†

a. It is proved to be effective.

b. It is a safe method.

c. It is no longer used for treating depression.*

d. It is given under general anesthesia.

23. If one feels better during the course of treatment, one should:†

a. Stop taking antidepressant medication.

b. Discuss the course of antidepressants treatment with doctor.*

c. Reduce the antidepressant dose by half.

d. Start a course of herbal treatment.

24. Which is NOT a common occurrence during treatment with antidepressants?

a. Gaining weight. *

b. Severe continuous headaches.

c. Feeling sleepy.

d. Sweating.

25. Which is FALSE about the response to treatment with antidepressants?

a. Up to 80% of people with depression do get better with the right medication.

b. Most people with depression need to be treated for at least six to nine months to prevent relapse.

c. For some people, it is necessary to stay on medication for long-term maintenance therapy.

d. If the acute depressive symptoms are relieved, the patient should stop antidepressants.*

26. Which is FALSE about selecting the right antidepressant for someone with depression?

a. There are no available laboratory tests to guide doctors' choices for treating clinical depression.*

b. Different people have different responses to antidepressants.

c. Doctors can tailor antidepressants to suit the symptoms of individual patients.

d. Doctors can always tell beforehand how a person is going to respond to the medication they prescribe.

27. Psychotherapy can help many people with clinical depression. Which of the following statements about psychotherapy is FALSE?†

a. Both individual and group talk therapy provides an opportunity to express and discuss thoughts and feelings with the therapist.

b. Therapy may help to resolve life issues that may contribute to depression.

c. All depressed individuals benefit from psychotherapy.*

d. In psychotherapy, negative, and self-defeating thoughts can be replaced by more positive, realistic thoughts.

†Items for the short version of the questionnaire picked by Foster et al. (2018).
*Correct choice for each item.