

# Examining the Influence of L1 on L2 during Chinese Japanese Learners' Collocation Processing: The Case of Verb-Noun Collocation

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# Examining the Influence of L1 on L2 during Chinese Japanese Learners' Collocation Processing: The Case of Verb-Noun Collocation

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## Abstract

We carried out an experiment to examine the influence of native language (L1) when Chinese learners of Japanese process Japanese (L2) collocations. In the present study, Chinese-Japanese congruent collocations (C-J), Japanese-only collocations (J-only), and unrelated items were presented visually by computer. The Chinese learners of Japanese were then asked to judge whether the stimuli exist in Japanese or not. Results showed that for low proficiency learners the reaction time for C-J collocation was shorter than that of J-only collocation, while for high proficiency learners the reaction time for C-J collocation was longer than that of J-only collocation. These findings indicate that in the case of J-only collocation, learners can get rid of the influence of L1 as their proficiency increases, while in the case of the C-J collocation, it is difficult for them to get rid of the influence from their L1. These results challenge Jiang (2000)'s lexical development model.

## Keyword

Chinese learners of Japanese, verb-noun collocations, L1 influence

## 中国人日本語学習者のコロケーション処理における母語の影響 －漢語名詞＋動詞のコロケーションの場合－

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## 要旨

中国人日本語学習者がL2日本語のコロケーションを処理する際のL1の影響を検証するために、本研究を行った。中国語-日本語で一致するコロケーション (C-J), 日本語にしかないコロケーション (J-only), 無関連な項目の3種類の刺激を呈示し, 日本語に存在しているかどうかを, 中上級の中国人日本語学習者に判断させた。実験の結果, 低習熟度の学習者の場合, C-Jの反応時間がJ-onlyより短いのにに対し, 高習熟度の学習者になると, C-Jの反応時間がJ-onlyより長くなった。これらの結果から, 習熟度が高まるに従い, 学習者がJ-onlyコロケーションを処理する際には, L1の影響を乗り越えるようになるのに対し, 習熟度が高くなっても, C-Jコロケーションを処理する際には, L1の影響を乗り越えにくいということが分かった。これはJiang (2000) の語彙発達モデルに反する結果であった。

## キーワード

中国人日本語学習者, 名詞-動詞型コロケーション, 母語の影響

## 1. Introduction

A collocation is a sequence consisting of two or more words which co-occur more frequently than chance would predict based on the frequency of occurrence of the individual constituent words (Wolter & Gyllstad, 2011). It is a kind of syntagmatic relationship. Unlike the paradigmatic relationship, collocation is not always the same in the second language learner's L1 and L2. For example, "heavy traffic" is understandable in English, while "heavy" could not be used to modify "traffic" in Chinese or Japanese. As an indicator of L2 lexical competence, collocation has been studied frequently in the second language acquisition area. It has been shown that even advanced learners cannot produce collocation properly and that L1 transfer is a major factor in their collocational misuse (Bahns & Eldaw, 1993; Howarth, 1996; Granger, 1998; Nesselhauf, 2005). In studying transfer of L1, it is useful to conjecture which kinds of collocation are easily misused. This study examines in more detail the influence of one's first language on acquisition of collocations by second language learners.

Theoretically, Jiang (2000) proposed a model of adult L2 learner's vocabulary acquisition. His model assumes a representation of lexical items that consists of two levels, the lemma level and the lexeme level (Figure 1). The lemma level incorporates semantic and syntactic information about the word, while the lexeme level includes morphological and phonological/orthographic information. According to Jiang's (2000) model, phonological/orthographic information will be first recognized by L2 adult learners for a new word, and then since the L2 form (i.e., phonological/orthographic information) cannot be directly linked to their concept, it is simultaneously activated with its L1 translation equivalent which has lemma information (i.e., semantic and syntactic information). As this kind of co-activation of L2 form and L1 lemma continuously occurs, the lemma information of L1 translation equivalents is transferred or copied to the L2 mental lexicon. At this stage, the transferred L1 lemma information links the L2 word and its concept directly, and the activation of L1 translation in L2 use decreases accordingly. This whole process results in a hybrid mental lexicon possessing the lexeme of

L2 word and the lemma of their L1 equivalent. In the third stage, through continued exposure to contextualized L2 input, the L2-specific lemma is developed completely. Jiang (2000) argued that the dual entity formed in the second stage often represents the mental lexicon of a large number of adult L2 learners because L1 lemma mediation becomes fossilized.

