

Grammatical category and L2 lexical representation*

Junkyu Lee

(Hankuk University of Foreign Studies)

Lee, Junkyu. 2013. Grammatical category and L2 lexical representation. *Linguistic Research* 30(1), 19-32. Despite a wide range of L2 vocabulary research to date, relatively little attention is paid to a fundamental inquiry such as L2 lexical representation. Provided that the changes in L2 learners' behavioral patterns are correlated with those in the internal mechanism, an investigation into the representations of the L2 lexicon should be placed in the center of L2 vocabulary research. This paper highlights the interconnectedness of lexicon modules through a necessary linkage between concept and grammatical categories on L2 lexical representation. An L2 group of advanced English proficiency performed an offline semantic-relatedness judgment task, in which the participants evaluated the semantic relatedness of a series of pairs. Half of (abstract) noun pairs and half of verb pairs were utilized as the related pairs, along with the number matched unrelated pairs. Results showed that the L2 group patterned with the L1 group in evaluating the experimental pairs. Both group judged verb pairs as more semantically related than noun pairs. The implication for L2 conceptual representation has been discussed. (Hankuk University of Foreign Studies)

Keywords Second language acquisition, Grammatical category, L2 lexicon, L1 transfer

1. Introduction

Since recognition of L2 vocabulary is of inevitable importance in production and comprehension (e.g., Gass, 1987) in second language acquisition (SLA), L2 vocabulary research, as many other linguistic domains, has made substantial progress toward how people acquire or learn a second language. In particular, many L2 vocabulary researchers have extensively adopted and utilized psycholinguistic approaches as a key research apparatus, including research on production modeling (e.g., de Bot, 1992; de Bot, Paribakht, & Wesche, 1997), L2 fluency (e.g., Kroll,

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Michael, Tokowicz, & Dufour, 2002), L2 idiom (e.g., Abel, 2003; Cieślicka, 2006), L2 morphology (e.g., Lee, 2002; Murphy, 2004), and vocabulary learning in relation to retention (e.g., Hulstijn & Laufer, 2001), incidental learning paradigm (e.g., Pulido, 2003), receptive and productive knowledge (e.g., Webb, 2005), L2 phonetics (e.g., Barcroft & Sommers, 2005), and writing (e.g., Barcroft, 2004). Psycholinguistic approach places inherent emphasis on modeling and empirical testing through on-line and off-line technique, allowing us that “well-defined problems can be articulated, and other more powerful and daring solutions can be offered to the one that has been tentatively established (Jordan, 2004, p. 210)”. Given its inherently focused advantages, psycholinguistic attempts in SLA are welcome.

Despite a wide range of psycholinguistic approaches to the L2 lexicon to date, relatively little attention is paid to a fundamental issue in relation to L2 vocabulary acquisition, namely, L2 lexical representation (Jiang, 2000; Wolter, 2001; Lee, 2011a, 2011b, 2011c). Jiang (2004) correctly pointed out, for instance, “more basic and specific issues related to the acquisition process, such as how lexical knowledge is represented in the learner’s mind ... what stages a word goes through before it becomes an integrated part of the learner’s lexicon, have received little attention (p. 416)”. Provided that the changes in L2 learners’ behavioral patterns are correlated with those in the internal mechanism, an investigation into the “inside” of the L2 lexicon could not be a simple matter of choice, but rather should be placed in the center of L2 vocabulary research.

Contributing to L2 lexical representation research base, this paper emphasizes a necessary linkage between concept and grammatical categories on L2 lexical representation.

2. Grammatical categories in lexical representation

2.1 Review of the literature

A single encoding of lexical information may concur with the encoding of other intertwined lexical information. Along with an individual encoding of L2 lexical components of a word, in essence, an equal research – focus should be placed on the possibility of a combinatorial encoding of diverse L2 lexical modules of the L2

words. Concept and grammatical categories¹ are two strong candidates to reveal the interconnectedness of lexical modules in L2 lexical representation.

Grammatical categories, a possible lexical component of the lexicon, tend to be far from the research target whereas concept or meaning takes a priority position in L2 lexical representation research (e.g., Jiang, 2002, 2004) as well as in L2 vocabulary research in general. However, it should be noted that grammatical categories could be a core indicator of interconnectedness among components within as well as across lexical items.

