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# 25 Dividing Semantic Space by Verbs in L2: How Do L2 Learners Understand the Relationship between the Meanings of Multiple Verbs in L2?

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## I. Introduction

To learn the meaning of a verb, learners have to understand the boundary of a verb in relation to other verbs belonging to same semantic domain because the boundary of a verb is determined by boundaries of other verbs surrounding it. For example, learners cannot understand the boundary of the English verb "tear" if one doesn't know how "tear" is different from "cut" or "break." In acquisition process of L1, Saji et al. (2008) asked the process through which children learn boundaries of words to converge to adult-like meanings. They reported that it takes a long time for children to delineate the boundary of multiple verbs. The same problem applies to L2 learners. However, this may be an even harder challenge for L2 learners because different languages often divide events differently. For example, verbs in Chinese divide carrying events very finely by over 20 verbs (e.g., "bei", "ding", "duan", etc. See Table 1 for example), whereas Korean and Japanese represent these events roughly by 5 to 7 verbs (e.g., "teulda", "antta", "meda" in Korea , "motsu", "daku", "seou" in Japanese). This means that, for L2 learners to learn words in the target language, restructuring the lexicon is perceptually required.

The aim of this study is to investigate how L2 learners sort out the relations among L2 verbs belonging to the same semantic domain and to show what degree the learner's lexical knowledge of L1 influence the learning process of L2

Table 1.　Stimuli videos

| Verb | Action | Held object |
|------|--------|-------------|
| bao | Carrying object in arm | Stuffed animal |
| bei | Carrying object on back | Rucksack |
| ding | Carrying object on the top of head | Wooden bowl |
| duan | Carrying object by hand, keeping horizontally | Glass bowl with water |
| jia | Carrying object under arm | Square back |
| ju | Carrying object lifting up | Square box |
| kang | Carrying object on shoulder | pipe |
| kua | Carrying object, hanging on shoulder | Tote bag |
| lin | Carrying object, hanging on finger | Plastic bag |
| na | Carrying object by hand | Plastic bottle |
| peng | Carrying in both hands | Bouquet |
| ti | Carrying object, pulling up | Handbag |
| tuo | Carrying object on palm | Tray |

quantitatively rather than qualitatively. Specifically, we studied how L2 learners of Chinese whose native language is Korean or Japanese apply various verbs to multiple videos depicting different carrying actions. As we described earlier, each of the 3 languages divides carrying events in very different way. So the lexical domain of carrying in Chinese offers an interesting test case for examining the question we wish to address in this research.

## II. Method

### 1. Participants and Stimuli

Native speaker of Chinese (21), learners of Chinese whose native language is Korean (30) or Japanese (21) and native speaker of Korean (20) or Japanese (16) participated in the experiment. L2 Learners of Chinese are the undergraduates studying in China (average of learning experience: 39 months in Korean; 28 months in Japanese). To construct the stimuli, we first selected 13 Chinese verbs belonging to the semantic domain of carrying and holding actions (see Table 1 for example) and
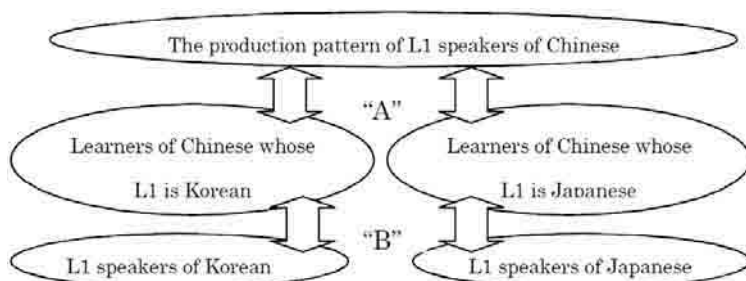
Figure 1. Overview of Analyses

prepared two video clips for each verb, one showing a carrying action and the other showing a holding action both in the manner denoted by the verb. Each event was video-taped with a female agent carrying or holding a familiar and typical object for the carrying action denoted by the verb.

