Chinese-Japanese *Dōkeigo* Recognition: Semantic Transfer and Re-transfer

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This study focuses on the recognition of Different and Overlapped *dōkeigo* (Japanese or Chinese words made up of Chinese-origin morphemes) by native Chinese speakers (CNS) who have learned Japanese as a second language (JSL) as well as Japanese-Chinese bilingual speakers. Specifically, this study examines the semantic transfer of Chinese character knowledge to the recognition of similar characters in Japanese and vice-versa and the relationship between the recognition of target words and the language proficiency of the speaker's Japanese or Chinese. The results indicate that both to CNS JSL learners and to Japanese-Chinese bilingual speakers, it is difficult to accurately identify Different and Overlapped *dōkeigo*. Therefore, it can be concluded that (1) not only do the Chinese meanings of *dōkeigo* transfer when CNS JSL learners and bilinguals recognize them in Japanese, but that (2) the Japanese meanings of *dōkeigo* also re-transfer when they recognize those words in their own native language.

日本語と中国語には、ともに漢字で書き表されている語彙があるが、このうち日本語と中国語に共通している漢字語も少なくない。このように、同じ漢字で表記される日本語と中国語の漢字語彙のことを「同形語」という。本研究は、中国人日本語学習者25名及び日中両語のバイリンガル12名に対して、文正誤判断を行った。意味の一部が異なる同形語（O語）と意味が全く異なる同形語（D語）がどのように認知処理され、その認知処理は日本語または中国語の習熟度とどのような影響を受けるのかを検証したものである。実験では、O語とD語を用いて、意味的に非文法的な漢語が他方の言語の意味においては意味が通るような文を作成した。その結果、(i) 日本語の非文だけでなく、(ii) 中国語の非文も、迅速に正しく否定判断するのが困難であるということがわかった。このことは、中国語（母語）の日本語（第二言語）への意味の転移のみならず、日本語（第二言語）の中国語（母語）への意味の転移も存在するということを示唆している。すなわち、双方向の言語転移が起こることが認められた。

Among the Chinese characters used in both the Japanese and Chinese written languages, there are many shared characters and combinations called cognates or *dōkeigo* in Japanese. Unlike phonographic cognates in many other languages, Japanese-Chinese *dōkeigo* is based mainly on the appearance of the two languages' ideograms as opposed to their pronunciation. It is often assumed that because of *dōkeigo*, Chinese native speakers (CNS) who learn Japanese as a second language (JSL) have an advantage in learning Japanese writing and reading when compared to language learners with no such prior knowledge. However, even though the Japanese and Chinese languages use the same characters, the meaning of these characters is not always the same. In addition, if language learners do not fully understand the different meanings of *dōkeigo* in both languages, interference and misunderstanding can occur.

According to Bunkachou (1978), *dōkeigo* can be divided into four categories according to their meanings (Table 1). These categories are Same (S type), Overlapped (O type), Different (D type), and Nothing (N type).

Table 1. Classification and Examples of *Dōkeigo*

S Type:	Identical meaning Ex. 大学 (Both: University)
O Type:	Overlapping meanings Ex. 単位 (Both: Unit, Japanese: Credits, Chinese: Workplace)
D Type:	Different meanings Ex. 愛人 (Japanese: Extramarital Lover, Chinese: Husband/Wife)
N Type:	Japanese only Ex. 神社 (Japanese: Temple, Chinese: *N/A*)

While S type, which makes up two-thirds of all *dōkeigo*, is shared by both languages making language interference inapplicable, N type only exists in the Japanese language, and thus language interference is nonexistent. Because O type and D type are used differently in Japanese and Chinese, however, CNS JSL learners tend to misuse these words (Bunkachou 1978). This is particularly true for the O type, as it has both a common meaning and an original meaning in each language (Figure 1). The O type word単位 (*tani*), for example, has a common meaning of "unit" in both languages, but also means "credit" in Japanese and "workplace" in Chinese (Figure 2). An example of D type is 愛人 (*aijin*), which means "extramarital lover" in Japanese and "husband/wife" in Chinese (Figure 3).

