

Reading in Japanese as a Second Language: A Review of Empirical Research

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During the past few decades the Japanese language has grown to be a popular second or foreign language (L2), and research on reading and learning of Japanese as L2 has started to appear in major academic journals and books in the fields of applied linguistics, second language acquisition, second/foreign language education, along with the more commonly researched languages such as English, Spanish and French. In this article, I will first describe theoretical assumptions used in L2 reading research and then present a review of recent empirical studies on reading in Japanese as L2, identifying major topics and issues addressed and analyzing research methodology used, and make some suggestions for future investigation.

1. Theoretical Assumptions

1.1 Influence from L1 reading research

Research on reading in a nonnative or second language (L2) has developed through the application of ideas and perspectives from research on reading in English as a native or first language (L1) since 1970's. The Goodman's psycholinguistic model (1970) and the Rumelhart's interactive theory (1977), along with schema theories (Rumelhardt, 1980; Schank & Abelson, 1977), have significantly influenced L2-reading research. As a result researchers and practitioners in the L2 learning and teaching have come to conceptualize that reading is an active process in which the reader constructs meaning through his interaction with the text, and that reading is a dynamic process in which both bottom-up processing (e.g., from letter identification and word recognition to sentence comprehension) and top-down processing (e.g.,

use of background knowledge to make a prediction about subsequent text) take place interactively (Bernhardt, 1991; Carrell, Devine, & Eskey, 1988; Grabe, 1991; Swaffar, Arens, & Byrnes, 1991). Other L1-reading theories and perspectives, such as the Just & Carpenter's capacity hypothesis (1992), the Perfetti's verbal efficiency theory (1985, 1988), and the Stanovich's interactive-compensatory model (1980, 1981), have also been introduced into L2-reading research. According to these theories and perspectives, with the limitation of cognitive resources or working memory capacity, lower-level processing is prioritized than higher-level conceptual processing. Therefore the efficiency of lower-level processing skills is critical to successful comprehension of a text, which further affects development of reading proficiency. Those who are not fluent in word recognition rely more heavily on context in order to compensate the inadequacy of lower-level processing; good readers can recognize words quickly and understand sentences which contain the words. These ideas have been useful to describe and explain the effect of fluency in L2 reading (Koda, 1996; Harrington & Sawyer, 1992; McLaughlin, Rossman, & MacLeod, 1983).

Recently the field of L1 reading and text comprehension research has made impressive advancements, providing detailed accounts of the cognitive processes at play at various stages of reading (Balota, Flores d'Arcais, & Rayner, 1990; Gernsbacher, 1994; Kintsch, 1998). Although different theories are available, a general model of reading can be described as follows. Readers identify letters and recognize words and analyze the syntactic and semantic relations in sentences to extract propositions. These propositions are integrated together with information which is activated from general knowledge (i.e., inference) so that a coherent representation of the text is constructed in memory. Understanding of the text results in multi-layered text representations in memory (Graesser, Millis, & Zwaan, 1997; van Dijk & Kintsch, 1983; van Oostendorp & Goldman, 1999). Generally accepted levels are the surface code, the propositional textbase, and the situation model; other levels suggested include the communication level and the text genre level. Throughout the course of processing a text, the readers monitor and regulate their own processing according to their comprehension goal in a

given situation (Baker & Brown, 1984; Britton & Glynn, 1987). These ideas and perspectives about the cognitive process of reading are beginning to attract the attention of L2 researchers and to have some impact on research on the cognitive process of L2 reading (Barry & Lazarte, 1998; Fender, 2001; Horiba, 2000; Nassaji, 2002; Zwaan & Brown, 1996).

1.2 Two hypotheses about L2 reading

Obviously L2 reading is different from L1 reading in that the L2 reader already has knowledge of at least one other language. There are other differences as well. Unlike L1 readers who have already acquired the (oral) language, L2 readers, especially those in the foreign language context, typically do not yet have mastered the language. In addition, L2 readers who are literate in their native language already have knowledge and skill of reading. Furthermore, L2 readers must deal with texts which are written by the authors who have certain expectations of what their audience should know about the world. Therefore L2 reading research needs to consider the potential effects of these differences.

