Bilingual Memory: L1 Mediation in L2 False Memory[*]

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Hyunjeong Nam (2018), Bilingual Memory: L1 Mediation in L2 False Memory. *Studies in Linguistics* 46, 353-374. The study aims to investigate Korean L2 learners' bilingual memory in order to trace L1 mediation in L2 veridical and false memory. Sixty six university students participated in the free recall and recognition tests which adopted and revised the DRM (Deese-Roediger-McDermott) paradigm. The findings from independent *t*-tests and Pearson correlation coefficient suggest first, their bilingual memory is shaped by concept mediation with the imbalance between L1 and L2 according to their L2 proficiency. The veridical memory of the English words whose translation equivalents are synonymous in L1 was more detected than that of synonymous L2 words. Second, English words whose L1 translation equivalents collocate in L1 were falsely recalled. Third, the L1 mediation decreased as their L2 proficiency increased. Since the highly proficient L2 learners have a more developed and resourceful L2 network, false memory arising from L2 collocational knowledge also emerged. Accordingly, the high L2 proficiency contributed to narrowing the gap between the memory benefited from L1 and L2 lexicon. The study further suggests the importance of L2-promoting instruction within the Revised Hierarchical

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1. Introduction

Linguists have long been intrigued by how a word is stored and retrieved in a speaker's mind. Their interest started with the study of infants' first language acquisition. In the past few decades, research in second language acquisition (SLA) has flourished with special attention to the organization of bilingual memory. The answer to this arcane phenomenon has been sought in various ways. For example, with advanced technologies some researchers (Halsband, Krause, Sililä, Teräs & Laihinen, 2002; Marian, Spivey & Hirsch, 2003) have tried to observe a speaker's on-going brain activity using neuro-imaging techniques, Positron Emission Tomography (PET), and functional Magnetic Resonance Imaging (fMRI). Other researchers have taken a cognitive approach using false memory mechanism. For example, in the DRM (Deese-Roediger-McDermott) paradigm, one of the most renowned techniques, subjects are presented with a list of words such as *thread, pin, eye, sewing, sharp, point, pricked, thimble, haystack, pain, hurt,* and *injection (*Roediger & McDermott, 1995: 804). After the study session, they are asked to recall or recognize the words in the list so that the trace of any falsely recalled/recognized word (e.g., a lure *needle*) is detected.

Provided that the false memory is manifest in bilinguals' both languages, it can be a powerful tool to examine how English words are stored and memorized in Korean L2 learners' minds and more importantly, whether/how their L1 mediates in L2 memory. To elaborate on this further, if Korean L2 learners memorize an L2 word through the meaning of its L1 translation equivalent, their attempts to recall the target L2 words with similar L1 translation equivalents in a memory test may be more successful. Therefore,

a question that calls for an answer is whether English words whose L1 translation equivalents collocate in L1 are more successfully recalled in the memory test. Further, the empirical evidence for L1 mediation in the L2 recall as a form of false memory arising from L1 collocational knowledge needs to be found to consolidate the hypothesis. However, research concerning this cross-linguistic issue on bilingual memory has not been rigorously conducted, and more regrettably, little attention has been paid to the false memory paradigm in language research in Korea. Therefore, the present study deploys the veridical and false memory paradigm to investigate the organization of Korean L2 learners' bilingual memory. The aim of this study is to investigate Korean L2 learners' bilingual memory in order to trace L1 mediation in L2 veridical and false memory.

2. Literature review

2.1. Bilingual memory

In earlier research, there have been two distinctive opinions about bilingual memory. Some researchers suggest that bilinguals have one common conceptual representation irrespective of the languages (e.g. Cummins, 1980; Fodor, 1987; Lambert, 1972). Others believe that bilinguals have language-specific conceptual representations according to languages (De Bot & Schreuder, 1993; Keatley & de Gelder, 1992).

