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Validating a Japanese Version of the Metacognitive Awareness of Reading Strategies Inventory (MARSI): A PLS-SEM Repeated Indicator Analysis

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The main objective of the current study was to find the appropriate factor structure for the English reading strategies employed by Japanese university students by using a version of the Metacognitive Awareness of Reading Strategies Inventory (MARSI), a well-validated instrument commonly used in various contexts and languages, which was adapted by translating the survey items into Japanese. Finding the appropriate factor structure for reading strategies allows any correlation between the many variables offered in the MARSI to be easily measured and determined. Data for the study were collected from 72 first-year undergraduate students at a university in Japan. For data analysis, descriptive tests were computed with SPSS 22; for the validity of the instrument, the partial least squares structural equation modeling (PLS-SEM) repeated indicator approach was employed, and measurement and structural models were obtained through the SmartPLS software. Results show that for Japanese EFL students, problem-solving reading strategies evoked the highest response. Moreover, 13 MARSI items were found to be valid after data analysis. The pedagogical implications for this research impact a number of disciplines, including syllabus designers, material developers, and lesson planners in reading activities in English teaching contexts. Theoretically, students themselves can also use the knowledge from this research to apply more metacognitive approaches to their reading.

Introduction

Reading is essential for second language learners who want to develop their language skills in general. It is undeniably one of the most effective methods for broadening one's horizons and acquiring new information. Moreover, Ahmed (2016) found that students develop and grow in all areas of learning by improving their reading skills.

Metacognition is commonly defined as "thinking about thinking." Coined by James H. Flavell (1976), the term involves self-regulation and self-reflection on the strengths, weaknesses, and types of strategies one develops with that knowledge. Since its inception, metacognition has become a foundation of culturally sensitive leadership, since it emphasizes how one thinks through a problem or situation and the strategies one develops to address it. Flavell's model identifies four types of metacognition: 1) metacognitive knowledge, 2) metacognitive experiences, 3) metacognitive tasks or goals, and 4) metacognitive strategies (Flavell, 1987). He later narrowed down and identified what he believed to be two elements of metacognition: knowledge of cognition and regulation of cognition (Flavell, 1985). These categories serve as a framework for thinking about the theory. Metacognitive awareness is an individual's comprehension or knowledge of their mental operations and the consequences of those procedures. Hence, metacognitive awareness of reading strategies addresses readers' understanding of the reading techniques they use when reading. Typically, teachers assign reading comprehension questions to assess comprehension of the text rather than teach metacognitive techniques for processing texts. However, Graham and Bellert (2004) emphasized the importance of teaching metacognitive techniques to help students overcome challenges in reading and comprehension. For this reason, research recommends teaching reading methods in schools to help students improve their reading abilities (Akkakoson, 2012; Carrell, 1998). Moreover, Vandergrift (2002) calls metacognitive awareness of reading strategies essential, since it allows language learning tasks to be monitored, regulated, or guided, and most importantly, allows for reflection on the learning process.

English proficiency in Japan has been rated "low" for the fourth straight year (So, 2019). This research attempts to investigate one potential cause of the deficiency by examining the metacognitive awareness of reading strategies among university students. The results of

this study will assist pedagogical experts in creating reading activities and curricula with the goal of increasing Japan's English proficiency.

Literature Review

Reading and Metacognition

Metacognition is increasingly seen as a crucial component for understanding learners and their learning processes, as well as an essential lens through which to evaluate learning efficiency, both in educational psychology and linguistics and language education. Researchers have also increasingly noted the relevance of metacognition for students' compositional processes for development (Lee & Mak, 2018; Teng & Huang, 2019). Across theoretical perspectives, a common early model of metacognition comprises two main components: knowledge of cognition and cognition control. Knowledge about cognition is known as the metacognitive knowledge of an individual (van Kraayenoord, 2010).

Flavell (1987) claimed that metacognitive knowledge consists of self-awareness, task-related information, and the use of strategic knowledge. Self-regulation refers to measures used to reach a person's learning goals and gain competence in a certain field, including metacognitive control as well as surveillance. Metacognitive monitoring refers to examining or evaluating an ongoing or present cognitive activity, while metacognitive control refers to continuous cognitive activity regulation (Dunlosky & Metcalfe, 2009). Metacognition's self-regulation component comprises the planning, control and testing, and revision of cognitive processes. Metacognitive knowledge, according to Pressley et al. (1985), is "potentially conscious and controllable" (p. 4).

Self-regulated readers actively participate in cognitive and metacognitive activities before, during, and after reading (Paris et al., 1991). In addition, they participate in "constructive reading," which entails reading with a purpose and actively building meanings from the text (Pressley & Afflerbach, 1995).