In the field of L2 reading research, there has been some debate over whether L2 reading is a language problem or a reading problem (Alderson, 1984). Two hypotheses are often used to characterize the problem: the linguistic interdependence hypothesis (the LIH) and the linguistic threshold hypothesis (the LTH) (Bernhardt & Kamil, 1995; Fitzgerald, 1995). According to the LIH, a significant component of general comprehension skills are transferable into another language. Once a set of language operations for reading has been acquired, they will also be available within L2 contexts (Cummins, 1979). On the other hand, the LTH states that L2 reading is highly related to general linguistic knowledge (i.e., vocabulary and grammar) in the language, and therefore functional (oral) proficiency in the language is required before readers can achieve comprehension of a text. A lack of L2 linguistic knowledge short-circuits the transfer of L1 reading skills to L2 contexts (Clarke, 1980). Research studies which attempted to measure the relative contribution of L2 linguistic knowledge and comprehension skill to the variance of L2 reading have consistently found that both factors contribute to L2 reading although much of the variance is not explained

by these factors (e.g., L2 Spanish - L1 English in Bernhardt & Kamil, 1995; L2/L1 Spanish - L1/L2 English in Carrell, 1991; L2 Dutch - L1 Turkish in Bossers, 1990; L2 English - L1 Korean in Lee & Schallert, 1997). No similar research has been conducted on reading in Japanese as L2.

As already mentioned, L2 readers who are literate in their L1 have two sets of knowledge sources based on L1 and L2 experience -- i.e., linguistic knowledge, literacy knowledge and general knowledge. L2 reading can be influenced by the interactive effects of working with the two sets of knowledge sources. This implies that variation in L2 reading partly depends on the differences and similarities between the L2 and the L1, in terms of linguistic characteristics, literacy practices and general knowledge assumed by the text's author. In order to understand the cognitive process of L2 reading by L1-literate individuals, L2 research must take into consideration the potential effects of these knowledge sources on the process of comprehension and the representation of the text in memory.

2. Japanese-as-L2 Reading Research

2.1 A Summary of the survey

In this section, I will discuss major factors in reading in Japanese as L2 as identified in recent empirical studies. A survey was conducted on research studies on reading in Japanese as L2 which have been published since 1990 in major academic journals of applied linguistics, second language acquisition, second/foreign language education, as well as teaching and learning of Japanese as L2. Each study was analyzed in terms of theoretical assumptions, research methodology, findings, conclusion and implications. Studies which primarily present descriptions of pedagogical practice such as curriculum design, material development, strategy training, and text analysis, and studies whose findings are hard to evaluate due to lack of clear description and explanation were excluded from the analysis. Table 1 shows a summary of the studies which can be considered to represent the current state of research on reading in Japanese as L2. In Table 1 each study is described in terms of subjects, text materials, independent variables and dependent variables, measures and tests, analysis methods and major findings.

Table 1. Summary of Japanese-as-L2 reading studies

Investigators	Subjects & Text Materials	Independent Variables	Dependent Variables & Measure(s) Used	Findings
Koda (1992)	48 college 1st-yr JSL learners related sentences, 4 paragraphs & one short text	1. lower-level processing skills - a letter identification test - a kanji/hiragana word recognition test	1. sentence/text comprehension - a multiple-choice sentence completion test - a cloze test - a paragraph comprehension test	1. Lower-level verbal processing skills accounted for the variance in text comprehension: word recognition was important to paragraph comprehension, whereas letter identification was important to cloze. 2. None of the lower level processing skills accounted for the variance in sentence comprehension.
Matsunaga (1999)	39 intermediate & advanced JSL learners (11 Chinese & 28 non-Chinese) one narrative text with fewer kanji & one descriptive text with many kanji	1. L1 background (kanji/Chinese vs. non-kanji/non-Chinese)	1. reading fluency - reading time 2. text comprehension - oral recall in English 3. knowledge of kanji - oral reading (pronunciation of kanji words) - oral translation into English 4. oral skills - an oral interview test	1. Kanji group and Non-kanji group did not differ in oral interview scores. 2. Kanji group read the descriptive text faster and comprehended it better than Non-kanji group did, while the two groups did not differ for the narrative text. 3. Kanji group showed no correlation between oral skills and reading comprehension, whereas Non-kanji group showed high correlation between oral skills and comprehension and reading time.