More eclectic ideas have emerged to include the consideration of bilinguals' L2 proficiency (e.g. Kroll & Sholl, 1992; Kroll & Stewart, 1994; Sholl, Sankaranarayanan & Kroll, 1995), and in particular the Revised Hierarchical Model (Kroll & Stewart, 1994) has widely been recognized. The model proposes that bilingual memory may demonstrate different organizations according to their L2 proficiency. That is, at an early stage of L2 acquisition the link between the L2 and the concept is weak contrary to the strong association between the L1 and the concept. Kroll and his colleagues (e.g., Kroll & Tokowicz, 2001) have confirmed that due to the

weak connection between the L2 and the concept, conceptual meaning is retrieved from the strong link to L1. As a bilingual's L2 proficiency advances, the L1 mediation decreases since the association between the L2 and the concept becomes stronger.

Furthermore, a bilingual's L1 and L2 may be triggered in a non-selective way. Many researchers found that non-target language of a bilingual was accessed (Costa, Navarrete & La Heij, 2006; Gollan & Acenas, 2004; Kroll, Bobb & Wodniecka, 2006; Roelofs & Verhoef, 2006). These researchers utilized interlingual homographs or phonological resemblance of cognates. However, this non-selective activation of a bilingual's languages may be observed in the form of a false memory arising from L1 mediation in L2 in the present study.

2.2. False memory

Originally, false memory paradigm has been used as a tool to understand people's mind in clinical psychology and psychiatry. For example, subjects in an experiment are presented with video clips of events and then asked to describe what they remember seeing in the video. In the linguistic field, it has been adopted to examine a language speaker's conceptual representations in their mental lexicon. The DRM (Deese-Roediger-McDermott) paradigm which was propagated by Roediger & McDermott (1995) is one of the most noted techniques of false memory. In the experiment of the false memory, subjects are provided with a list of words (e.g., *mad, fear, hate, rage, temper* etc.), and then requested to remember the words. If the subject falsely recalls the lure word (e.g., *anger*) which is not presented in the list, it is considered compelling evidence for false memory. Gallo (2006) suggests that the conceptual meaning of the related lure is the core of all the words in the list, and thus it is apt to be falsely accessed.

2.3. Cross-linguistic influence on false memory

Traces of false memory have been observed not only within-language but also across-languages. Many researchers have utilized in their studies both languages of a bilingual (Cabeza & Lennartson, 2005; Kawasaki-Miyaji, Inoue & Yama, 2003; Kweon, 2012; Sahlin, Harding & Seamon, 2005; Sunderman, 2011). For example, half of the lists were presented in L1 while the other half in L2. In addition, attempts to switch the languages of the presentation and the test have been made. There are two significant outcomes which may be relevant to the present study.

First, false memory is more evident in L1 than in L2 lists (Kawasaki-Miyaji et al., 2003; Mao, Yang, Wang, & Yuang, 2008; Kweon, 2012; Sunderman, 2011). For example, in the study of Kawasaki-Miyaji et al. (2003), Japanese-dominant bilinguals were presented with six lists of words in Japanese and another six in English and then tested in both languages. In the recognition test, more false memory was observed when the words were presented in L1 in the test. Mao et al. (2008) also found that Chinese-English bilinguals revealed more false memory in L1 than in L2 lists. Similar results were found that Korean English learners revealed higher extent of false memory in L1 than in L2 (Kweon, 2012).

Second, L2 proficiency of a bilingual affects the extent of false memory (Cabeza & Lennartson, 2005; Sahlin et al., 2005; Sunderman, 2011). Sahlin et al. (2005) found that false memory in L1 was similar to that of L2 for highly proficient English-Spanish bilinguals. Kweon (2012) also found that false memory in L2 was observed more in high proficient Korean L2 learners than in low proficient L2 learners.

The Revised Hierarchical Model (Kroll & Stewart, 1994) well explains these L1 effects and L2 proficiency effects on false memory. Since the link between the L1 and the concept is stronger than the association between the L2 and the concept, each time an L1 word in the list is presented, the common core concept of the words may be activated and thus the lure word with the central concept is falsely recognized. However, since low proficient L2 learners have relatively weak connections between the L2 and the concept, the central meaning of the lure word is hardly activated and thus less likely

to be falsely recognized. This is why the false memory was manifest more
in L1 than in L2 in the previous research. As a bilingual's L2 proficiency
increases, the link to the concept becomes stronger and consequently the
critical lure is to be more readily activated.