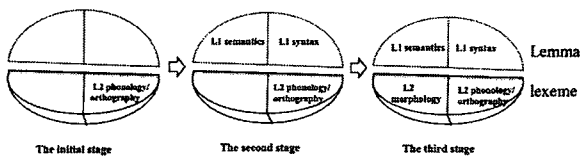


Figure 1. Developmental model of L2 lexical acquisition (The figure is based on Jiang (2000), and has been revised partially by the authors)

Jiang's (2000) model shows the continuous influence of L1 when learning L2 lexical items. Although his model focuses on the single word, some researchers (e.g., Yamashita & Jiang, 2010; Wolter & Gyllstad, 2011) considered that the model could be applied in the process of L2 collocation acquisition as well. Using a psychological method, two experiments were conducted to examine the influence of L1 on second language learners' L2 collocation processing.

Yamashita & Jiang (2010) used an acceptability judgment task to investigate L1 influence on L2 collocation development. Comparing both error rate scores and reaction time scores for collocations with L1-L2 congruent collocations (collocations with L1 equivalents) and without L1-L2 non-congruent collocations (collocations without L1 equivalents), they found that the medium level English learners of Japanese did better on both scores for the congruent collocations, whereas the high level English learners of Japanese

only did significantly better on the error rate scores for the congruent collocations. This might suggest that the amount of exposure to the L2 influences L2 collocational development. Using a primed lexical decision task, Wolter and Gyllstad (2011) also looked at the influence of L1 intralexical knowledge on the creation of collocational links in the L2 mental lexicon of high proficiency Swedish English learners. They found that congruent collocations were processed much faster than non-congruent collocations. The study might indicate that the L1 influence exists even when the second language learners become highly proficient.

Both studies showed the influence of L1 during English learners' collocation processing, however, no studies have been done to explore Chinese learners of Japanese' collocation processing. Along with globalization, there are more and more foreign students in Japan learning Japanese. It is said that it is necessary for them to grasp about 8,000 words to study in Japan. Among which, about half are *kanji*, which is a kind of characters originating from Chinese. For adult Chinese learners of Japanese, who have already had a good command of Chinese characters, it is inevitable that they utilize knowledge of their mother tongue in *kanji* learning; on the other hand, it is not always easy to learn collocations of those *kanji*. Is collocation with *kanji* special for Chinese learners of Japanese? How much are Chinese learners of Japanese influenced by L1 when they process Japanese collocations with *kanji*? Is L1 influence the same as reported with previous studies with different writing systems in their L1 and L2? In order to examine this, we conducted the present experiment.

## 2. Experiment

### 2.1. Stimuli

Three kinds of stimuli were created: Chinese-Japanese congruent collocations (C-J collocation), e.g., 自由を奪う (jiyū-o ubau, deprive someone of freedom (acc)), collocations only exist in Japanese (J-only collocation), e.g., 注意を払う (chūi-o harau, pay attention to), and Unrelated items, e.g., 旅行を戦う (ryokō-o tatakau, fight a journey). Of each condition, 10 stimuli were created. Table 1 shows all of the stimuli.

We first extracted nouns of the collocations from the Chinese-Japanese isomorphic synonyms list in Bunkachō (1978), and then we extracted collocations containing those nouns from NLB<sup>1)</sup>. C-J collocations and J-only collocations were distinguished by the core meaning of the verbs.