Kitajima (1997)	28 college 4th-semester JSL learners (13 experimental & 15 control) one story	1. referential strategy training (training vs. no training) (in-class strategy training on the comprehension of referential ties in text)	1. text comprehension - rewriting the text's content in L1 (overall comprehension; referent identification) (given at the end of the semester)	1. Experimental group comprehended the story at the macro level better than Control group. 2. No difference was found between the two groups for success rate of referent identification.
Tateoka (1996)	82 advanced JSL learners (42 English-, 18 Korean- & 22 Chinese-speaking) & 55 native Japanese one expository passage with a glossary	1. L1 background (English vs. Korean vs. Chinese vs. native) 2. text's rhetorical structure (ki-sho-ten-ketsu style vs. English text style)	1. text comprehension - summary recall (with a the glossary & word bank available) (idea units) 2. awareness of text structure - retrospective questions (for English & Native groups only) - text-segments mapping task (for English group only)	1. English group recalled the original ki-sho-ten-ketsu version less than Chinese and Korean groups. 2. Native, Chinese and Korean groups recalled the original version better than the English version, whereas English group recalled the English version better than the original. 3. English group had trouble with the 'ten-ketsu' segments.
Kikuchi (1997)	85 JSL learners (44 intermediate & 41 advanced) & 41 native Japanese one collection-of-descriptions passage & one comparison-and-contrast passage	1. language proficiency (intermediate vs. advanced vs. native) 2. text's rhetorical structure (collection-of-descriptions vs. comparison-and-contrast) 3. pre-reading information about text structure (with vs. without)	1. text comprehension - recall in L1 (idea units: top-level structure, main & supporting ideas)	1. The comparison-contrast text was better recalled than the collection-of-descriptions text, especially for L2 readers. 2. The collection-of-descriptions text was difficult for recall of supporting ideas by L2 readers. 3. Prior information about the text's structure did not facilitate recall; it rather impeded L2 readers' recall of supporting ideas.

Yamamoto (1994)	61 intermediate & advanced JSL learners one scientific-technical text (an abstract of a academic paper) & one general text (a translation of the Meyer's passage)	1. text's structure marking (signaling vs. no signaling) 2. passage type (general vs. scientific-technical) 3. a glossary (with vs. without) (for the technical text only)	1. text comprehension - a comprehension test (question types: factual, inferential, reasoning, & evaluation questions; format types: multiple-choice; true-false, open-ended, & fill-in-the-blanks)	1. Signaling was effective for comprehension of the scientific-technical passage, but not so for the general passage. 2. Signaling was effective for the understanding of text structure and common sense reasoning. 3. The glossary was effective for comprehension of the scientific-technical passage only when it was provided together with signaling.
Horiba (1990)	11 advanced JSL learners & 9 native Japanese one story	1. language proficiency (nonnative vs. native) 2. reading condition (read with think-aloud vs. read silently) 3. repetition (1st vs. 2nd reading) (L2 group only)	1. reading process - think-alouds in L1 (8 categories: prediction, question, text structure, own behavior, confirmation of predictions, reference to antecedent information, inferences, & general knowledge associations) 2. text comprehension - recall in L1 (events & causal links; propositions)	1. L2 readers made more comments on their own behaviors related to monitoring of vocabulary and sentence comprehension, whereas L1 readers made more inferences. 2. Although L2 readers recalled as well as L1 readers did, their recall contained fewer causal links than that of L1 readers. 3. The think-aloud task did not impede comprehension. 4. L2 readers recalled better in the 2nd reading.