Of particular relevance is that, dating back to Aristotle, grammatical categories appear to be correlated with concept. Specifically, there appears to be the correspondence or bidirectional relationship between concept and linguistic expressions. A classical, relevant example would be distinction between noun and verb. Nouns generally refer to an entity or an object while verbs refer to an event in which an object participate. Alternatively, verbs are more conceptually complicated than nouns because nouns are a part of a specification of the verb concept.

This association is tied with an assumption that verbs have more complex internal lexical structure than nouns, as indicated by a fact that many lexical semantics research in L1 (e.g., Levin & Rappaport, 1995) and L2 (e.g., Montrul, 2000) devote themselves to studying verbs. A way of defining the complexity of a structure is the number of participants in the structure. Then, this differentiable concept complexity across syntactic categories lead to a generalization that the quantity of lexicon information would differ across syntactic categories and be similar within categories, which is not explored in SLA. For clarity, the concept of a verb is associated with the complex structure of the verb, which has many modules or components in comparison to an internal structure of a noun. From a more familiar “depth” perspective, the “depth” might be associated with overall different “quantity” across syntactic categories, although the depth of knowledge usually refers to the “quality”.

More intuitively, the bidirectionality between concept and grammatical category is reflected on differentiated difficulty in learning words. For instance, it is our general intuition that learning a noun may be easier than learning a verb (e.g., Ellis

¹ In this paper, the term “grammatical category” is used as a synonym to the term “syntactic category”.

& Beaton, 1993), although such easiness of learning words depends on operationalization of learning the word. Within the current context, the resource of differentiated learning difficulty can be explained partially by the different amount of lexical information between verb and noun.

In addition, brain-imaging and aphasia studies provide empirical supports for the presence of grammatical categories in lexical representation. From neurophysiological perspective, a dense body of brain-imaging studies has demonstrated the functionally differentiated brain region activations across syntactic categories, or at least between noun/verb distinctions, implicating the presence of grammatical categories in the lexical representations (Black & Chait, 2003; Dehaene, 1995; Kellenbach, Wijers, Hovius, Mulder, & Mulder, 2002; Koenig & Lehmann, 1996; Federmeier, Segal, Lombrozo, & Kutas, 2000). Plus, a number of empirical evidence of aphasia studies has also illustrated that Broca's aphasia has syntactic-categorically selective deficits (Caramazza & Hillis, 1991; Daniele, Giustolisi, Silveri, Colosimo, & Gainotti, 1994; Bak, O'Donovan, Xuereb, Boniface, & Hodges, 2001; Zingeser & Berndt, 1990), suggesting that Broca's impairment is not global but linguistically selective.

Taken together, grammatical categories are an essential component of lexical representations, considering that grammatical categories have a necessary linkage with concept. Grammatical category will provide an important insight in understanding the nature of lexical representation in both L1 and L2 research. Importantly, a fact that the quantities of inside members of lexical items are differentiable across grammatical categories allows us an empirical testing for such differentiation, in conjunction with L1 influence.

2.2 Research questions and hypotheses

Motivated by the gaps in the previous literature, the goal of this study is to examine the role of grammatical categories in L2 lexical representation. For this, the performances of an L1 group and an L2 group were compared. Specifically, the two groups evaluated the semantic relatedness of a series of noun and verb pairs. Considering the possibility of stable L2 lexical representations, the L2 group included a high level of English proficiency. The following three research questions were addressed.

- Research question 1:

[The interaction between the L1 and L2 groups]

Do the L1 and L2 group pattern differently in evaluating the semantic relatedness of the nouns and verbs?

- Hypothesis 1-1: Given that the sample of the L2 group has a high level of English proficiency, the L2 group patterns with the L1 group because the high proficiency is likely to relate to the stable mental representations of the L2 lexicon.

- Hypothesis 1-2: The L2 group does not pattern with the L1 group because the high proficiency does not guarantee the similar performance to the L1 group.

- Research question 2:

[Between group comparisons in terms of grammatical categories]

Do the L1 and L2 groups show different magnitudes in evaluating the two grammatical categories?