At the heart of reading is the objective of building meaning or comprehension. Reading comprehension is a complex and multidimensional process that requires the reader to orchestrate a variety of skills and tactics to interact with texts deliberately and critically. Reading comprehension

influences the reader's knowledge, experiences, and intent towards the substance and characteristics of the text and its setting or context. Specifically, it comprises the outcomes of processing textual concepts related to the reader's previous knowledge and experiences and mental representation of the text (Kintsch, 1998). Metacognitive processes that contribute to reading understanding include metacognitive knowledge, metacognitive monitoring, and control, consistent with the concept of metacognition (van Kraayenoord, 2010).

Researchers came to recognize the relevance of metacognitive awareness in reading by studying reading understanding among skilled and unskilled readers (Mokhtari & Reichard, 2002). However, the difference between "strategy" and "skill" must be identified, since several definitions of "strategy" have arisen, and distinguishing the two terms has become difficult. For example, Urquhart and Weir (2014) posited a difference between "reader-oriented" and "text-oriented" strategies. In contrast, Aarnoutse and Schellings (2003) described reading strategies as the "special heuristics, procedures, or processes actively adopted by readers to develop and understand properly what a book contains" (p. 391). In contrast, Wallace (2003) described reading strategies as "the different approaches to reading difficulties" (p. 20). Based on these definitions, one can conclude that reading strategies can be used successfully to improve reading competence. The current research attempts to unpack the degree to which Japanese university students employ reading strategies and identify the factors and correlations between the variables offered on the MARSI.

Ishihara (1999) investigated how Japanese junior and high school students develop their metacognitive knowledge and awareness and how metacognition develops in good and poor readers. The results showed that, among other factors, some metacognitive knowledge depends on the number of years of English instruction. Further examination of the metacognitive knowledge of Japanese students at the post-high school (university) level will offer additional insight into the degree to which Japanese university students employ metacognitive strategies when reading.

In an exploratory quantitative survey on the metacognitive awareness of reading strategy use in English of Japanese university students, Shikano (2013) reported that overall, students tended to use problem-solving strategies slightly more often than global and support strategies. This was consistent with the findings of prior studies (Alhaqbani

& Riazi, 2012; Martinez, 2008). Correlations among strategies revealed about 15% of potential combinations of strategies showed weak or moderate relationships, which indicated that the strategy items were distinct from one another. In contrast, the current paper chose to use a PLS-SEM repeated indicator approach for the validity of the instrument, and measurement and structural models were obtained with the SmartPLS software. This updated approach to data analysis offers further insight into the overall tendencies of Japanese university students' use of metacognitive reading strategies and contributes to the pedagogical insights for syllabus designers, material developers, and lesson planners in reading activities in the English teaching context.

Metacognitive Awareness Reading Strategies

Global Strategies

The first subcategory of metacognitive reading techniques is global reading strategies. Mokhtari and Sheorey (2002) defined global tactics by readers as "deliberate, well-planned techniques" (p. 4). Moreover, readers using global reading strategies always have the objectives of reading, activate previous understanding, check if the material serves the reader's purpose or is useful to the reader, skim to find relevant information, decide what to read, and utilize contextual hints, structures, and other textual features to enhance reading understanding (Pookcharoen, 2009). Hence, readers who use global reading methods have specific reading intentions and seek solutions that help them meet their reading goals.

Mokhtari and Reichard's Reading Strategy Survey (2002) included a series of 13 questions, including "I decide what to read closely and what to ignore" and "I think about what I know to help me understand what I read" (p. 252). This survey thus provides a collection of reading methods for a worldwide text analysis (Mokhtari & Reichard, 2002) and is among the survey questionnaires employed by researchers to understand how English learners interact with their reading materials.

Problem-Solving Strategies

The second category of metacognitive reading techniques includes problem-solving. As defined by Mokhtari and Sheorey (2002), problem-solving strategies are activities or methods employed by readers in direct

interaction with the text as located, concentrated approaches that can be employed while reading. These techniques give readers action plans to successfully traverse the text (Mokhtari & Reichard, 2002). Examples of some such techniques are being mindful of what one reads, taking a rest to check one's knowledge, reading multiple times, examining the material, and reading loudly or employing guessing skills when encountering unfamiliar vocabulary (Songsiengchai, 2010).