2.4. The present study

As Pu & Tse (2014: 164) pointed out, compared with the rigorous
research on false memory conducted in one language, little research has
concerned bilinguals. Cross-linguistic aspects in false memory have studied
by some researchers; however, the primary focus has been on either the
comparison of the extent of false memory between L1 and L2 words or
between high and low proficiency bilinguals. Some researchers made attempts
to switch the languages used in the study session and the test in order to
examine any change in the extent of false memory (e.g., Cabeza &
Lennartson, 2005; Marmolejo, Diliberto-Macaluso & Altarriba, 2009).

However, the cross-linguistic influence on false memory has not been
studied beyond the comparison of total sum between two languages. In those
studies, the bilinguals were exposed to two languages. Few studies have
directly investigated whether/how L1 mediates in L2 even when no L1 words
are presented in the list and in the memory test.

The present study aims to explore L1 mediation in L2 using memory
paradigms. The differences from previous research lie in; first, it includes not
only false memory but also veridical memory. Second, it deploys exclusively
L2 words to avoid any unwanted activation from L1 words presented in the
list and the test. Instead, it compares the memory of the list of L2 words
that have synonymous meanings in L1 and L2. This may enable us to
scrutinize the bilinguals' cognitive activity. Third, it includes the list of L2
words whose translation equivalents collocates exclusively in L1 to detect the
trace of any false memory arising from L1 collocational knowledge. Last,
it examines any relationships between false memory resulting from L1
mediation and L2 proficiency. The research questions are as follows:

1) Which is more evident between the veridical memory of the list of words that have synonymous meanings in L1 and L2?

2) Which is more evident between the false memory arising from L1 and L2 collocational knowledge?

3) Does the L2 proficiency affect the gap between the L1-mediated and L2-mediated memory?

3. Methods

3.1. Participants

A total of 78 university students volunteered in the study at the initial stage. The participants were majoring in various subjects and taking English courses. After the memory tests, 12 students who responded that the list in the study included some words that they did not know were excluded in the data collection. As a result, 66 English learners participated in the study and they were at different levels of English proficiency (TOEIC scores ranging from 450 to 945; M=585.83, SD=129.26).

Table 1. Range of TOEIC Scores

Range	400	500	600	700	800	900
Participants	9	43	4	2	2	6

3.2. Materials and procedure

Four different types of words were used in the memory tests. The first list includes pairs of English words whose translation equivalents are synonymous in L1. They are *appointment-promise, middle-center, tool-equipment, advantage-benefit, upset-angry, really-actually,* and *house-home*. The second list involves pairs of words that have synonymous meanings in L2 but have different translation equivalents in L1 (*ancient-old,*

trouble-difficulty, *challenging-difficult*, *foreign-alien*, *ordinary-normal*, *typical-classic*, *annoying-disturbing*). The third list comprises pairs of words that collocate in L2 but not in L1 (*go-Dutch*, *heavy-drinker*, *sports-car*, *fast-train*, *window-shopping*, *campus-life*, *rich-taste*). The fourth list entails pairs of words whose translation equivalents collocate in L1 but not in L2 (*skin-lotion*, *love-tooth*, *much-quantity*, *stone-head*, *spider-line*). The number of words on each list was adjusted to an even number (14) to effectively observe differences between L1 and L2 (e.g., 10 words used in Sahlin et al., 2005; 15 words in Roediger & McDermott, 1995). The words were collected from previous research (Kim, 2012; Lee, 2016; Park, 2011; Roediger & McDermott, 1995) and from online synonym and collocation dictionaries[1]. Additional confirmation of the congruency of L1 translation equivalents was obtained by 39 Korean L2 learners who did not participate in the study.