We investigated the core meaning of the verbs by consulting two dictionaries: Crown Nicchū Jiten (Sugimoto & Makita, 2010) and Iwanami Nicchū Jiten (Kuraishi & Orisikise, 2001). Then, we investigated the combination of the core meaning of the verb and the noun in the BCC<sup>2)</sup> corpus. If the combination also exists in BCC frequently, then it was classified as a C-J collocation. Oppositely, if the combination could be found only rarely in the BCC, then it was classified as a J-only collocation. More specifically, C-J collocations exist in both NLB and BCC corpus, while J-only collocations only exist in NLB corpus.

We measured the co-occurrence frequency and MI score<sup>3)</sup> of the Japanese version collocation stimuli by using the NLB. A two tail paired t-test revealed that there was no difference between the frequency or MI score of those Japanese version C-J collocations and J-only collocations ( $p=0.54$ ). Then, we measured the frequency of the nouns and verbs which appeared in those items by consulting Amano & Kondō (2000). A one-way analysis of variance revealed there was no significant difference between the nouns ( $F(9,2)=0.62$ ,  $p=0.55$ ) or the verbs ( $F(9,2)=0.61$ ,  $p=0.55$ ) of the three conditions. Table 2 shows a description of the stimuli.

Table 1. Stimuli used in the experiment

C-J	J-only	Unrelated
権力を握る	計画を立てる	戦争を渡す
自由を奪う	注意を払う	時代を注ぐ
目標を定める	生活を送る	世界を務める
規則を守る	批判を浴びる	困難を開く
経験を積む	速度を落とす	印象を流す
記録を破る	予算を組む	旅行を戦う
責任を負う	時間を潰す	事故を売る
誤解を生む	感動を呼ぶ	政治を逃す
能力を養う	反感を買う	同情を埋める
要求を満たす	決心を固める	視線を脱ぐ

### 2.2. Task and procedure

Participants were asked to judge whether these stimuli exist in Japanese or not as quickly

Table 2. Summary of the stimuli (with standard deviation in the parenthesis)

	C-J collocation	J-only collocation	Unrelated items
Frequency of noun	11057.4 (17079.4)	16536.1 (33207.5)	39973.1 (34413.1)
Frequency of verb	24401.0 (8405.0)	35690.8 (9503.2)	24626.8 (38847.5)
Frequency of collocation	157.6 (236.2)	261.6 (282.0)	NA
MI score of collocation	11.2 (1.9)	9.3 (1.3)	NA

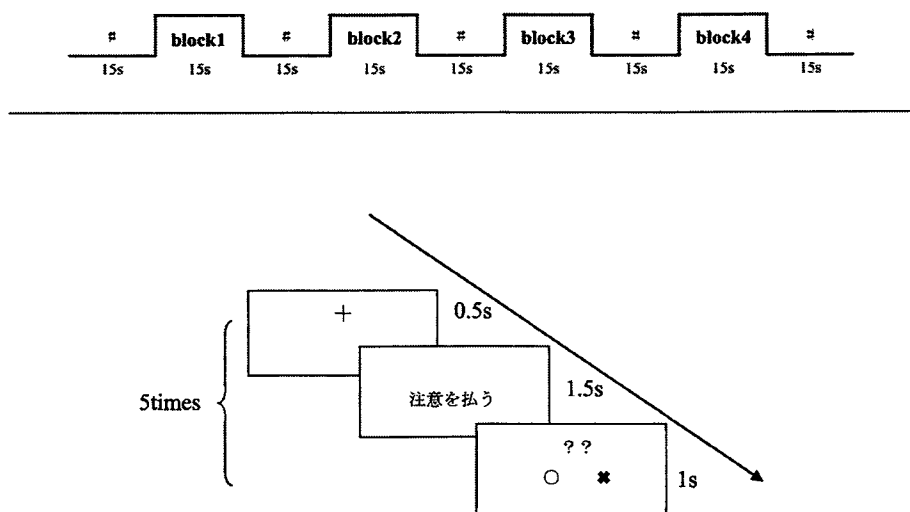


Figure 2. Experimental procedure

The upper part : procedure of one Session The bottom part : procedure of one block

as possible. See Figure 2 for the procedure. In the experiment, a fixation was presented for 0.5s at first, and then the stimulus was presented for 1.5s. Finally, ?? was presented for 1s and the participants were asked to press the “d” in the keyboard if they thought the stimuli exists in Japanese; otherwise they were asked to press the “k” in the keyboard. In one block, the procedure was repeated for five times. One session consisted of 4 experimental blocks and 5 rest blocks. Two sessions were used in the experiment.