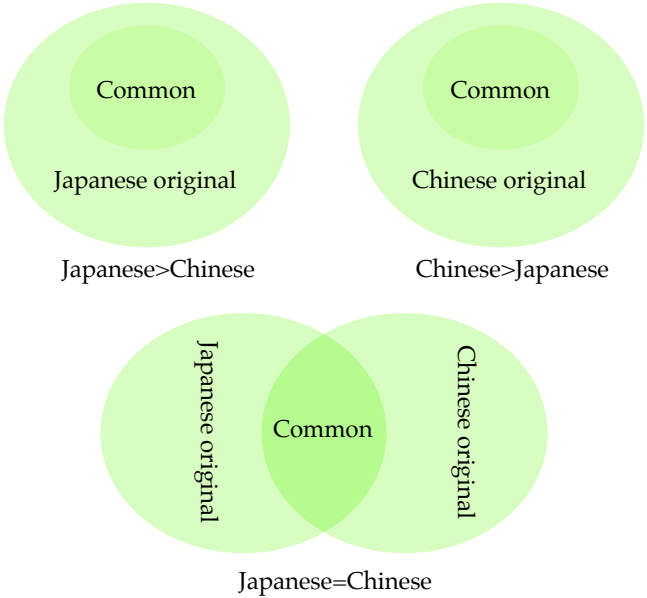

Figure 1. Meaning Area of O Type

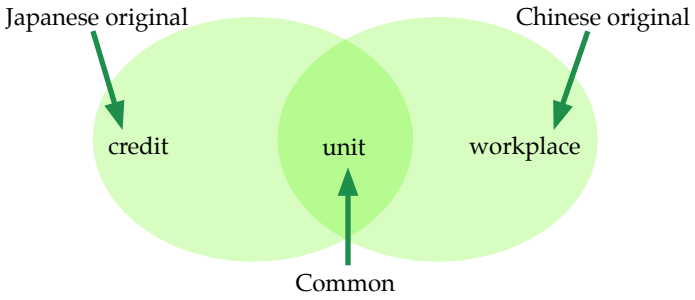

Figure 2. Example of O Type "単位 (tani)"

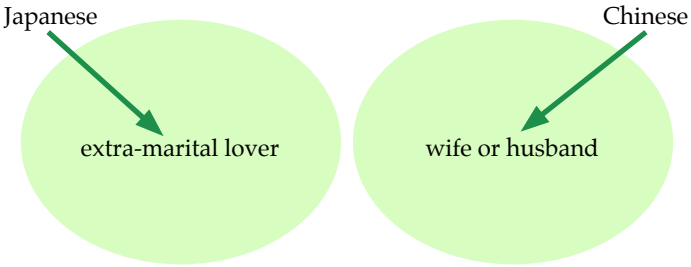

Figure 3. Example of D Type "愛人 (aijin)"

Literature Review

While quite a wide variety of studies have been conducted comparing the cognates of English and other languages like Dutch (Dijkstra, Grainger, & van Hueven, 1999), Spanish (Gerard & Scarborough, 1989) and French (Jared & Scuzs, 2002), most studies about Japanese cognates, or *dōkeigo,* have been comparative linguistic analyses and error analyses of Chinese JSL learners (e.g., Komori, Tamaoka, & Kondo, 2008; Kato, 2005; Chen, 2003), with Qin's (2008) study on the application of *dōkeigo* for motivational purposes in Japanese junior and senior high schools being an exception. Chen (2003) used a questionnaire to research the correlation between Taiwanese Chinese native speakers' (CNS) Japanese language proficiency and their ability to acquire the meaning of the four types of *dōkeigo,* finding a positive correlation between the CNS's Japanese proficiency level and their *dōkeigo* identification accuracy. Kato (2005) gave a true or false test with the four types of *dōkeigo* to research the CNS's first language transfer and found that that in beginner and intermediate levels, D type had a strong negative transfer while at advanced levels no such transfer occurred. Komori et al. (2008) conducted a true or false sentence examination with 50 CNS where O type and D type were used to design sentences that were correct in Chinese but incorrect in Japanese and concluded that (1) CNS had similar reaction times and accuracy despite contrasting levels of Japanese proficiency and that (2) reaction time of D type was overall faster than O type.

Until recently, mainstream conclusions were similar to Chen's (2003) and Kato's (2005) conclusion that the negative transfer from CNS's first language is reduced with a rise in Japanese proficiency. However, Komori et al. (2008) contradicted this by showing that for CNS, correctly recognizing D and O type *dōkeigo* is difficult regardless of Japanese proficiency level. In all, Komori et al. (2008) concluded that all CNS JSL learners must first consciously exclude the Chinese meaning of the *dōkeigo* in order to identify an incorrect usage of the *dōkeigo* in a Japanese sentence, resulting in a longer reaction time.