Horiba (1993)	40 JSL learners (20 intermediate & 20 advanced), 20 native Japanese, & 16 native English two stories	<p>1. language proficiency (intermediate vs. advanced vs. native-Japanese vs. native-English)</p> <p>2. degree of text's causal coherence (high vs. low)</p> <p>3. reading condition (read with think-aloud vs. read silently)</p> <p>4. repetition (1st vs. 2nd reading)</p>	<p>1. reading process</p> <ul style="list-style-type: none"> - sentence reading time - think-alouds in L1 (backward inferences generated at the target sentences) 2. text comprehension - recall in L1 (events; propositions) 	<p>1. More competent readers processed the texts faster and recalled better than less competent readers did.</p> <p>2. The high-coherence texts were not processed faster than the low-coherence texts, though they were better recalled by L1 and Advanced readers (in their 2nd reading).</p> <p>3. More competent readers generated critical backward inferences more frequently than less competent readers.</p> <p>4. The texts were processed faster in the 2nd reading.</p> <p>5. Sentence reading times had similar patterns between the think-aloud and the silent-reading subgroup.</p>
Horiba (1996a)	40 JSL learners (20 intermediate & 20 advanced), 20 native Japanese, & 16 native English two stories	<p>1. language proficiency (intermediate vs. advanced vs. native Japanese vs. native English)</p> <p>2. text's causal structure</p> <ul style="list-style-type: none"> - degree of causal coherence (high vs. low) - number of causal connections <p>3. repetition (1st vs. 2nd reading)</p>	<p>1. comprehension process</p> <ul style="list-style-type: none"> - think-alouds in L1 (9 categories: lower-level: graphophone/word, higher-level: sentence; backward inference, forward inference, elaborative inference, general knowledge & own behavior) 2. text comprehension - recall in L1 (events) 	<p>1. L1 readers frequently reported on higher-level processing (e.g., elaborations and associations), whereas L2 readers (esp. Intermediate readers) reported frequently on lower-level processing. Advanced readers also generated backward and forward inferences.</p> <p>2. L1 readers processed the high and the low coherence text differently, generating backward inferences according to the text's causal structure; whereas L2 readers did not.</p> <p>3. L1 readers and Advanced readers (in their 2nd reading) recalled more connected events better than less connected events.</p>

<p>Horiba (2000) Experiment 1</p>	<p>for narrative 4 advanced JSL learners & 5 native Japanese; for expository 7 advanced JSL learners & 7 native Japanese</p> <p>two stories & two essays</p>	<p>1. language proficiency (nonnative vs. native) 2. text type (narrative vs. expository)</p>	<p>1. comprehension process - think-alouds in L1 (9 categories: lower-level: graphophone/ morpheme, word, sentence; higher-level: backward inference, forward inference, elaborative inference, general knowledge association, text structure, & own behavior) 2. text comprehension - recall in L1 (propositions; idea units)</p>	<p>1. L1 readers generated more backward inferences and associations for essays and more forward inferences for stories. 2. L2 readers generated more elaborative inferences and more comments on text structure for essays.</p> <p>1. In the read-for-coherence condition, L1 readers generated more backward inferences, more comments on text structure, and fewer associations than in the read-freely condition. 2. L2 readers' patterns of processing did not differ between the two conditions, though their recall in the read-for-coherence condition was better and as good as that of L1 readers.</p>
<p>Watanabe (1998)</p>	<p>20 English-speaking JSL learners (10 intermediate & 10 advanced) & 12 native Japanese</p> <p>two stories</p>	<p>1. language proficiency (intermediate vs. advanced vs. native) 2. language used for recall (L1 vs. L2) 3. repetition (1st vs. 2nd reading)</p>	<p>1. comprehension process - notes produced in L1 during reading (categories: translation, restatement, causal inferences, & non-causal inferences) 2. text comprehension oral recall in L1 or L2 (events; propositions; causal & non-causal inferences)</p>	<p>1. More competent readers recalled better than less competent readers. 2. Recall in L1 was better than recall in L2, especially Advanced readers. 3. Recall was better in the 2nd reading. 4. Notes produced by L1 and Advanced readers included causal inferences, corresponding to their recall. Intermediate readers' notes included many direct translation of words; their recall contained inappropriate inferences.</p>