- Hypothesis 2-1: The L1 and L2 groups show similar magnitudes in evaluating the two grammatical categories, given the stability of the L2 lexical representation.

- Hypothesis 2-2: The L1 and L2 groups show different magnitudes in evaluating the two grammatical categories, considering the instability of the L2 conceptual representation.

- Research question 3:

[Within subject comparison with respect to grammatical category]

Does each group differ significantly in judging each grammatical category?

- Hypothesis 3-1: Both groups show a comparable evaluation of semantic relatedness of noun and verb pairs.

- Hypothesis 3-2: Each group shows a different evaluation of semantic relatedness of noun and verb pairs.

3. The study

3.1 Method

3.1.1 Participants

Forty two participants were recruited from two populations: 22 Korean learners of English (L2 group) studying at a large Midwestern university in the U.S., as well as 20 native speakers (L1 group) of English studying at the same institution. All of the participants in this study gained extra course credit.

The L2 group included 6 male and 16 female participants whereas the L1 group had 2 male and 18 female students. The average age of the L2 group was 31.95 years (SD = 5.73) while that of the L1 group was 27.60 years (SD = 5.41).

Table 1. The profiles of English proficiency of the L2 group

	M	SD	N	Min	Max
CBT TOEFL	272.11	13.69	20	0	300
Speaking	7.21	.87	22	0	9
Listening	7.48	.98	22	0	9
Reading	8.43	1.21	22	0	9
Writing	7.43	1.08	22	0	9

The participants in the L2 group were selected from those who have a high level of English proficiency, considering that a high proficiency is likely to relate to stable L2 lexical representations. It was reasoned that the stable L2 conceptual representations would provide a better position in making comparison with the conceptual representation of the L1 group.

The L2 group deemed to have advanced level of English proficiency. The ESL participants in the L2 group were full-time graduate students, who had satisfied the English requirement of their university. The average CBT TOEFL score (provided by 20 participants) was 272.11. The participants in the L2 group self-rated their English

proficiency in the domains of 4 skills (i.e., speaking, listening, reading, and writing) on a 10-point Likert scale (0 = beginner, 9 = near native). As seen in Table 1, their self-evaluations on the 4 skill were above 7 points out of 9 points.

3.1.2 Instruments

Materials were designed for a semantic-relatedness judgment task. The materials included 32 pairs of items in total. The main experimental stimuli included 8 semantically related pairs of nouns (e.g., trip – journey) and 8 semantically related pairs of verbs (e.g., repair – fix). The semantically related pairs were extracted from the synonym lists of an American Heritage thesaurus (2004), in order to minimize the potential compounding factors. All the nouns were abstract nouns.

Table 2. The main experimental stimuli

Noun related pairs	Verb related pairs
trip - journey	hear - listen
fortune - luck	collect - gather
idea - thought	see - watch
danger - risk	repair - fix
horror - terror	suppose - imagine
trouble - difficulty	begin - start
question - problem	guide - lead
development - growth	consider - think

In addition, the materials contained 16 unrelated pairs made up of 8 noun pairs and 8 verb pairs (e.g., apple – pencil), in order to detect whether participants paid attention to the materials.

3.1.3 Procedure

The main experimental task was an offline semantic relatedness judgment task without time limitations of completing the task. The participants were asked to complete the Likert-type questionnaires in which they evaluated the semantic-relatedness of pairs of words in a series of pairs on a 6-point scale (1 = Not related at all, 6 = Absolutely related). For example, the participants looked at a noun pair

such as trip-journey and were asked to evaluate to the extent which the pair was semantically related on the 6-point scale. The use of a dictionary was not allowed. Instructions were included at the beginning of the tasks. After finishing the tasks, they completed a short biographical questionnaire about age, gender, native language, and English language background. The participants performed the tasks in classrooms.

3.2 Result

The reliability of the instrument was very high, *Cronbach's alpha* = 0.91. The descriptive statistics of the L1 group and the L2 group for each condition was provided in Table 3 and Figure 1.