Research Questions

Most academic research about *dōkeigo* (Komori et al., 2008; Kato 2005; Chen 2003, etc.) has focused on Chinese JSL learners with low to high Japanese proficiency levels. However, there has yet to be a study that includes Chinese-Japanese bilinguals (fluent speakers of both languages). Furthermore, while these studies have observed the negative semantic transfer from the Chinese to Japanese, it is still unclear if the Japanese proficiency is the only key reason for semantic transfer. Does this transfer also work with bilingual speakers? Also, does low proficiency Japanese transfer to Chinese as well?

This study, an extended analysis of Huang (2009), focuses on CNS JSL learners with high and low JSL proficiency as well as Chinese-Japanese bilingual speakers (for this study defined as ethnic Chinese who have had attended a significant amount of formal K-12 education in Japan). In this study, based on Komori et al.'s (2008) true or false sentence examination, both O type and D type *dōkeigo* were put into target sentences during two

examinations (one Japanese and one Chinese). The reaction time and accuracy rate of recognition was recorded in order to answer the following research questions:

1. Can CNS JSL learners with high and low proficiency as well as the bilingual speakers correctly and efficiently judge Japanese sentences with words of O type and D type Chinese original meanings as incorrect?
2. Can the same subjects judge Chinese sentences with words of O type and D type Japanese original meanings as incorrect?
3. Is there a correlation between recognition of *dōkeigo* and the subjects' Japanese or Chinese proficiency?
4. Is there a negative semantic transfer from Chinese to Japanese as well as a negative re-transfer from Japanese to Chinese?

This extended analysis contains several important additions to Huang (2009) including Japanese and Chinese monolingual control groups for cloze tests, an updated literature review and conclusion with applications for semantic re-transfer, and a more detailed explanation of procedures and analyses for each of the examinations conducted. Although no studies have examined the re-transfer of CNS learners' second language to their native language, since *dōkeigo* exists in both Chinese and Japanese, it can be hypothesized that as CNS's Japanese proficiency rises, there is a semantic re-transfer from Japanese to Chinese.

Methodology

Subjects

The subjects of the study are 37 Mandarin CNS originally from mainland China including 12 Chinese-Japanese bilinguals. All subjects were students at Japanese universities with at least level two on the Japanese Language Proficiency Test (JLPT), level one being the highest. The high proficiency group (HPG) and low proficiency group (LPG) were determined with a Japanese language cloze test while the bilingual group was determined through a background information questionnaire and confirmed by both Japanese and Chinese cloze tests. The Japanese cloze test (67 point total) used both exact-word scoring (EWS) and acceptable-word scoring (AWS). EWS is calculated by counting the number of answers that match exactly with the original text that the cloze test was based on. AWS considers words that are different but are contextually and grammatically correct as determined by the author. In addition to the cloze tests, all subjects completed a questionnaire about their JSL learning history. The bilingual subjects also completed a Chinese language learning questionnaire and a Chinese cloze test. Based on the cloze tests and the questionnaires, the 37 subjects were broken up in the following manner: 12 subjects in the HPG, 13 subjects in the LPG, and 12 subjects in the bilingual group. According to the questionnaires, all HPG and LPG subjects started learning Japanese after high school and the average age in coming to Japan was 24.5. The average age that the bilingual group came to Japan, however, was 7.0 and all members received a Japanese education while speaking Chinese at home. As control groups, five native Japanese speakers and five native Chinese speakers also took the same cloze tests. Detailed subject information can be found in Table 2.

Table 2. Subject Backgrounds

	N	Average age to arrive in Japan	Japanese Average EWS	Japanese Average AWS	Chinese Average EWS	Chinese Average AWS
LPG	13	24	48	51	—	—
HPG	12	25	57	60	—	—
Bilingual	12	7	62	65	48	52
Japanese control	5	0	63	66	—	—
Chinese control	5	26	—	—	63	65

Instruments

Examination 1

In Examination 1, target *dōkeigo* words including O type and D type were put into Japanese sentences. Based on Komori et al. (2008), Ueno and Lu (1995), Wang et al. (2007), Bunkacho (1978), and Zhang (2004), eight words were chosen of both O type and D type for a total of 16 words, all characters being between level four and level two of the JLPT exam (Table 3). The levels of the characters were judged according to "Reading Tutor" (an online JSL support system).