Yamada (1995)	23 Chinese JSL learners (technology majors) one long passage on an unfamiliar topic & 6 short passages on familiar topics	1. topic familiarity (familiar vs. not familiar); 2. L2 grammar knowledge based on a grammar test 3. test format (open-ended vs. multiple-choice questions)	1. text comprehension - a comprehension test (10 questions including open-ended & multiple-choice items) (given as a pre- & a post-test)	1. L2 grammar test scores did not correlate with reading comprehension test scores. 2. Differences in scores between the open-ended items and the multiple-choice items became smaller for the familiar passage but not for the unfamiliar passages.
Kato (2002) Experiment 1 Experiment 2	63 advanced JSL learners sections of an academic article 38 intermediate & advanced JSL learners (16 freshmen & 22 sophomores in college) sections of an academic article	1. availability of visual information (with vs. without) 2. prior experience of reading academic articles (with vs. without) 1. availability of visual information (with vs. without) 2. grade level (1st-year vs. 2nd-year)	1. text comprehension - a comprehension test (fill-in-the-blanks and open-ended questions) 1. text comprehension - a comprehension test (true-false questions for explanatory recall and problem-solving transfer items)	1. Those in the with-visuals condition did not perform better in comprehension than those in the without-visuals condition. 2. The with-visuals condition negatively affected those who had no prior experience. 1. 1st-year students did better in the without-visuals condition than in the with-visuals condition, whereas no difference was found for 2nd-year students. 2. Those in the without-visuals condition performed better for the problem-solving transfer items than those in the with-visuals condition.

Minaminosono (1997)	78 intermediate & advanced JSL learners one passage with a glossary used in the reading test	1. L2 reading skill (high vs. mid vs. low) based on a multiple-choice comprehension test (20 items) on the passage	1. reading strategy use - a questionnaire to elicit self-report on strategy use during the reading / test-taking (3 categories: top-down, bottom-up, & test-taking strategies)	1. High skill readers reported fewer bottom-up strategies than Low skill readers. No differences were found for top-down and test-taking strategies for level of L2 reading skill.
Tateoka (2001)	31 English-speaking JSL learners (intermediate & advanced) one passage with a glossary	1. L2 reading skill (high vs. mid vs. low) based on performance for a reading test	1. self-questioning during reading - think-alouds in L1 produced for one target sentence in the text (local & global questions; problem-solving behaviors) 2. text comprehension - a comprehension test (true-false & open-ended questions)	1. More competent readers produced more global questions related to hypothesis and integration, whereas less competent readers produced many local questions about vocabulary recognition.
Mori (2000)	1 intermediate, 1 advanced JSL learner, & 1 native Japanese one passage	1. individual case	1. comprehension process - think alouds in L1 2. text comprehension - summary recall in L1 - a comprehension test in L1 (analyzed descriptively)	1. Native reader processed the text at social and affective levels. 2. Advanced reader frequently used top-down strategies and comprehended the text well. 3. Intermediate reader used bottom-up decoding and self-monitoring and did not comprehend the text.