After the experiment, the participants were asked to translate the C-J collocations and

J-only collocations into Chinese. We call this the translation task.

### 2.3. Participants

Twelve Chinese learners of Japanese (5 males, 7 females) took part in the experiment. One of the participants was excluded from the further analyses due to his low accuracy. All of them had passed the N2 level of Japanese-Language Proficiency Test. All of them were studying at a university in Japan. Their average age was 24 years old. All of them were right-handed and normal or corrected to normal vision. Written consent was obtained from all

Table 3. Japanese learning background of Chinese learners of Japanese

	Age	Length of Japanese Learning (years)	Length of Residence in Japan (years)	Self-report Proficiency Scores <sup>a</sup>				Frequency of Using Japanese in everyday life <sup>b</sup>
				Listening	Speaking	Reading	Writing	
Average	24	5.2	1.2	4.6	4.2	5.2	4.5	4.5
Standard Deviation	1.2	1.5	0.7	0.6	0.7	0.7	0.7	0.7
Range	21~26	3~8	0.1~2.1	4~6	3~5	4~6	3~5	3~5

a 1 = not at all 7 = native-like

b 1 = not at all 5 = very frequent

participants with the protocol approved by the ethics committee of Kanazawa University. The participants were additionally asked to provide information about their Japanese learning background, their self-reported proficiency in Japanese by a questionnaire administered immediately after the experiment. Table 3 summarizes the participants' Japanese learning background.

### 3. Results

The average of reaction time and error rates were calculated and shown in Table 4. A two tail paired t-test shows no significant difference between the reaction time of C-J collocation and J-only collocation, while the error rate of J-only collocation was significantly higher than that of

Table 4. The results of the experiment  
(with standard deviation in the parenthesis)

	C-J	J-only	Unrelated
Reaction time (ms)	526.1 (143.4)	494.1 (96.5)	469.5 (52.3)
Error rate (%)	18.3 (8.0)	38.3 (27.9)	19.2 (23.6)

Table 5. The results of translation task

Participant No.	C-J	J-only
12	10	1
5	10	3
13	10	3
7	10	4
4	10	5
6	10	6
1	10	8
8	10	8
11	10	8
2	10	9
9	10	9
3	10	10

C-J collocation.

Participants' scores for the translation task are shown in Table 5. By referring to their scores, participants whose correct answer was more than 50%, i.e., who got more than 6 points in their J-only collocation translation were grouped into the high proficiency learners, while participants whose correct answer was less than 50%, i.e., who got less than 5 points in their J-only collocation translation were grouped into the low proficiency learners.

The average of reaction times for each group were calculated and the results are shown in Figure 3. For the low proficiency group, the reaction time of C-J collocation was shorter than that of J-only collocation, while for the high proficiency group, the reaction time of C-J collocation was longer than that of J-only collocation, though it was not significant. Interestingly, the reaction time of C-J collocation was longer for the high proficiency group, while the reaction time of J-only was shorter for the high proficiency group.

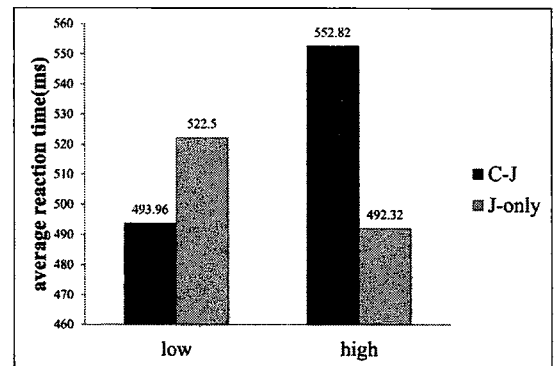


Figure 3. Average reaction time of each condition

### 4. Discussion

Taken together, while there was no significant difference between the overall reaction times of C-J collocation and J-only collocation, the error

rate of J-only collocation was higher than that of C-J collocation. It seems to be consistent with Jiang's (2000) developmental model of L2 lexical acquisition.