Table 3. Select Japanese O Type and D Type Target Words

O type:	単位	左右	東西	一定
	tani	*sayuu*	*touzai*	*ittei*
D type:	勉強	手紙	新聞	顔色
	benkyou	*tegami*	*shinbun*	*kaoiro*

After choosing target words, 16 target sentences were created by inserting incorrect target words in the place of correct words. For example, the sentence "彼は東西を買いに出かけた (He went out to buy 東西) is incorrect as the word東西means "things" in Chinese and "East and West" in both Chinese and Japanese.

Next, target sentences with non-words (made up of character combinations with no meaning) were created based on the O type and D type by exchanging target words with non-words in the same target sentences. Non-words were created by changing the front or back character to one with a similar stroke count and level that when put next to the other character, created a meaningless word. For example, if the front character of the word "勉強" (study) is changed to "動", it becomes "動強", which is meaningless. Another example is changing the latter character in "東西" to "一" which then becomes "東一". Of the 16 target sentences, four contained non-words in which the front characters were changed and four contained non-words in which the back characters were changed for a total of eight non-word sentences. Overall, Examination 1 used a total of 24 sentences including eight target sentences each for O type and D type target words, four sentences with non-words from changed front characters, and four sentences with non-words from changed back characters. Outside of the target sentences, 20 grammatically correct dummy sentences were also created in order to balance out the target sentences. In total 44 sentences were designed.

Examination 2

In Examination 2, the target words and sentences were presented in simplified Chinese characters. Similar to Examination 1, eight words of both O type and D type were chosen (Table 4) from the "Common Chinese Characters Table".

Table 4. Select Chinese O Type and D Type Target Words

O type:	时间	经验	专门	分解
	shijian	*jingyan*	*zhuanmen*	*fenjie*
D type:	趣味	约束	社员	用意
	quwei	*yueshu*	*sheyuan*	*yongyi*

Procedures

The examination was conducted individually with target sentences presented on a 15.4 inch laptop. The reaction time (RT) of the subjects when presented with the target sentence was measured with E-Prime Version 1.2.

At the beginning of each examination, an introduction was shown in the center of the screen for 1500 milliseconds. Next, four sections of a target sentence were presented on the one at a time with a time limit of 6000 milliseconds for each section. The subjects were instructed to move to the next section by pressing the space key at their own pace wherein their RT would be recorded. Target words were placed into either the second or fourth section of each sentence. At the end of each sentence, subjects were asked to judge as quickly as possible if the target sentence was correct, which they could indicate by pressing the "1" number key, or incorrect, which corresponded with the "2" number key. After making a selection the last section would disappear. Because all of the target sentences in this examination were incorrect (the dummy sentences were correct), "2" was always the correct answer. The RT was measured from the start of the target section until the number key was pressed. The accuracy of the answers was also recorded. Before the examination started, all subjects were given the instructions and had a chance to practice.

Analysis

In order to analyze the data from Examinations 1 and 2, the reaction time and inaccuracy rate data were input into Microsoft Excel and SPSS (Version 15). In Excel, the mean and standard deviations of each group's reaction time and inaccuracy rate were calculated for each *dōkeigo* type. In SPSS, the same data was analyzed using ANOVA (General Linear Model) with an alpha of 0.05 to determine the data's significance concerning the linkages between reaction time, inaccuracy rate, and Japanese proficiency level. $p<0.05$ was considered significant with $0.05<p<0.10$ tending to be significant and $p>0.10$ being not significant.

Results

Examination 1

Examination 1's reaction time (RT) and inaccuracy rate (IR) can be viewed in Table 5. For the reaction time (RT), only correct answers made in the last section of each examination sentence were analyzed as judgment of the target sentence was not made until the last section making reaction time consistently longer than the other three sections. When calculating average reaction time, incorrect answers were excluded as only correct answers have an impact on the final results.

The data in Table 5 also shows that D type *dōkeigo* has a higher inaccuracy rate than O type *dōkeigo*. This tendency can be observed among all three groups. Thus, in Japanese sentences, D type tends to interfere more than O type.

After analyzing the reaction time and inaccuracy rate, the next step was to analyze the target word sentences, incorrect sentences, and dummy sentences as well as the language proficiency factor (high, low, and bilingual) and the target factor (O, D, non-word, and dummy) for significance.