Table 3. The descriptive statistics of the two groups for each condition

	Nouns		Verbs	
	M	SD	M	SD
L2 group (n = 22)	4.00	.77	4.56	.67
L1 group (n = 20)	3.97	.43	4.26	.63

Note. M = Mean, SD = Standard Deviation

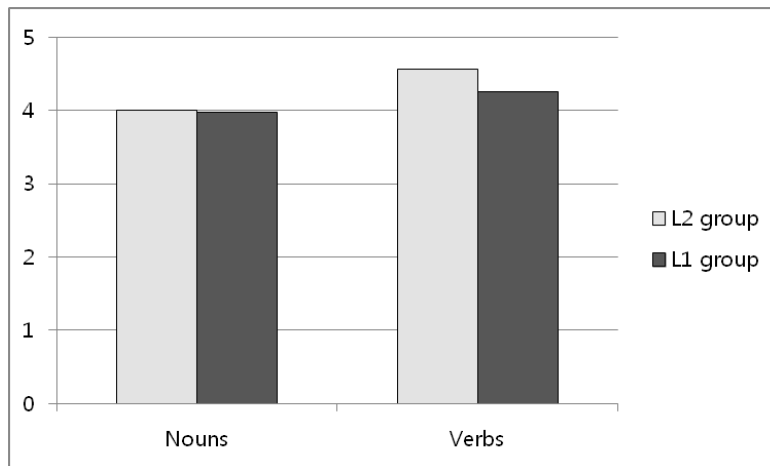


Figure 1. The graphic display of the means of the two groups

The first research question was related to whether the L1 and L2 groups pattern

differently in evaluating the semantic relatedness of the nouns and verbs. To respond to the first research question, a mixed ANOVA (analysis of variance) was administered with the two groups (L1 vs. L2) as a between-subject factor and the evaluations of the two grammatical categories (i.e., nouns vs. verbs) as a within-subject factor. The mixed ANOVA did not yield a significant interaction between Group and Grammatical Category, $F(1, 40) = 3.17, p = .083$, indicating that the L1 and L2 groups showed a similar pattern in evaluating the two grammatical categories. As for the main factors, Grammatical Categories (the within-subject factor) was statistically significant in explaining the variance of the dependent variable (i.e., the judgments of the semantic relatedness of the pairs), $F(1, 40) = 32.13, p = .0001, \eta^2 = .45$. In contrast, the Group variable (the between-subject factor) was not statistically significant $F(1, 40) = .82, p = .37$.

Table 4. The summary of the mixed ANOVA

Factor	F-value	p-value	Eta-square
GC	32.13	.0001	.45
Group	.82	.37	.02
GC x Group	3.17	.083	.07

Note. GC refers to Grammatical Category

The second research question was concerned with whether the L1 and L2 groups show different magnitudes in evaluating the two grammatical categories. To answer, two separate independent t-tests were conducted; while the two independent t-tests had Group (L1 vs. L2) as an independent variable, the first test used the noun scores as a dependent variable and the second test employed the verb scores as a dependent variable. The two group did not differ significantly not only for the noun scores, $t(40) = .16, p = .87$ but also for the verb scores, $t(40) = 1.49, p = .15$.

Table 5. Within-subject contrast (noun vs. verb)

Group	Mean difference	t-value	p-value	df
L2	.56	3.56	.0001	21
L1	.29	2.71	.014	19

The third research question asked whether each group differed statistically in judging each grammatical category. Two separate paired sample t-tests for each

group were run with the noun scores and the verb scores as dependent variables. Overall, as can be seen in Table 3 and Figure 1, both groups evaluated the pairs of the verbs more semantically related than those of the nouns. As for the L2 group, the paired sample t-test revealed that the L2 group judged the two grammatical categories significantly different, $t(21) = 5.36$, $p = .0001$. That is, the 0.56 mean difference between the nouns ($M = 4.00$) and the verbs ($M = 4.56$) yield a significant difference in the L2 group. Similarly, the L1 group evaluated the verbs ($M = 4.26$) more semantically related than the nouns ($M = 3.97$). The 0.29 mean difference between the two grammatical categories differed significantly, $t(19) = 2.71$, $p = .014$.