There were two sessions in the study. In the study session, Microsoft Office Power Point slide presentation of each word from each list was presented to the participants at a time for 2 seconds (adopted from Sunderman, 2011). In the memory test session which was conducted immediately after the study session, there were two different types of tests. First, in the free recall the participants were asked to write down all the words they remembered from the screen (e.g., *appointment, promise, middle, center*, *tool, equipment*, *advantage, benefit*, *upset, angry*, *really, actually*, *house,* and *home*) and then requested to fold the test sheet so that they would not consult their own answers for the next section. Second, in the recognition test which was conducted after the free recall (adopted from Kweon, 2012), they were provided with a word (both the studied words and critical lures) and asked to remember whether the word appeared on the screen or not. It was given in the form of the self-paced Yes/No recognition test (adopted from Cadavid & Beato, 2017) as in "Do you remember seeing the word *tool* on the screen?". The study has acceptable internal consistency of the scales with

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[1] http://www.thesaurus.com; https://www.merriam-webster.com/thesaurus; http://www.freecollocation.com; https://www.oxfordlearnersdictionaries.com; http://www.ozdic.com/collocation-dictionary

Kuder-Richardson-20 (KR-20) Reliability Analysis (.71).

3.3. Data collection and analysis

Data collection involves the following steps. First, veridical memory of the studied words and false memory of the words that did not appear on screen were counted separately in both the free recall and the recognition test. Second, the data were organized using Microsoft Excel program and fed to the statistics program SPSS 24. Third, to compare the participants' veridical memory of the words that have synonymous meanings in L1 with those in L2, an independent *t*-test was used. The *t*-test was also used for the comparison of veridical memory between the words that collocate in L1 and those in L2. The procedures were repeated for the false memory. Fourth, the relationships between the participants' L2 proficiency and the extent of veridical/false memory in both the free recall and the recognition test were investigated using Pearson product-moment correlation coefficient.

4. Results

Both veridical and false memory were investigated in the study. Results show, first, the comparison of veridical memory of the target English words whose meanings are synonymous in L1 and in L2, and then the comparisons between false memory arising from L1 and L2. Second, the correlations between L2 proficiency and L2 effect on memory will be followed by the correlations between L2 proficiency and gap of veridical memory.

Table 2. Descriptive Statistics of Veridical and False Memory

	Mean	SD
L1Recall	10.58	2.41
L1Recog	13.59	0.82
L2Recall	6.91	3.04
L2Recog	12.14	2.58
L1ColloRecall	5.11	2.88

L2ColloRecall	5.44	2.30
L1FalseRecall	4.29	1.30
L1FalseRecog	6.70	1.32
L2FalseRecall	3.29	1.79
L2FalseRecog	5.97	1.75

Note. L1Recall: veridical memory of the words that are synonymous in L1 in the free recall, L1Recog: veridical memory of the words that are synonymous in L1 in the recognition test, L2Recall: veridical memory of the words that are synonymous in L2 in the free recall, L2Recog: veridical memory of the words that are synonymous in L2 in the recognition test, L1ColloRecall: veridical memory of the words that collocate in L1 in the free recall, L2ColloRecall: veridical memory of the words that collocate in L2 in the free recall, L1FalseRecall: false memory of the words that collocate in L1 in the free recall, L1FalseRecog: false memory of the words that collocate in L1 in the recognition test, L2FalseRecall: false memory of the words that collocate in L2 in the free recall, L2FalseRecog: false memory of the words that collocate in L2 in the recognition test.

Table 2 shows the veridical memory of the lists of words that appeared on the screen in the study session and the false memory of the words that did not. The veridical memory was higher in the recognition test than in the free recall both arising from L1 and L2 knowledge. It was also higher for L1 than L2 synonymous words both in the free recall and the recognition test.

False memory arising from L1 collocational knowledge was higher than that of L2 collocational knowledge both in the free recall and the recognition test.