Support Strategies

The remaining subcategories of metacognitive reading techniques are described as focus mechanisms of support for reading that help readers to understand the texts (Sheorey and Mokhtari, 2001). The 2002 study by Mokhtari and Reichard identifies nine functional or supportive strategies (for example, "I take notes while reading," "I underline or circle information in the text to help me remember it," and "I summarize what I read to reflect on important information in the text" [pp. 252–253]) that readers use when reading. In follow-up research, Songsiengchai (2010) also found that readers use reading strategies such as using a dictionary, highlighting important points, translating from English into their native languages, and employing other supportive materials to better understand texts in English. In summary, supportive reading methods include seeking outside guidance or engaging in individual practices to improve one's comprehension of academic English documents.

The Objective of the Research

"Intangible assets," such as metacognitive reading strategies, have been described as a multifaceted concept (Tefera & Hunsaker, 2022). However, there are gaps in studies that consider intangible assets as high-order constructs. Tefera and Hunsaker (2022) found that the establishment of intangible assets as a high-order construct model is valid. The analysis used in this paper is distinct from other research models in that a hierarchical component model is used to close the gap in research between intangible assets as a high-order construct. The high-order construct model uses PLS-SEM which allows for a more accurate estimation of the complex cause-effect relationships between metacognitive awareness of reading strategies of students.

This study aimed to identify the appropriate factor structure for an adapted-for-Japanese version of the Metacognitive Awareness of Reading Strategies Inventory (MARSI). The MARSI was adapted by translating the survey items into Japanese, which made it easier for Japanese students to understand the questions and accurately represent their perceived reading strategies in their responses. Using the framework provided by previous studies, it examined the use of English reading strategies in academic contexts as reported by Japanese university students to identify their overall bias and key components influencing their choice of strategies. It addressed the following research questions:

1. What is the appropriate factor structure for the variables offered in the MARSI?
2. What general patterns can be seen in the construct-validated MARSI items reported by Japanese university English as foreign language (EFL) learners? Which reading strategy subscales and items are used most and least?

Methodologies

Sample

The study employed a convenience sampling approach because the researcher had twice-weekly classroom access to students who were willing to participate in the study. Data were collected from students at a university in Kyoto, Japan. The study sample comprised 72 first-year students studying English in a required course called "Communicative English." Students ranged in age from 18 to 19 years old. Participants were of mixed gender and had learned English in the Japanese junior and senior high school system. All participants were assessed at the "High Intermediate" level of English based on the Common European Framework of Reference for Languages (CEFR). All students were non-English majors whose first language was not English. Students completed the MARSI anonymously during the class. The MARSI was administered either in the morning from 9 a.m.–12:15 p.m. or in the afternoon from 1:10 p.m.–4:25 p.m., depending on when the group met for class.

The Instrument

Mochtari and Reichard (2002) created the MARSI to assess both readers' knowledge and perceived use of reading techniques using three

sub-scales for global, problem-solving, and reading support strategies. MARSI comprises 30 items, out of which 13 test global strategies, 8 test problem-solving strategies, and 9 test reading support strategies. The reliability and validity of MARSI were determined by the evaluation and measurement of psychometric data. In recent years, the MARSI has been employed by numerous researchers to assess metacognitive reading strategies at the school, college, and academic levels (e.g., Fitrisia et al., 2015, Veloo et al., 2015; Wu et al., 2012). Moreover, researchers have also investigated MARSI's relevance to other areas of learning. For instance, a study investigating relationships between the MARSI and student achievements in Malaysia showed a modest positive correlation between the two variables (Veloo et al., 2015). Similarly, Fitrisia et al. (2015), using a sample from Indonesia, found a positive correlation between MARSI and academic performance in reading comprehension.

The MARSI questionnaire is originally a document in English. It was translated from English to Japanese for this research (See Appendix A for translation). Below is a list of the 30 questions asked on the MARSI. Students were asked to choose their tendencies from 1 (never) to 5 (always) for each strategy:

1. I have a purpose in mind when I read.
2. I take notes while reading to help me understand what I read.
3. I think about what I know to help me understand what I read.
4. I preview the text to see what it is about before reading it.
5. When the text becomes difficult, I read aloud to help me understand what I read.
6. I summarize what I read to reflect on the text.
7. I think about whether the content of the text fits my purposes.
8. I read slowly but carefully to be sure I understand what I read.
9. I discuss what I read with others to check my understanding.
10. I skim the text first by noting the text characteristics and keywords.
11. I try to get back on track when I lose concentration.
12. I underline or circle information in the text to help me remember it.
13. I adjust my reading speed according to what I read.
14. I decide what to read closely and what to ignore.
15. I use reference materials such as dictionaries to help me understand what I read.
16. When text becomes too difficult, I pay closer attention to what I am reading.
17. I pay attention to transition words to help me understand the text.
18. I stop from time to time and think about what I am reading.