Table 5. RT and IR for the Japanese Target Words in the True or False Sentence Examination

	JP HPG N=12				JP LPG N=13				Bilingual N=12			
	RT (ms)		IR (%)		RT (ms)		IR (%)		RT (ms)		IR (%)	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
D Type	1682	1225	41.67	30.99	1583	1104	45.19	27.40	1245	908	28.13	33.23
O Type	1769	1020	34.38	35.21	1515	1106	40.38	25.57	1245	825	18.75	26.83
Non-Words	1878	1080	20.83	31.85	1559	1043	31.73	32.83	1234	722	22.92	29.41
Dummy	1052	822	12.92	8.65	1072	978	20.77	12.05	775	712	3.33	4.44

Note: M=Mean, ms=milliseconds

The multiple comparison analysis for reaction time established that the main effect of the language proficiency factor [$F(2,34)=4.844$, $p<.05$] is significant and that the main effect of the target factor [$F(2,34)=2.659$, $p=.054$] is significant or tends to be significant. Also, the interaction of the two variables tends to be significant [$F(2,34)=1.865$, $p=.094$]. That is, the reaction time of the LPG was longer than that of the Bilingual group by a significant length of time. Thus, as Japanese proficiency rises, reaction time decreases. This is also apparent with the reaction time of incorrect sentences with non-words and short dummy sentences (Figure 4).

Regarding the inaccuracy rate, the main effects of both the language proficiency factor [$F(2,34)=4.328$, $p<.05$] and the target factor [$F(2,34)=16.708$, $p<.001$] were significant. However, the interaction of two variances [$F(2,34)=0.756$, n.s.] was not significant. Thus, although the inaccuracy rate decreases as proficiency rises, all groups are less accurate when target sentences contain target words and more accurate with dummy sentences (Figure 5). Because the main effects of both the language proficiency

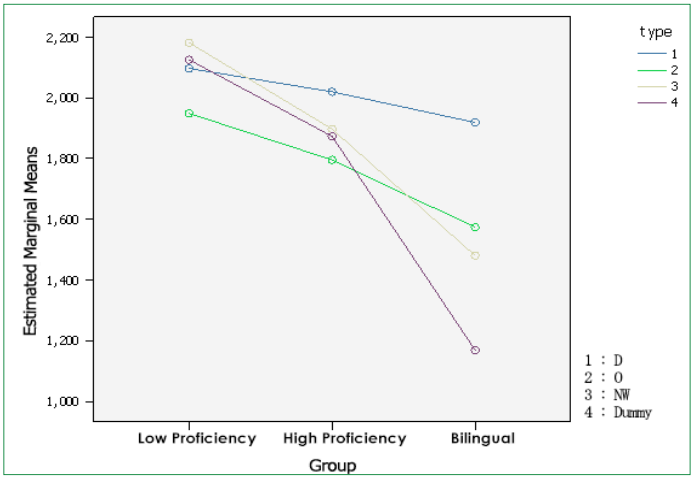

Figure 4. Reaction Time for Japanese Target Word True/False Sentence Examination

factor and target factor of the reaction time and inaccuracy rate were significant, the implication is that there is a negative semantic transfer from the learners' first language (Chinese) to the target language (Japanese).

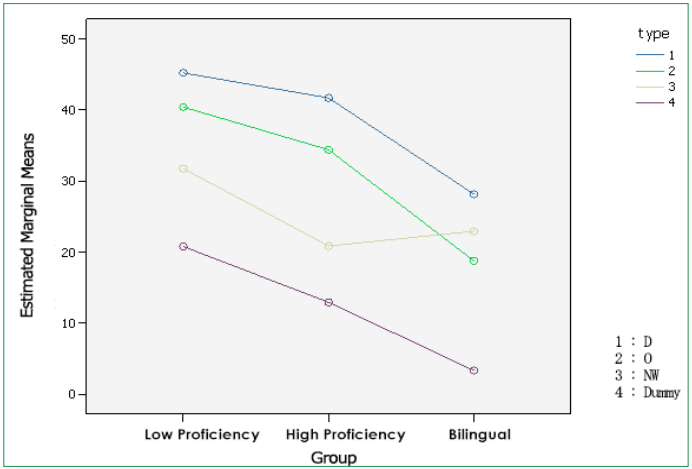

Figure 5. Inaccuracy Rate for Japanese Target Word True/False Sentence Examination

Examination 2

The results of reaction time (RT) and inaccuracy rate (IR) for Examination 2 are summarized in Table 7. Like Examination 1, only the correct judgments made during the last section were used in the average reaction time (RT) and the same groups were used.