Table 3 Comparisons of Veridical Memory

Veridical memory	N	Synonymous meaning in L1		Synonymous meaning in L2		t	p	d
		M	SD	M	SD			
Free recall test	66	10.58	2.41	6.91	3.04	7.67	.00	.31
Recognition test	66	13.59	.82	12.14	2.58	4.37	.00	.13

In Table 3, an independent *t*-test was conducted to compare veridical

memory of the target English words whose meanings are synonymous in L1 and in L2. In the free recall test there was a significant difference in L1 (M=10.58, SD=2.41) and for L2 (M=6.91, SD=3.04; $t(130)$=7.67, p=.00). The magnitude of the differences in the means was large (eta squared=.31). In the recognition test, there was also a significant difference in L1 (M=13.59, SD=.82) and for L2 (M=12.14, SD=2.58; $t(78)$= 4.37, p=.00). The magnitude of the differences in the means was moderate (eta squared=.13).

Table 4. Comparisons between False Memory Arising from L1 and L2

False memory	N	Arising from L1 collocational knowledge		Arising from L2 collocational knowledge		t	p	d
		M	SD	M	SD			
Free recall test	66	4.29	1.30	3.29	1.79	3.68	.03	.10
Recognition test	66	6.70	1.32	5.97	1.75	2.70	.01	.05

In Table 4, an independent t-test was conducted to examine false memory of the English words that did not appear on the screen in the study session. False memory of the English words that collocate in L2 was compared with that of the words whose L1 translation equivalents collocate in L1. In the free recall test there was a significant difference in false memory arising from L1(M=4.29, SD=1.30) and from L2 collocational knowledge (M=3.29, SD=1.79; $t(118)$=3.68, p=.03). The magnitude of the differences in the means was moderate (eta squared=.10). In the recognition test, there was also a significant difference in false memory arising from L1 (M=6.70, SD=1.32) and from L2 collocational knowledge (M=5.97, SD=1.75; $t(121)$=2.70, p=.01). The magnitude of the differences in the means was small (eta squared=.05).

Table 5. Correlations between L2 Proficiency and L2 Effect on Memory

		Veridical memory of L2 synonyms	False memory arising from L2 collocational knowledge
L2 Proficiency	Pearson	.79[*]	.47[*]

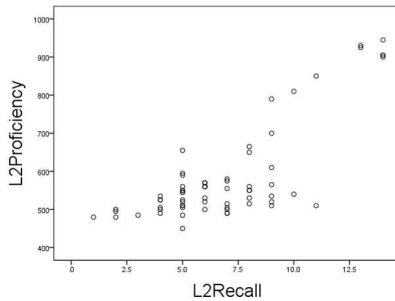|		
Correlation Sig. (2-tailed)	.00	.00
N	66	66

Figure 1 Correlations between L2 Proficiency and the Veridical Memory
arising from L2 Synonym Knowledge

In Table 5 and Figure 1, the relationship between L2 proficiency and the veridical memory of L2 synonyms was investigated using Pearson product-moment correlation coefficient. There was large positive correlation between the two variables (r=.79, n=66, p<.00). The higher L2 proficiency the participants have, the better recall of the words that are synonymous in L2.
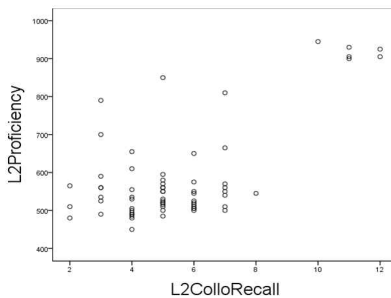
Figure 2 Correlations between L2 Proficiency and the False Memory arising
from L2 Collocational Knowledge

As shown in Table 5 and Figure 2 there was medium positive correlation
between the L2 proficiency and the false memory arising from L2
collocational knowledge (r=.47, n=66, p<.00). The higher L2 proficiency the
participants have, the more false memory arising from L2 collocational
knowledge.

These results suggest that as L2 proficiency increases both veridical and
false memory benefits from L2 lexicon.