19. I use context clues to help me better understand what I am reading.
20. I relate ideas in my own words to better understand what I am reading.
21. I try to picture or visualize information to help me remember what I need.
22. I use typographical aids like bold face and italics to identify key information.
23. I critically analyze and evaluate information in the text.
24. I go back and forth in the text to find relationships among ideas in it.
25. I check my understanding when I come across conflicting information.
26. I try to guess what the material is about when I read.
27. When text becomes difficult, I reread to increase my understanding.
28. I ask myself questions I like to have answered in the text.
29. I check to see if my guesses about the text are right or wrong.
30. I try to guess the meaning of unknown words or phrases.

Statistical Approach

This paper used variance-based structural equation modeling (SEM) to analyze the data. While there are four general types of models in SEM, this study used a formative type model (Hassan et al., 2015). To validate e-lifestyle devices using partial least squares (PLS) analysis, the software SmartPLS 3.0 (Ringle et al., 2015) was utilized. PLS was chosen as the methodological choice for several reasons: First, it sets minimum requirements for residual distributions and sample size to ensure adequate numerical power (Hair et al., 2012). Second, it accommodates the advanced technique of combining analytical structure with other techniques (Acedo & Jones, 2007). Third, it allows simultaneous assessment of the measurement and structural model (Chin, 1998) without causing multicollinearity problems (Inkpen & Birkenshaw, 1994). Fourth, it allows evidence to be analyzed early in the formation of the theory (Tsang, 2002).

Results

Table 1 shows descriptive statistics and values of skewness and kurtosis for the three strategies. The PLS-SEM method was reported using the criteria of Hair et al. (2013). Because PLS-SEM is non-parametric, it was not necessary to distribute the data regularly. However, the checked data were not far from a normal distribution. Before data analysis, skewing and kurtosis were analyzed to determine how symmetrical the distribution of each variable was (Hair et al., 2013).

The question items in Table 1 are classified according to the three subscales of the MARSI Reading Strategies: global strategies (glo), support strategies (sup), and problem-solving strategies (pro) (Mokhtari & Sheorey, 2002).

Table 1. Descriptive Statistics

Descriptive Statistics						
Type: Strategy	**Minimum**	**Maximum**	**Mean**	**Std. Dev**	**Skewness**	**Kurtosis**
glo1: I have a purpose in mind when I read	1	5	3.28	1.02	–.18	–.45
glo2: I think about what I know to help me understand what I read	2	5	3.83	0.87	–.32	–.55
glo3: I preview the text to see what it is about before reading it	1	5	3.53	1.10	–.46	–.50
glo4: I think about whether the content of the text fits my reading purpose	1	5	3.03	1.02	–.46	–.51
glo5: I skim the text first by noting characteristics like length/organization	1	5	3.10	1.31	–.03	–1.15
glo6: I decide what to read closely and what to ignore	1	5	3.35	0.98	–.47	–.18
glo7: I pay attention to transition words to help me understand the text	1	5	4.01	0.92	–.90	.68
glo8: I use context clues to help me better understand what I am reading	1	5	3.76	1.12	–1.00	.80
glo9: I use typographical aids like bold face and italics to identify key information	1	5	3.35	1.10	–.28	–.56
glo10: I critically analyze and evaluate the information presented in the text	1	4	2.64	0.90	.09	–.88
glo11: I check my understanding when I come across conflicting information	1	5	3.46	0.90	–.22	.32
glo12: I try to guess what the material is about when I read	1	5	3.81	0.94	–.42	–.19
glo13: I check to see if my guesses about the text are right or wrong	1	5	3.07	1.06	.07	–.64
sup1: I take notes while reading to help me understand what I read	1	5	2.86	1.23	.22	–.89