Table 7. RT and IR for the Chinese Target Words in the True or False Sentence Examination

	JP HPG N=12				JP LPG N=13				Bilingual N=12			
	RT (ms)		IR (%)		RT (ms)		IR (%)		RT (ms)		IR (%)	
	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*	M	*SD*
D Type	1104	797	43.75	32.34	1343	1046	53.85	35.14	1736	1384	46.88	27.89
O Type	1142	869	58.33	33.51	1220	1045	59.62	28.35	1914	1312	64.58	26.50
Non-Words	990	445	15.63	31.11	1142	651	25.00	38.73	1492	885	30.21	29.47
Dummy	651	511	10.00	9.29	621	539	14.23	14.70	873	660	11.25	13.67

Note: M=Mean, ms=milliseconds

As in Table 7, the inaccuracy rate was high among both D word and O word target sentences. Thus, it is hard to judge the target sentences that are correct in Japanese but are incorrect in Chinese. This demonstrates that the negative re-transfer from Japanese to the learners' first language Chinese is strong.

In testing for significance in the reaction time, the main effects of language proficiency factor [$F(2,34)=6.248$, $p<.01$] and target factor [$F(2,34)=15.484$, $p=.001$] were both found to be significant. However, the interaction of the two variables was found to be not significant [$F(2,34)=1.271$, n.s.]. The reaction time of the bilingual group, thus, was longer than the HPG and LPG significantly. Although the reaction times of the HPG and LPG were shorter than the bilingual group, all groups show a tendency to have longer reaction times in target sentences than incorrect sentences and dummy sentences (Figure 6). This is true despite the HPG and LPG tending to have higher Chinese language proficiency. Once again the implication is that there is a negative re-transfer from Japanese to Chinese.

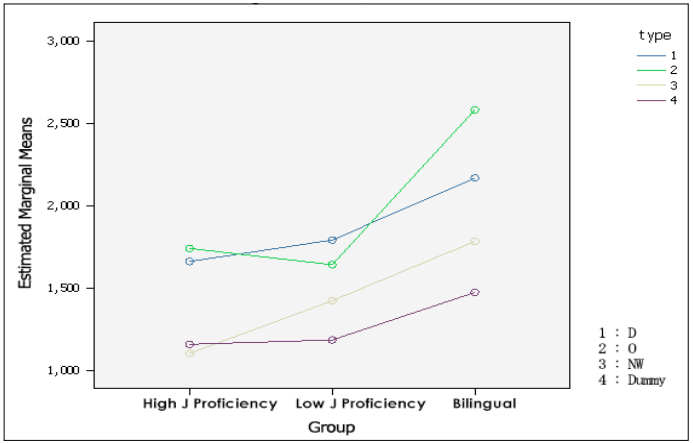

Figure 6. Reaction Time for Chinese Target Word True/False Sentence Examination

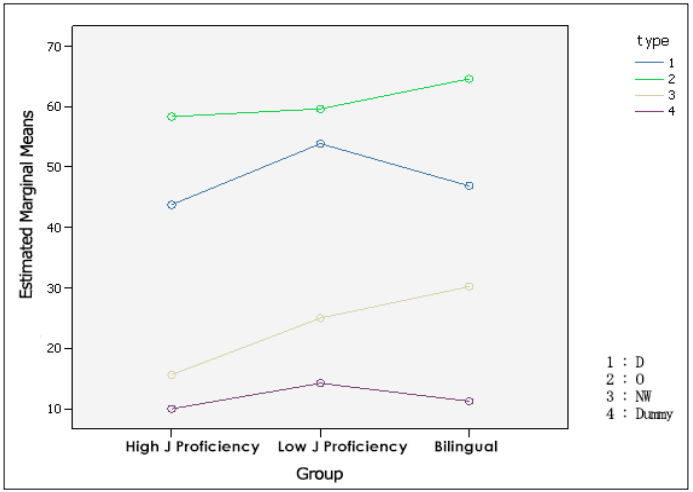

Figure 7. Inaccuracy Rate for Chinese Target Word True/False Sentence Examination

For the inaccuracy rate, the main effect of language proficiency factor was not significant [$F(2,34)=0.726$, n.s.] but the main effect of target factor was found to be very significant [$F(2,34)=51.099$, $p<.001$]. However, the interaction of two variances [$F(2,34)=0.502$, n.s.] was not significant. Thus, no significant difference exists in accuracy between HPG, LPG, and the bilingual group, but there is a difference among D words, O words, and incorrect words. In addition, the inaccuracy rate of target sentence appeared higher than the incorrect and dummy sentence among all three groups (Figure 7).