<p>Horiba (1996b) Experiment 1</p>	<p>21 intermediate JSL learners causally related sentence pairs (20 sets)</p>	<p>1. encoding task (elaboration vs. study for memorization)</p>	<p>1. text memory - 24h-delayed cued recall in L1 (propositions of the 1st sentence recalled)</p>	<p>1. Recall in the elaboration condition was better than recall in the study condition. 2. In the study condition, recall was as a function of degree of causal relatedness. In the elaboration condition, minimally related sentences were recalled better than moderately related sentences and as well as highly related sentences.</p>
<p>Experiment 2</p>	<p>22 intermediate JSL learners causally related sentence pairs (20 sets)</p>	<p>1. encoding task (elaboration vs. study for memorization) 2. degree of causal relatedness (high vs. mid vs. low)</p>	<p>1. predictions generated during reading - predictions written for the given text segment (a total of 11 segments given incrementally) (adequacy of predictions) 2. text comprehension - recall in L1 (idea units: main ideas & supporting ideas)</p>	<p>1. Those who generated more accurate predictions recalled better. 2. L1 readers generated more accurate and more homogeneous predictions. L2 readers generated more inaccurate predictions. 3. L1 group recalled better than Korean group; no difference was found between L1 and Chinese group.</p>
<p>Sugiyama, Tashiro, & Nishi (1997)</p>	<p>40 JSL learners (20 Chinese & 20 Korean; 5 advanced & 15 intermediate each) & 20 native Japanese one narrative text</p>	<p>1. L1 background (Chinese vs. Korean vs. native)</p>	<p>1. text comprehension - a comprehension test (15 multiple-choice content questions; 1 reordering question)</p>	<p>1. Experimental group outperformed Control group.</p>
<p>Kinjo & Ikeda (1996)</p>	<p>138 beginning & intermediate JSL learners (71 experimental & 67 control) one story</p>	<p>1. availability of adjunct questions (and answers) (with vs. without)</p>	<p>1. text comprehension - a comprehension test (15 multiple-choice content questions; 1 reordering question)</p>	<p>1. Experimental group outperformed Control group.</p>

<p>Tsurumi (1998)</p>	<p>38 beginning-high, 37 intermediate-high, & 33 advanced Korean JSL learners</p> <p>one narrative text & one conversation-based text</p>	<p>1. language proficiency (beginning-high vs. intermediate-high vs. advanced)</p> <p>2. reading condition (oral reading vs. silent reading)</p>	<p>1. text comprehension</p> <p>- recall in L1 (idea units: main & supporting ideas)</p>	<p>1. More proficient readers recalled better than less proficient readers.</p> <p>2. The effect of oral-reading differed between the two texts. For the narrative text, the silent-reading condition lead to better recall than the oral-reading condition. For the conversation-based text, no difference was found between the two reading conditions.</p>
<p>Shiraishi (1999)</p>	<p>20 English-speaking JSL learners (10 intermediate & 10 advanced) & 10 native Japanese</p> <p>two news articles</p>	<p>1. language proficiency (intermediate vs. advanced vs. native)</p> <p>2. retelling before recall (with vs. without)</p> <p>3. time of recall (immediate vs. 1-week delayed)</p>	<p>1. text comprehension</p> <p>- recall in L1 (idea units)</p> <p>2. processing during retelling</p> <p>- retelling protocol (5 categories: monitoring, labeling, summarizing, commenting, & inferencing)</p>	<p>1. Advanced group recalled the text better under the retelling condition for both the immediate and the delayed recall. Native group recalled better under the retelling condition only for the delayed recall. No effect was found for Intermediate group.</p> <p>2. Readers used strategies such as monitoring and inferencing during retelling.</p>

2.2 Topics and issues addressed

Research on reading in Japanese as L2 has addressed a variety of topics and issues like L2 reading research in general. Since reading is an interactive process where processing at multiple levels interact with each other, a particular feature of reading performance can be a manifestation of the effects of multiple factors. Due to this complexity of reading as well as the kind of theoretical and practical motivation in the field, most studies have dealt with multiple variables, for example, level of L2 proficiency and a particular feature of the text in their investigation. In this section I will use five major factors of reading, linguistic knowledge, literacy knowledge, background knowledge, reading strategy and task, and assessment factor to discuss the issues addressed in these studies on reading in Japanese as L2.