## 2. Procedure

Each subject saw 26 videos and asked to produce the best verb for the video. Native speakers and learners of Chinese produced Chinese verbs. Native speakers of Korean or Japanese who were not learners of Chinese named the videos in their native language.

## III. Analyses & Results

## 1. Analyses Overview

The analyses were conducted in two steps (see Figure 1 for overview). First, we compared the way learners of Chinese divided the semantic space on L2 (Chinese) with the way native speakers of Chinese named the same events by their native language ("A" in Figure 1). Second, we compared the learners' production pattern of Chinese verbs with the production pattern of Japanese or Korean verbs by native Japanese or Korean speakers, in order to examine the degree to which learners' verb use of L2 were influenced by their lexical knowledge of L1 ("B" in Figure 1).

To carry out various multi-variate analyses, we first constructed response matrices from the results of the production task. We created matrices for each of the five groups, separately for themoving and non-moving events. In each matrix, we tallied the number of verbs which had been produced by the participants for

each video. Thirteen rows in each matrix represented the 13 videos and columns represented the verbs the participants had produced. Using these matrices, we calculated correlation values between matrices for the moving and non-moving events for each subject group in order to check whether participants in all groups used the same verb for the corresponding pair of moving and non-moving actions. The correlation value was indeed high for all groups (Chinese L1 speaker: .94; learners of Chinese whose L1 is Korean: .91; learners of Chinese whose L1 is Japanese: .90; Korean L1 speaker: .91; Japanese L1 speaker: .74), indicating that each subjects' group used the same verb for the same manner, regardless of whether the actions were moving or non-moving. We thus aggregated the responses for the moving and non-moving actions of the same manner to simplify further quantitative analyses.

## 2. How many verb types did learners and native speakers of Chinese produced to carrying/holding actions?

The size of the vocabulary has been most commonly used as a measure for vocabulary growth. We thus first counted the number of verb types each individual produced across the videos. Native speakers of Chinese on average produced 11.2 different verb types. The mean-produced verb types for the two L2 learners' group were 7.72 and 7.1 for Korean- and Japanese-speaking learners, respectively. The results suggest that native speakers of Chinese mostly used different verbs for each of the 13 actions though the learners used a smaller number of verbs than native speakers. The means of verb types were not different among the 3 groups, but it differed significantly between each of the learners' groups and the native group( (all ps <.05, Bonferoni corrected)) .

## 3. Does L2 learners of Chinese used Chinese verbs in the same way native speakers of Chinese do?

To address the question "A" in Figure 1, we examined the degree to which the patterns of application of Chinese verbs to the videos are different between native speakers and learners of Chinese. Specifically, we compared the response matrix by L2 learners with that by Korean and Japanese native speakers using MDS (Multi Dimensional Scaling) solutions. We calculated MDS plots based on each of the three response matrices. Figure 2 shows the results (Figure2a for the native speaker of Chinese, 2b for the Korean learners and 2c for the Japanese learners). Each plot in the figure represents the 13 videos, and the distances between them represent the similarity of the pattern of verb production pattern.

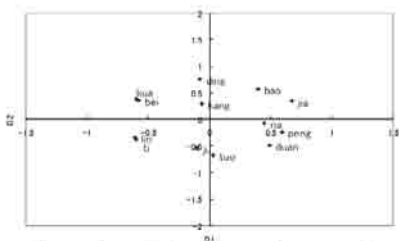Results show that the configurations of the multi-dimensional spaces are very
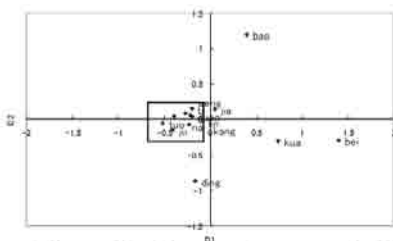
**Figure2a. Chinese native speaker**          **Figure2b. Korean learner of Chinese**
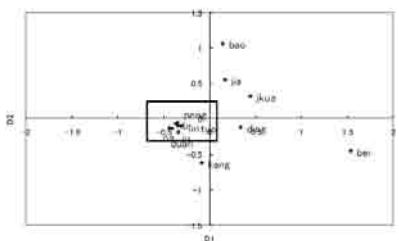