In conclusion, there is negative re-transfer from Japanese to the learners' first language Chinese in relation to reaction time. Regarding the inaccuracy rate, negative re-transfer from Japanese to Chinese occurs among different types of words regardless of the Chinese language proficiency.

Discussion

In analyzing the two experiments conducted, it can be seen that (1) the data strongly suggests CNS JSL learners cannot correctly and efficiently judge Japanese sentences with words of O type and D type Chinese original meanings (and vice versa) as incorrect, and (2) that CNS JSL learners have even more trouble with Chinese sentences. However, more important is the answer

to whether there is a correlation between recognition of *dōkeigo* and the learners' Japanese or Chinese proficiency. The examinations show that as Japanese proficiency increases, the reaction time shortens and the inaccuracy rate decreases. However, as Chinese proficiency rises, reaction time shortens but no significant difference can be observed with the inaccuracy rate. Finally, regardless of Chinese proficiency, it was difficult for all of the subjects to correctly judge Chinese target sentences, especially those with O words.

A direct comparison of O words and D words finds that D words had a higher inaccuracy rate than O words in Examination 1. In other words, *dōkeigo* without Chinese original meaning causes more interference from Chinese than the *dōkeigo* with common Chinese and Japanese meaning in Japanese sentences. This point is different from Komori et al.'s (2008) observation that O words had a higher inaccuracy rate than D words. On the other hand, in Examination 2 results show that O words had a higher inaccuracy rate than D words with Chinese sentences. This means that *dōkeigo* without the original Japanese meanings causes less interference from Japanese than *dōkeigo* with common Chinese and Japanese meaning in Chinese sentences.

It can also be concluded that judging D words correctly is difficult for all three groups. In addition, it was hard for both CNS JSLs with high and low proficiency and bilingual speakers to correctly and efficiently judge (a) Japanese sentences with words of O type and D type Chinese original meanings as incorrect and (b) Chinese sentences with words of O type and D type Japanese original meanings as incorrect. These results demonstrate that in addition to the negative semantic transfer from the learners' first language (Chinese to Japanese) established in Komori et al. (2008), there is also a re-transfer from the learners' second language (Japanese to Chinese). Furthermore, this phenomenon of re-transfer can be seen among both the JSL learners and the bilinguals. Finally, the fact that negative semantic re-transfer is present among all three groups regardless of their Chinese proficiency difference is noteworthy and when combined with the other conclusions should be useful in furthering both the development of *dōkeigo* as a Japanese language educational tool like that described in Qin (2008) as well as in other second language research examining semantic transfer and re-transfer. Despite this study being limited to the ideographic Chinese characters used in the Japanese and Chinese languages, the process through which this study was conducted and analyzed as well as the presence of a semantic re-transfer may be useful in conducting similar studies comparing the cognates of phonographic written languages as well.

Limitations and Conclusion

This study had several limitations and areas for improvement, most resulting from the relative originality of research on the semantic re-transfer from Japanese to Chinese.

One area for improvement is the grouping of the subjects. Examination 2 used the same Japanese language proficiency grouping as Examination 1 as opposed to regrouping the CNS JSLs based on their Chinese language proficiency. For future studies, all subjects should take both tests cloze tests and should be regrouped for each examination to maximize the impact of the data analysis.

Another area for improvement is the number of subjects. While most of the data did test as significant with an alpha of 0.05, a larger subject pool from a wider variety of backgrounds could help to solidify this study's findings.

Despite the limitations of this study, it is my hope that it will be useful in both expanding research on the topic of *dōkeigo* and making practical the analysis of semantic transfers and re-transfers as both are important in the development of JSL education for Chinese native speakers.

Bio Data

Chuanning Huang currently teaches at the Kanazawa Institute of Technology. Her research interests include language program development and language testing.

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