In linguistic knowledge factors, lower-level processing skills (letter identification and word recognition) (Koda, 1992) and L1-based kanji knowledge (Matsunaga, 1999) have been examined and shown to affect text comprehension in Japanese as L2. The relationship between the processing of referential ties and text comprehension has also been examined in the Kitajima's strategy training study (1997). As is the case with L2 reading research in general, language proficiency is one of the independent variables in many studies (Horiba, 1990, 1993, 1996a, 2000; Kikuchi, 1997; Mori, 2000; Shiraishi, 1999; Tsurumi, 1998; Watanabe, 1998) and has generally shown to affect the comprehension process and the memory of the text's content. Other studies have examined the effect of L2 reading skill (Minaminosono, 1997; Tateoka, 2001). In many of these studies, language proficiency or L2 reading skill was not measured with a standardized test; it was measured with a locally developed test or it was informally labeled based on the subject's class enrollment in their language program. Use of a standardized language test like TOEFL to determine the level of language proficiency in Japanese as L2 will definitely help better characterize the L2 readers and learners whom this research attempts to investigate.

In literacy knowledge factors, the content structure of a text has received much attention of Japanese-as-L2 reading researchers. For expository texts, some studies have investigated the effect that a text's rhetorical structural organizations has on recall; Kikuchi (1997) used passages whose structures were identified as the collection-of-descriptions and the comparison-and-contrast style (Meyers 1985) and Tateoka (1996) used passages which were structured in the "ki-sho-ten-ketsu" writing style (Hinds, 1983) and the English writing style. A text's rhetorical devices called signaling which linguistically marks the content structure of a technical text has also been examined (Yamamoto, 1994). For narrative texts, some research has investigated the effect of causal structure and causal relations on the comprehension process and memory representations of the text (Horiba, 1990, 1993, 1996a, 1996b; Watanabe, 1998). Type of text, narrative vs. expository, has also been investigated in terms of text processing (Horiba, 2000). These studies generally found the effect of the text structural factor and its interaction with the effect of language proficiency.

General knowledge factors have not attracted much attention of Japanese-as-L2 reading researchers, unlike the field of L2 reading research in general (Carrell, Devine, & Eskey, 1988). Some research has examined the effect of topic familiarity (Yamada, 1995) and visual information (i.e., figures and tables) (Kato, 2002) on comprehension of expository texts. The latter study (Kato, 2002) revealed that visual information did not facilitate text comprehension but rather had a negative effect on comprehension for less experienced L2 readers. Various factors such as relationship between the visual information and the text and the reader's ability to integrate and synthesize the linguistic and visual information need to be further investigated.

Reading strategy has been attracting much attention of L2 practitioners and researchers in recent years. Japanese-as-L2 reading studies have also investigated linguistic and conceptual processing strategies generally employed by L2 readers. Some studies have examined the use of reading strategies in specific instructional contexts

(Minaminosono, 1997; Mori, 2000; Morimoto, 1994). Other studies have focused on specific linguistic or conceptual processing strategies in Japanese-as-L2 reading: for example, referential strategies in Kitajima (1997), causal inferences in Horiba (1996a, 1996b) and Watanabe (1998), and self-questioning in Tateoka (2001). As for task factors, research has examined the effect of reading task instructions (Horiba, 2000), the induced elaboration (Horiba, 1996b) and predictions (Sugiyama, Tashiro, & Nishi, 1997), oral reading (Tsurumi, 1998), retelling (Shiraishi, 1999), and repeated reading (Horiba, 1990, 1993, 1996b; Watanabe, 1998). The selection of these task factors reflect the concerns of L2 researchers/practitioners in regard to what characteristics of a reading task might enhance L2 students' reading comprehension and their development of reading proficiency. Other research has examined the effect of reading aids commonly used in practice such as a glossary (Yamamoto, 1994) and adjunct comprehension questions (Kinjo & Ikeda, 1996). Some research has also examined the effect of assessment variables such as time of test (e.g., immediate vs. delayed recall in Shiraishi, 1999), language used for recall (e.g., L1 vs. L2 in Watanabe, 1998), assessment/test methods (e.g., multiple-choice and open-ended questions vs. cloze in Koda, 1992), scoring methods (e.g., propositions vs. idea units in Horiba, 1993), and use of the think-aloud technique (Horiba, 1990, 1993).