**Figure2c. Japanese learner of Chinese**

different between native speakers and learners of Chinese. Generally, the plots in Figure 2a were configured in a circle and the distances among the videos were more eaqually spaced than plots in Figure 2b or 2c, indicating that native speakers of Chinese can separate the 13 events appropriately using different verbs. On the other hand, Figure 2b or 2c, the videos are not eaqually spaced. Some are very closely, and others are much separated from others. These results suggest that both groups of learners cannot distinguish some videos by different Chinese verbs. To examine this possibility quantitatively, we calculated correlation values between the MDS results of native speakers and learners, using all of the 78 distances from the 78 pairs of videos as data points (Ameel & Storms, 2008). In this case, correlation values represent the degree to which how closely the two groups of learners of Chinese produced verbs as compared to native Chinese speakers. The correlation between the learners and the native speakers of Chinese are very low(r=.27: learners whose L1 is Korea, r=.26: learners whose L1 is Japanese). Surprisingly, even for the learners who had studied in China for over 2-years, the degree of understanding the relation among all verbs was about the same as what was shown by Chinese 3-years-old children in Saji et al (2008).

# 4. What degree learners' lexical knowledge of L1 influences the learning process of L2?

The results from the earlier analyses suggest that it is difficult for L2 learners to delineate the boundary of the verb meanings in L2 in the same way native speakers do. However, when we see the MDS plots for the learners, there are some videos which learners of Chinese could differentiate from others, using different Chinese verbs. Interestingly, the videos which learners can distinguish from others are the ones to which verbs in their native language have corresponding verbs. For example, Korean learners cannot distinguish the videos of "peng", "ti", "duan", "lin", "kang", "na", "tuo", "ju" and Japanese cannot distinguish the videos of "peng", "ti", "lin", "ju", "duan", "na" (see the plots in the box of Figure 2), all of which are represented by *one* verb in both language (Korean: "tulgo", Japanese: "motsu"). On the other hand, Korean could distinguish the event of "ding" which corresponds to the Korean verb "igo" more distinctively than Japanese. Japanese could differentiate the video of "kang" from other videos, which can be represented by Japanese verb "katsugu". This suggests that L2 learners sort out the meanings of multiple verbs in L2 depending on their lexical knowledge of L1 ("B" in Figure 1). To examine this possibility more quantitatively, we again correlated the pattern of verb production for Chinese by L2 learners with the pattern of verb production for Korean and Japanese by native speakers of Korean and Japanese using distances between plots on MDS results. The result is r=.83 between Korean learners of Chinese and Korean native speakers, r=.72 between Japanese learners of Chinese and Japanese native speakers. These values are significantly higher than correlation between usage patterns of learners and native speakers of Chinese we showed former analysis (all ps<.05), indicating that L2 learners does *not* understand the semantic system of L2 verbs in the way the target language (Chinese) divides, but understand in more nearly way their L1 sorts out.

## IV. Discussion

The results revealed that it is difficult for L2 learners to use multiple words belonging to the same semantic domein in L2 in the same way native speakers of native speakers do, regardless of their learning experience of L2. Furthermore, the influence of the lexical knowledge of L1 to the learning process of L2 was apparent. The L2 learners' structure of the semantic space for their target language closely paralleled the structure of the semantic space for their L1. These results suggest that it is extremely difficult for L2 learners to modify the verb system of L1, especially when the semantic systems of L1 and L2 are partly overlapping. To become able

to use words in L2 in the way native speakers do, it is important for L2 learners to be consciously attentive to how the semantic system in L2 as a whole differs from that in L1.

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