Table 6. Correlations between L2 Proficiency and Gap of Veridical Memory

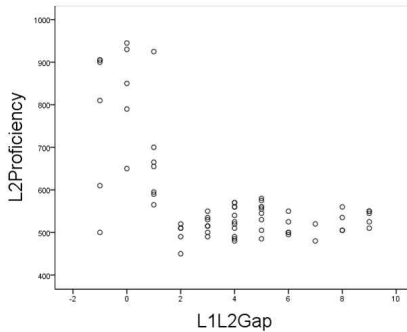|		Gap between L1- and L2-mediated memories
	Pearson Correlation	-.60*
L2 proficiency	Sig.(2-tailed)	.00
	N	66

Figure 3 Gap of Veridical Memory between L1 and L2

As presented before, there was a gap of veridical memory between the
words that have synonymous meanings in L1 and L2. In Table 6 and Figure
3, the relationship between the participants' L2 proficiency (TOEIC scores)
and the gap of veridical memory between L1 and L2 was investigated using

Pearson product-moment correlation coefficient. There was large negative correlation between the two variables, r=-.60 n=66, p<.00. This result suggests that as L2 proficiency increases the gap between L1- and L2-mediated memories becomes narrow.

5. Discussion

5.1. Asymmetric bilingual memory

To answer the research question one, the present study compared the extent of veridical memory of the list of English words whose meanings are synonymous in L1 and L2. The former includes words (e.g., *appointment-promise*) that have synonymous translation equivalents in L1 but have different meanings in L2 while the latter list comprises words (e.g., *challenging-difficult*) that have synonymous meanings in L2 but have different translation equivalents in L1. A more successful memory was found in the free recall of the list of words that have synonymous meanings in L1 (M=10.58, SD=2.41) than in L2 (M=6.91, SD=3.04) as well as in the recognition test. The results suggest the influence of L1 mediation on the bilinguals' memory.

The findings can be explained in the Revised Hierarchical Model (Kroll & Stewart, 1994). In a bilingual's mental lexicon, the concept is more closely connected to L1 than L2. Especially for L1 dominant bilinguals, there is a weak link between the concept and the L2, and thus the meaning of L2 is accessed through the lexical link between L1 and L2. When the participants saw an English word on the screen in the present study, they may have accessed its meaning through the direct link to L1. In terms of the connectionist view (Dell, 2000; Jacquet & French, 2002), the second time they saw an English word that has the same L1 translation equivalent, the same node between the L1 and the concept may have been additionally activated due to the repeated stimulation. As a result, when they made an attempt to remember the words in the memory test, the node which was

already activated became more readily accessed, and thus the veridical memory of the words was more successful.

Green's Inhibitory Control model (1986, 1993) suggests that, although L1 is closely connected with the concept and thus become more activated in L2, it is so strongly suppressed that it cannot be produced. However, the findings in the present study are in line with Nam's (2011) counterevidence that supports L1 access in L2.

5.2. L1 mediation in L2 collocations

In relation to the research question two, the study compared false memory arising from L1 and L2 collocational knowledge. After the participants were exposed to the list of English words in collocational relations (e.g., *heavy* and *drinker,* one word at a time), they were asked to remember the words in the free recall test. English words whose L1 translation equivalents collocate in L1 (e.g., *strong* in place of *heavy*) were falsely recalled (M=4.29, SD=1.30), which was more observed than the false memory of the words arising from L2 collocational knowledge (e.g., false memory of the word *large* after the presentation of the words *much* and *quantity*) (M=3.29, SD=1.79). This evidence from both the free recall and the recognition test supports L1 mediation in L2 collocations.

From the earlier research on bilingual processing, it has long been pointed out that L2 learners, unbalanced bilinguals, assume the 'oversimplified equivalence hypothesis, L2=L1' (Ringbom, 2007: 55) or use 'hypothesis of transferability' (Bahns, 1993: 61). If L2 learners' L2 networks are not fully developed, they tend to resort to their L1 knowledge with the hope of successful transfer of L1 knowledge to L2. Provided that Korean L2 learners may be unaware that every English word has its own collocational restrictions that are different from those in L1, any attempt to transfer L1 collocational knowledge to L2 may be problematic in that collocations are language-specific (Stubbs, 1995). The finding from the false memory in the present study is in line with Kim & Yoon's view (2008) that L1 mediation

contributes to incorrect use of L2 collocations .