Descriptive Statistics

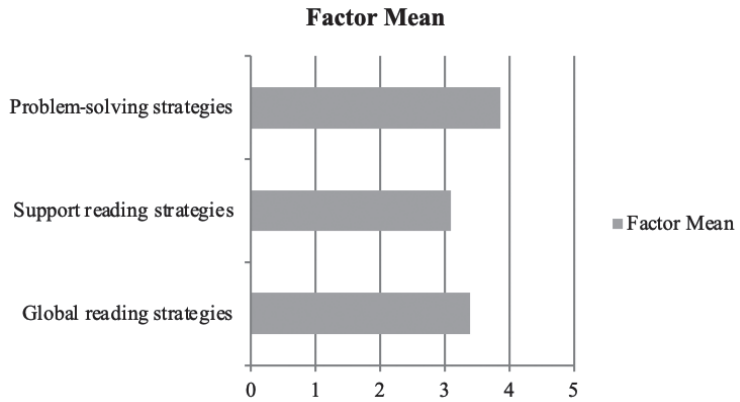
Type: Strategy	Minimum	Maximum	Mean	Std. Dev	Skewness	Kurtosis
sup2: When text becomes difficult, I read aloud to help me understand what I read	1	5	2.97	1.36	.05	–1.15
sup3: I underline or circle information in the text to help me remember it	1	5	2.79	1.26	.23	–1.01
sup4: I use reference materials such as dictionaries to help me understand what I read	1	5	2.78	1.16	.06	–.99
sup5: I summarize what I read to reflect on the text	1	5	3.72	1.17	–.76	–.27
sup6: I go back and forth in the text to find relationships among ideas in it	1	5	3.65	1.12	–.48	–.49
sup7: I relate ideas in my own words to better understand what I am reading	1	5	3.40	1.08	–.46	–.67
sup8: I discuss what I read with others to check my understanding	2	5	4.08	0.68	–.37	.133
sup9: I ask myself questions I like to have answered in the text	1	4	2.26	0.93	.18	–.84
pro1: I read slowly but carefully what I read to be sure I understand what I read	1	5	3.90	0.84	–.68	.93
pro2: I try to get back on track when I lose concentration	1	5	3.75	1.08	–.70	–.00
pro3: I adjust my reading speed according to what I am reading	1	5	3.81	1.04	–.66	–.05
pro4: When text becomes difficult, I pay closer attention to what I am reading	2	5	4.15	0.81	–.61	–.35
pro5: I stop from time to time and think about what I am reading	2	5	4.14	0.81	–.75	.20
pro6: I try to picture or visualize information to help remember what I read	1	5	2.78	1.17	.23	–.83
pro7: When text becomes difficult, I re-read to increase my understanding	2	5	4.15	0.83	–.74	–.00
pro8: I try to guess the meaning of unknown words or phrases	2	5	4.32	0.78	–.99	.515

Table 1 shows that the skewness and kurtosis of the items were well below the recommended variability transformation thresholds, between -1 and +1 (Ghisseli et al., 1981). Non-normal data are, therefore, not a problem for the study. The outcomes of the study are discussed below.

Table 2. Ranking of Factors

	Factor Mean	Rank
Global reading strategies	3.4	2
Support reading strategies	3.1	3
Problem-solving strategies	3.87	1

Figure 1. Means of Factors



Note. Mean average values from Table 1 depict the rank of the items.

Table 1 shows overall trends by providing statistical descriptions of the reported use of reading strategies. The mean score (M) and the standard deviation (SD) of the overall responses are shown.

Mokhtari and Sheorey (2002) established a key to interpreting the means as follows: A mean of 2.4 or lower as low usage, a mean between 2.5 and 3.4 as moderate usage, and a mean of 3.5 as high usage. The present study follows the same standard. The means of individual items ranged from 4.32 (SD = 0.78) to 2.26 (SD = 0.93). Of the 30 items examined in this study, 16 strategies were considered high-use strategies and 13 were considered moderate-use strategies, while 1 belonged to the low-use domain. The mean values of all problem-solving strategies (pro) factors had high scores, except one item ("I try to picture or visualize information to help remember what I read"), which had a medium mean

score of 2.78 and thus a medium score (pro6). All the global reading strategies (glo) items had high or medium scores. Similarly, almost all support reading strategies (sup) items also had high and medium scores, except for one item (sup 9) ("I ask myself questions I like to have answered in the text"), which had a low mean score of 2.26. Because only one low-use strategy was found, it can be concluded that the participants in this study were high to moderate users of the MARSI reading strategies. This overall tendency is consistent with some prior studies (Shikano, 2013).

The next table (Table 2) shows participants' preferences for each subscale. The main preference for problem-solving strategies (factor mean = 3.87) is consistent with previous studies (Alhaqbani & Riazi, 2012; Martinez, 2008; Shikano, 2013). While participants used problem-solving strategies more than the other two types of strategies, the use of neither global reading strategies nor support reading strategies was low. The rankings of these strategies, however, diverged from previous findings and were in fact the inverse to those in Shikano's research (2013), with a lower factor mean for support reading strategies. Specifically, the least-frequently used item (sup 9) ("I ask myself questions I like to have answered in the text") had the lowest mean of all the strategies, which bought down the overall mean average for this strategy.

Overall mean scores for the factors in this study are shown in Figure 1. The highest factor mean score among the three strategies was 3.87 for problem-solving strategies, the second highest was 3.4 for global strategies, and the lowest was 3.1 for support strategies.