4. Discussion

The goal of this study is to explore the interconnectedness of lexicon modules through grammatical categories. For the sake of empirical testing, the L1 and L2 groups evaluated the semantic relatedness of a series of noun and verb pairs.

The findings in relation to the first research question were that the L1 and L2 group pattern similarly in evaluating the semantic relatedness of the nouns and verbs in the sense that there was no statistically significant interaction between Group and Grammatical Category. A possible interpretation would be that, because the sample of the L2 group has a high level of English proficiency, the high proficiency is likely to relate to the stable mental representations of the L2 lexicon, which, in turn, led to the similar patterns between the L1 and L2 group.

The findings associated with the second research question were also in support of those of the first research question. That is, the two groups did not differ significantly in evaluating each category. Thus, the L1 conceptual representation and the corresponding L2 conceptual representation might be comparable at least with the current experiment. Still, a caution about the finding of this study needs to be exerted; that is, the finding of this study does not necessarily guarantee the comparable conceptual representations between the L1 and the L2 groups. For example, although there was no significant difference, the L2 group ($M = 4.56$) evaluated verbs more conceptually related than the L1 group ($M = 4.26$). More importantly, the practical significance of the group difference (estimated by eta-

square) is negligible ($\eta^2 = .05$); that is, only 5 percent of the total variance can be explained, remaining 95 percent of unexplained variance. Thus, future research needs to replicate this study with a larger sampling. The investigation of lower levels of English proficiency would strengthen the findings of this study that tested a high level of English proficiency.

Of interest is the results related to the third research question. The L1 and the L2 group judged verb pairs more semantically related than noun pairs. Given that verbs, in general, denote an event, one may predict a less close semantic association of verbs than nouns. Yet, the noun stimuli in this study were abstract but not concrete nouns; therefore, the abstractness of the nouns used in this study seemed to lead to looser semantic relatedness of the noun pairs in this study.

5. Conclusion

The differential contribution of each category has implications for future lexical representation studies as well as SLA (second language acquisition) in general. First, given that every word of NNS is not equally different from that of NS with respect to concept, the précis of understanding lexical representation requires more fine-grained linguistic distinction. For instance, this paper is based on gross distinction among grammatical categories in the sense that two classical syntactic categories were examined so as to gain an overall picture of the presence of grammatical categories in lexical representation. Yet, even for verbs, there are many ways to differentiate concepts of verbs with reference to event or aspectual structure such as Vendler (1967) or Jackendoff (1990, 2002). Second, the potential presence of grammatical categories highlights an importance of multiple indicators in figuring out the characteristics of lexical representation. Alternatively, it appears not necessary to explore conceptual representation through only meaning-focused research. Other concept-related linguistic modules such as argument structure may serve as a better window to understanding concept transfer.

Taking into consideration both L2 lexical representation and processing, L2 vocabulary acquisition processes require the encoding of L2 lexical information and the processing of encoded information. During the encodings, the preexisting L1 lexicon is likely to become involved in developing a new L2 lexicon. This paper

argues that L1 concept transfer onto a new L2 lexicon should interact with other interconnected L2 lexicon components such as grammatical category. Wolter (2001) noted that “it is important to remember that the mental lexicon of perhaps all learners, and most probably all native speakers, is *unstable*.” (p.47; Emphasis added). If only L1 concept transfer takes place in creating new L2 lexicon, the status of L2 lexicon would be far more stable, given many possible concept correspondences across language. What appears to cause instability of L2 lexicon would be the complicated, interconnected information in the L2 lexicon. Furthermore, the findings of this paper indicate that the instability of lexicon could be investigated through multiple indicators, including syntactic categories. This broader L1 transfer perspective will provide more generalizability than an entirely concept-dependent type of research. Crucially, the instability of the L2 learners in creating L2 lexicon will provide L2 researchers a unique window into a better understanding of how lexicon is organized in the brain and processed in real-time via both erroneous and errorless production and comprehension of L2 learners, equally contributing to the nature of human language.

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Junkyu Lee

Graduate School of Education (English Education)
Hankuk University of Foreign Studies
107 Imun-ro, Dongdaemun-gu
Seoul, 130-791, Korea
E-mail: junkyu@hufs.ac.kr

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