5.3. Proficiency effect on bilinguals'memory

With regard to the research question three, correlations between L2 learners' proficiency and bilinguals' memory were found in the study. First, the higher L2 proficiency promoted a better recall of the words that are synonymous in L2. Different from low proficient L2 learners whose memory benefited primarily from L1 meanings, the highly proficient L2 learners have more developed L2 network which brings the synonym effect to L2 recall and recognition. Consequently, as the L2 learners' L2 proficiency increased, the gap between the veridical memory that benefited from L1 and L2 synonyms became narrower. This supports the view that the memory of highly proficient bilinguals in L2 becomes similar to L1 (e.g., Kweon, 2012; Sahlin et al., 2005).

Second, positive correlations between the L2 proficiency and the false memory arising from L2 collocational knowledge were found in the study. For low proficient L2 learners, there is not much information of L2 collocations stored in their mental lexicon. Therefore, contrary to evident false memory arising from L1 collocational knowledge, there is a slim chance to falsely the recall of L2 collocations. As L2 proficiency increased due to the developed collocational knowledge in the L2 network, the false memory arising from L2 collocational knowledge emerged. This supports the previous literature (Sinclair, 1991; Wray, 2002) viewing collocational knowledge as an important characteristic of L2 proficiency.

In summary, the findings of the present study supporting proficiency effects on bilinguals' memory matched those of previous research. For example, Sunderman (2011) found that the access of semantically associated L2 items was harder for low proficiency learners in the recall. Sahlin et al. (2005) also observed that English-Spanish bilinguals' false memory was similar in L1 and L2 when their L2 proficiency was high. They elucidated that the high L2 proficiency enabled them to retrieve concepts from the direct

link to L2 and also to be prone to the false memory arising from L2 knowledge.

5.4. Pedagogical implications

When the target word is not available in L2, a synonym in L2 may be sought as a back-up procedure (Aitchison, 2003) or an L1 word by way of a compensatory strategy (De Bot & Schreuder, 1993). As found in the present study, although reference to L1 lemma was prevalent among all the participants, the more rigorous attempts to access the L2 synonyms were made by highly proficient L2 learners. Given that the use of L2 synonymous words may be a safer back-up than resorting to any synonymous translation equivalents in L1 for successful communication, the evidence found in this study lends credence to L2-promoting instruction in Korea.

In this study, L1 mediation was found to be evident even in L2 collocations and it decreased as L2 proficiency increased. Different from L1 acquisition in which the string of the collocation is stored and retrieved as a lexical chunk, L2 learners in an instructional setting separately store the individual words in the collocation (Wray, 2002). During the composition of collocations in L2 production, L1 lemma is subject to be retrieved due to the lack of L2 resources in the network. Therefore, as Sunderman (2011: 233) stressed, L2 instruction should promote building a direct link between the concept and the L2 and further establish 'a rich and interconnected network of L2 words'. This may enable Korean L2 learners to retrieve the appropriate collocations directly from the well-developed L2 network.

It is important for English educators to acknowledge that word knowledge reflects the way knowledge is acquired (Kolers & Gonzalez, 1980). Given that the 'apple-사과' paradigm is still prevalent in teaching in Korea, educators need to be alerted to the possibility that a reliance on L1 meanings in vocabulary learning leads to L1-mediated production in L2 (Nam, 2011).

6. Conclusion

The study examined Korean L2 learners' bilingual memory in order to trace L1 mediation in L2 veridical and false memory. The findings suggest that first, their bilingual memory is shaped by concept mediation with the imbalance between L1 and L2 according to their L2 proficiency. The veridical memory of the English words whose translation equivalents are synonymous in L1 was more detected than that of synonymous L2 words. Second, L1 mediation was also manifest in L2 collocations. English words whose L1 translation equivalents collocate in L1 (e.g., *deep* in place of *rich* that collocates with *taste*) were falsely recalled. Third, the L1 mediation decreased as their L2 proficiency increased. Accordingly, the high L2 proficiency contributed to narrowing the gap between the veridical memory benefited from L1 and L2 lexicon. Furthermore, since the highly proficient L2 learners have a more developed and resourceful L2 network, false memory arising from L2 collocational knowledge also emerged. The study also suggests L2-promoting rather than L1-mediated vocabulary learning in Korea.

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