Table 3. Validity of Construct

Items	Weight	Loading	VIF	T Value	P Value
glo4	0.181	0.953	1.04	80.59	0.00
glo6	0.181	0.944	7.39	76.32	0.00
glo7	0.181	0.954	9.27	88.49	0.00
glo8	0.178	0.957	9.5	72.79	0.00
glo10	0.177	0.89	4.26	22.15	0.00
glo11	0.166	0.939	6.65	71.52	0.00
pro1	0.264	0.933	4.68	73.6	0.00
pro4	0.268	0.956	6.86	90.4	0.00
pro6	0.267	0.942	5.11	61.07	0.00
pro8	0.261	0.943	5.76	81.39	0.00
sup7	0.358	0.953	5.46	75.3	0.00
sup8	0.347	0.925	3.32	65.63	0.00
sup9	0.353	0.958	5.8	51.27	0.00

Figure 2. Measurement Model

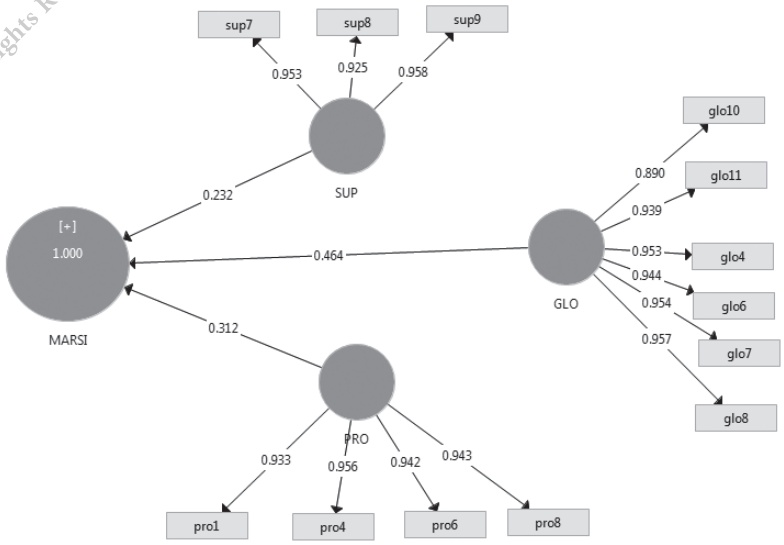


Table 3 illustrates the assessment of formative constructs using the weight significance of each item. It shows that all items have a weight above 0.1 (Hassan et al., 2015) and are significant at 1% alpha. Moreover, all item loadings are above 0.7 and reasonably meet the rule-of-thumb minimum criteria of 0.7 (Hair Jr. et al., 2014). According to Hair Jr. et. al., item loadings above 0.7 indicate that the construct explains more than 50% of the indicator's variance, which confirms the indicator exhibits acceptable item reliability. Table 3 shows the variance inflation factor (VIF) is less than the commonly used rule-of-thumb criteria of 10 for all three construct indicators of MARSI. Therefore, there is no concern about cross-indicator multi-linearity. Figure 2 indicates the measurement model, which comprises the indicators measuring latent variables as well as the path coefficients between constructs along with their R-square values. It shows that the measurement model is comprised of 13 out of the total 30 MARSI items. These 13 items are considered for discussion here. Other items were deleted due to high VIF values.

Discussion

The average total score reflects the frequency at which students employed techniques from the inventory when reading academic texts.

The averages for each inventive sub-scaling reveal which methods (global, problem-solving, or supportive) students most or least employed while reading. This set of data allows the identification of whether they scored extremely high or very low (Mokhtari & Reichard, 2002). Students in this study scored highest on problem-solving strategies. This shows that when readers have difficulties understanding the material, they employ self-contained techniques, such as adapting their reading pace to the ease or difficulty of the textual material, guessing the meanings of unknown words, or re-reading the text to improve understanding. These findings are consistent with Shikano's (2013) findings from a similar study conducted at Nanzan University in Japan. For the problem-solving reading strategies, mean scores for all items except one are high, which imply that students' awareness of problem-solving skills is high. Results for the other two factors also show average to high mean scores for the items, apart from the support reading strategy (sup 9) ("I ask myself questions I like to have answered in the text"). Some possible reasons why the use of support reading strategies is low compared to other studies may be attributed to factors including a misunderstanding of the item or an element of meaning lost in the translation of the item. Nevertheless, the average total scores show that students are aware of these reading strategies and use them often.

Students' preferences are consistent with those found in previous studies, such as Dündar (2016), which was conducted in Poland with Computer Science students and showed an identical ranking of the means factor (with problem-solving strategies as the most used type, followed by global reading strategies and support reading strategies). However, in Dündar (2016), mean scores for global reading strategies and support strategies were low, while the current study found high and medium scores for both factors. Moreover, the lowest reading strategy used in this study, support reading strategy (sup 9) ("I ask myself questions I like to have answered in the text"), was also one of the three lowest-ranked strategies in Dündar (2016).