Some of these studies' findings are not very clear about which variable(s) might have influenced the L2 readers' comprehension. Research has shown that, although mature readers have the ability to monitor and regulate their own processing in a given context (Baker & Brown, 1984), actual use of reading strategies can be influenced by various factors, including language proficiency and task constraints. Therefore, studies need to be carefully designed by considering the possible effects of a secondary task (i.e., the task given in addition to the primary task of reading) on the comprehension process and its resulting text memory. The importance of task in language learning has been increasingly acknowledged in the field of L2 research and practice

(Robinson, 2002; Skehan, 1998) in recent years. Japanese-as-L2 reading research also needs to collaborate with this research on task and second language acquisition.

2.3 Research methodology used

Japanese-as-L2 reading research has methodological characteristics which are commonly observed in L2-reading research in general. As for subjects, most studies have dealt with adult L2 learners who are enrolled in a language program in North America or Japan. The subjects' level of language proficiency is indicated with a label such as beginning, intermediate and advanced; these labels are used loosely to differentiate groups of subjects within the context of a particular study. As for the materials, the target text(s) used in some studies were formally analyzed using some theory based procedures such as the Meyer 's method (1985), the propositional analysis (Bovair & Kieras, 1985; Kintsch & van Dijk, 1978), and the Trabasso & van den Broek causal network model (Trabasso, Secco, & van den Broek, 1984). In these studies, data on text comprehension, such as recall protocols and think-alouds, were scored using the structurally analyzed original text as a template. In other studies, the target text(s) were not submitted to any formal analysis. In some cases the method of data collection and analysis (e.g., the type of questions and the scoring method used in the study) were not theoretically motivated or the rationales behind their use were not clearly explained.

As is the case with L2 research in general, most research is cross-sectional. No longitudinal studies were found in the present survey. Some studies have compared the experimental group and the control group with a pre- and post-test design (Kinjo & Ikeda, 1996; Kitajima, 1997). In many studies, presumably due to a small sample size and the practical constraints of experimentation, some variables which would be better treated as within-subject variables have been dealt with as between-subject variables (i.e., performance by different individuals are compared with each other rather than performance by the same individual is

compared under different material/task conditions).

In order to examine the product of text comprehension or memory representation, these Japanese-as-L2 reading studies have employed various kinds of measures including comprehension questions and tasks such as recall, summarization, translation and retrospective self-report. Studies which examined the on-line comprehension process have used measures such as reading time and the think-aloud method. In some studies multiple measures and/or multiple levels of analysis were used to obtain more information about the effect of the target variable. In some studies, multiple types of test format were used to test the comprehension and memory of a text by their subjects. However, the effect of assessment factor such as test format and type of question has not been adequately examined in Japanese-as-L2 reading research.

Like L2 reading research in general, many of these Japanese-as-L2 reading research studies have methodological shortcomings. Typically found are unclear theoretical base for the analysis of text and/or data, no control group and/or no baseline data to compare and interpret the obtained data, the possibility of confounding effects of multiple factors, reliability problems (e.g., use of a single passage per condition; no report of interrater reliability; reliance on a single measure). These problems make it difficult to adequately interpret research findings and to compare and synthesize the findings from different studies. So far there has been only a small number of research studies conducted to formally investigate the nature of reading in Japanese as L2. The findings of these studies need to be scrutinized with more information obtained from further research on the same topics and issues. In order for Japanese-as-L2 reading research to develop as a field of scientific inquiry, research efforts are needed to explore, describe and explain the nature of reading in Japanese as L2. Definitely more research studies are required which are carefully planned and executed, whose data thoroughly analyzed and whose findings adequately interpreted.

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