However, for the low proficiency group, the reaction times of C-J collocation tended to be shorter than those of J-only collocation, while for the high proficiency group, the reaction times of C-J collocation tended to be longer than those of J-only collocation. These results might suggest that there are different processing routes for C-J collocation and J-only collocation. That is, the low proficiency group stored the C-J collocations analytically, and understood the meaning of each word according to its corresponding L1; then, they accessed the whole meaning of the collocation by combining the meaning of the two words. Similarly, they stored the J-only collocations analytically, and understood the meaning of each word by their corresponding L1; then, they tried to access the whole meaning of the collocation by combining the meaning of the two words, but failed because the whole meaning of the J-only collocation was not the simple combination of the two words. To access the meaning of the J-only collocations, they must get rid of the influence of L1; as a result, the high proficiency group stored and processed J-only collocation holistically; they accessed the whole meaning of the collocation directly, instead of passing through the meaning of their corresponding L1 word. However, in the condition of C-J collocation, learners could access the meaning of the whole collocation by either referring to their L1 knowledge or not. There is a possibility that, to process the C-J collocation, two ways were developed as second language learners' proficiency improves. One way is that they got rid of the influence of L1 and processed the collocation holistically, thus accessing the

whole meaning of the collocation, similar to the J-only collocation. While the other way is that they stored the C-J collocation analytically, and understood the meaning of each word by their corresponding L1; then, they accessed the whole meaning of the collocation by combining the meaning of the two words, similar to the C-J collocation. For the high proficiency group, they accessed the whole meaning of the C-J collocation in these two ways and as a result, the reaction time of the C-J collocation became longer even than the low proficiency group.

In contrast to previous studies, the present study showed reaction times are different for learners processing C-J collocation and J-only collocation. For the low proficiency group, the result was almost the same as the two previous studies, which confirmed the influence of L1; and, moreover, the result was consistent with Jiang's (2000) lexical development model. However, for the high proficiency group, the result was opposite from the two previous studies, and offers a challenge to Jiang's (2000) model.

The results imply that L1 mediation might not always occur in the processing of the congruent collocations. As Yamashita and Jiang (2010) suggested, even if an L2 collocation has an exact translation equivalent in L1, L1 transfer may not occur because the L2 learners perceived a distance between L2 collocations and their L1 translation equivalents, and these may differ individually. Kellerman (1977, 1979) also pointed out that, when there exists a great similarity between the L1 and the L2, the L2 learners might doubt that the similarities are real. For example, as we used Chinese-Japanese isomorphic synonyms in our collocations, some of the learners in the current study may have doubted that the L2 collocations and their L1



translation equivalents truly coincided when they process the congruent collocation (C-J collocation); thus, they did not utilize their L1 intralexical knowledge when processing the L2 collocations. In this sense, even if the L2 collocations have L1 translation equivalents, and thus their meanings can be effectively transferable from L1, it may be necessary step for the L1 learner to be taught to be aware of them as valid L2 collocations, through contextualized input or explicit instructions.

## Notes

- 1) Abbreviation of NINJAL-LWP for BCCWJ, which is an online search tool for the Balanced Corpus of Contemporary Written Japanese, which uses the lexical profiling technique. It was jointly developed by the National Institute for Japanese Language and Linguistics (NINJAL) and Lago Gengo Kenkyusho.
- 2) A Chinese corpus developed by Beijing Language and Culture University.
- 3) Abbreviation of mutual information. MI score is used to calculate the tendency for words to co-occur with other words in the corpus, and corpus linguists have often used a minimum MI score threshold of 3 as indicative of significant co-occurrence.

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