The MARSI findings from this study indicated that the students preferred to re-read texts when they encountered difficulties and tried to focus more slowly and carefully on what they were reading. In addition, they mostly tried to guess the meanings of unfamiliar words or phrases. This means that students see concentration as an important element in understanding a text. However, learners did not often discuss their readings with others to check their understanding, nor did they critically analyze or

evaluate the information presented in the text. These findings suggest that it may be beneficial for students to form groups to discuss readings to collectively build a better understanding of the text. In addition, students may benefit from being more proactively educated of critical thinking skills, including how to critically analyze and evaluate information in texts.

MARSI thus reveals information that can help students improve their reading skills by enabling students to evaluate themselves and modify their ideas about reading and learning from the text in connection with other readers. A crucial first step to careful reading that emphasizes contemporary reading models is to become aware of one's cognitive processes in reading (Mokhtari & Reichard, 2002).

Pedagogical Implications

Information obtained from MARSI can be a valuable tool for instructors, who can use it to evaluate, monitor, and document the types and amounts of reading techniques employed by their students. For instance, teachers may evaluate the overall responses to ensure that students have an overall familiarity with and ability to use the many reading techniques suggested. Over- or under-reliance on a specific method may indicate how students handle the reading assignment.

EFL instructors can make use of the findings of this study to help improve the reading skills of EFL students by helping them understand what metacognitive reading strategies are and dedicating classroom time to teaching and practicing these strategies. Hudson (2007) described a successful reading strategy curriculum as continuous modeling and demonstration with ample opportunities for practice across different texts and tasks, rather than simply lists of strategies. Janzen and Stoller (1998) posited four criteria that must be met to develop a successful reading strategy curriculum: 1) the selection of texts appropriate to the student's level, 2) the selection of reading strategies to include in the program, 3) the planning of lessons for the presentation of strategies, and 4) the adaptation of teaching strategies to meet students' needs.

Conclusion

This study attempted to find the appropriate factor structure for English reading strategies employed by Japanese university students using a version of the MARSI, which was adapted by translating the survey

items into Japanese. For the validity of the instrument, a PLS-SEM repeated indicator approach was employed, and measurement and structural models were obtained with the SmartPLS software. Thirteen MARSI items were found to be valid after data analysis. The perceived use of metacognitive reading strategies by Japanese university students was explored, and the most- and least-used reading strategy subscales were calculated and examined. Participants showed general preferences for using problem-solving (pro) strategies over support (sup) and global (glo) strategies. These findings are consistent with the findings and implications of previous studies on the general tendency towards metacognitive perception of reading strategies. The findings of this research are significant in that they offer a clear and accurate validation of previous studies that did not apply a high-order construct model to test the data using PLS-SEM.

Like any social science research, this study has limitations. There are few such studies focusing specifically on Japanese university students, which makes comparisons and seeking validation limited. Moreover, the sample size of this study was small. For high-order construct models using structural equation modeling, a sample size of at least 100 is a rule of thumb that has been advanced (Boomsma, 1985), however, such rules are said to be problematic as they are not model-specific. In future studies, researchers can employ a larger sample that may offer more accurate findings. Finally, while concerted efforts were made to ensure the reliability of the English-to-Japanese translation, sometimes meaning can get lost. There is no telling to what extent the students understood the concepts in the MARSI questionnaire. Moreover, the level of diligence with which the students answered the questions cannot be determined.

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Appendix

MARSI Questionnaire (Translated into Japanese)

大学のリーディングクラスで英語の教材を読む時、どのような状況が最も当てはまるかを1〜5 の中から選んでください。

率直にありのままお答え下さい。大学の成績とは一切関係ありません。ご協力よろしくお願いいたします。

回答例（1〜5 の数字をひとつ選び、その番号に○印をつけてください。）

1	2	3	4	5
全く、ほとんどしない Never	たまにしかしない Occasionally	時々 (50% の頻度) する Sometimes	たいていする Usually	常に (ほぼ毎日) する Always

リーディングクラスで英語教材を読むときのストラテジー (読解方略) / Strategy	スケール (尺度) / Scale				
1. 私は英語の教材を、目的をもって読む。 I have a purpose in mind when I read.	1	2	3	4	5
2. 私は内容を理解する助けとして，メモをとりながら読む。 I take notes while reading to help me to understand what I read.	1	2	3	4	5
3. 私は内容を理解する助けとして，自分が知っていることを思い浮かべる。 I think about what I know to help me understand what I read.	1	2	3	4	5
4. 私は内容を把握するために，読む前に文全体にさっと目を通す。 I preview the text to see what it is about before reading it.	1	2	3	4	5
5. 私は文が難しくなると，内容を理解する助けとして、音読する。 When text becomes difficult, I read aloud to help me understand what I read.	1	2	3	4	5
6. 私は文中にある重要な情報を振り返るために，読んだ内容を要約する。 I summarize what I read to reflect on the text.	1	2	3	4	5
7. 私は読む文の内容が自分の読解目的に合っているかどうか、について考える。 I think about whether the context of the text fits my purposes.	1	2	3	4	5
8. 私は読んでいるものが理解できているかを確かめるために，ゆっくりではあるが注意深く読む。 I read slowly but carefully to be sure I understand what I read.	1	2	3	4	5
9. 私は自分の理解を確認するために，ほかの人と読んだ内容について話し合う。 I discuss what I read with others to check my understanding.	1	2	3	4	5
10. 私は文の長さや構成といった特徴を知るために，最初に文全体にさっと目を通す (スキミング) 。 I skim the text first by noting text characteristics and keywords.	1	2	3	4	5

リーディングクラスで英語教材を読むときのストラテジー（読解方略）/ Strategy	スケール（尺度）/ Scale				
11. 私は集中力がなくなってきたら，すでに読んだところの段落にもう一度戻ろうとする。 I try to get back on track when I lose concentration.	1	2	3	4	5
12. 私は内容を思い出す助けとして，文中の情報に下線や丸印をつける。 I underline or circle information in the text to help me remember it.	1	2	3	4	5
13. 私は読んでいるものによって，読む速さを変える。 I adjust my reading speed according to what I read.	1	2	3	4	5
14. 私はきちんと読むべき箇所とそうでない箇所を，見極めて読む。 I decide what to read closely and what to ignore.	1	2	3	4	5
15. 私は内容を理解する助けとして，辞書などの道具を活用する。 I use reference materials such as dictionaries to help me understand what I read.	1	2	3	4	5
16. 文が難しくなるとき，私はよりいっそう何を読んでいるかに注意して読む。 When text becomes too difficult, I pay closer attention to what I am reading.	1	2	3	4	5
17. テキストの接続語に注意して，テキストの流れをつかむようにする。 I pay attention to transition words to help me understand the text.	1	2	3	4	5
18. 私は時折、読むのをやめて，何を読んでいるかについて考える。 I stop from time to time and think about what I am reading.	1	2	3	4	5
19. 私は内容をより深く理解できる助けとして，文脈からのヒントを利用する。 I use context clues to help me better understand what I am reading.	1	2	3	4	5
20. 私は内容をより深く理解するために，自分の言葉で言い換え（パラフレーズ）をする。 I relate ideas in my own words to better understand what I am reading.	1	2	3	4	5
21. 私は内容を思い出す助けとして情報を絵で表現したり，視覚化しようとする。 I try to picture or visualize information to help me remember what I read.	1	2	3	4	5
22. 私は重要な情報を確認するために，大文字やイタリック体のような書体の変化に注目する。 I use typographical aids like bold face and italics to identify key information.	1	2	3	4	5
23. 私は文に出てきた情報を批判的に分析，評価する。 I critically analyze and evaluate the information in the text.	1	2	3	4	5
24. 私は文の中にある考えのつながりを見つけるために，文を行ったり来たりしながら読む。 I go back and forth in the text to find relationships among ideas in it.	1	2	3	4	5
25. 私は矛盾する情報に出くわすとき，自分の解釈を確認する。 I check my understanding when I come across conflicting information.	1	2	3	4	5

リーディングクラスで英語教材を読むときのストラテジー (読解方略) / Strategy	スケール (尺度) / Scale				
26. 私は読むとき，その教材が何に関するものなのかを推測しようとする。 I try to guess what the material is about when I read.	1	2	3	4	5
27. 文が難しくなるとき，私は理解を深めるために読み返す。 When text becomes difficult, I reread to increase my understanding.	1	2	3	4	5
28. 私は答えが文の中に入っていると期待しながら読む。 I ask myself questions I like to have answered in the text.	1	2	3	4	5
29. 私は文に関する自分の推測が正しいのか，間違っているのかどうかを知るためにその文を確認する。 I check to see if my guesses about the text are right or wrong.	1	2	3	4	5
30. 私は知らない語や語句の意味を推測しようとする。 I try to guess the meaning of unknown words or phrases.	1	2	3	4	5

Reference: Mokhtari, K., & Reichard, C. A. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of educational psychology, 94*(2), 249–259.