日本人英語学習者の英語力は彼らの国語力と関連があるのだろうか。（その２）

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概要

Cummins (1991) は第一言語（L1）から第二言語（L2）への転移に関する２つの仮説を提案した。一つは L1, L2 の相互依存性に関するもので、もう一つは転移には一定の L2 能力（閾値）が必要であるという閾値仮説である。これらの仮説は L2 学習者のある時点での言語能力を扱っており、教育上関心のある学習に伴う言語能力変化に言及していない。この問題に対し Ikematsu ら（2016, 2017）は、日本人大学生の日本語（国語）読解力が日本語の訓練（論説文作成）により向上すること（t = -1.75, df = 28, p = 0.046）およびそれに伴い英語読解力も向上すること（t = -1.82, df = 28, p = 0.039）を見出した。この結果は日本語読解力の英語読解力への転移と解釈されたが、ではそれがどのような状況の時に起こるのかについては明確に示されなかった。この課題に対する一つの可能性として、日本語クラスの授業目標である「論説文作成を通じた論理性涵養」が英語読解力向上に一定の役割を果たしたことを挙げることができる。これは英語が日本語と比べ、より論理的な言語と考えられているためである。そこで今回、この点を明らかにするため、英語学習の後に日本語訓練（授業目標：情緒性涵養）を受けた学習者と前回の学習者（英語と日本語（授業目標：論理性涵養）を同時に学習・訓練）を比較した。その結果、学習者の日本語読解力は授業

目標に関わらず、日本語訓練によって向上することが分かった。一方、英語と日本語を同時に学習・訓練した学習者に見られた英語力の向上分は、当該学習者が両言語の学習・訓練を行わない間に消失し、最終的に英語と日本語の学習・訓練の方法（同時か連続的か）によらず両学習者間の各言語能力は同等となった（英語：$t = -1.05$, $df = 24$, $p = 0.152$; 日本語：$t = -0.59$, $df = 24$, $p = 0.284$）。これらの結果から、大人においてもその日本語読解力は日本語訓練によって向上させることができ、かつ、引き続く日本語訓練がなくとも、さらに向上させることができると結論される。他方、英語学習と日本語訓練を同時に行うことによる英語読解力向上の効果は長くは続かず、両言語の学習と訓練を止めると消失してしまうことも明らかとなった。この英語学習と日本語訓練によって生じる謂わば「英語力向上に与える日本語のプライミング効果」は、後に英語習得が成功裡に終わるための「種」となるものなのかもしれない。

IS JAPANESE VERBAL APTITUDE RELATED WITH PERFORMANCE OF ENGLISH LEARNING OF JAPANESE? (Part 2)

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Introduction

L1 somehow determines the outcome of L2 acquisition even though language transfer often occurs positively or negatively from L1 to L2. How is this caused to happen? The linguistic threshold hypothesis proposed by Cummins (1979, 1991) and Bossers (1991), and refined by Yamashita (2002) indicates L1 reading ability transfers to L2 reading ability when a certain L2 threshold is fulfilled. The linguistic threshold hypothesis empirically seems to work. Nevertheless, what it deals with is the static correlation between L1 and L2 reading ability found in L2 learners, not the developmental aspects of L1 and L2. Although some research on college students inferred that L2 learning outcomes could be predicted by L1 proficiency at the beginning of L2 learning in college (Watanabe, 2011; Yamamoto, 2016), such a dynamic correlation between L1 and L2 is not necessarily clarified.

Some neuroimaging technologies have recently become tools used to address this issue. Individual differences in resting-state connectivity have been associated with language learning

abilities when acquiring L2 sounds (Ventura-Campos et al., 2013) and L2 words (Veroude et al., 2010). Concerning L2 reading abilities, Chai et al. (2016) found that pretraining functional connectivity within two different language subnetworks (L1: English; L2: French) correlated strongly with learning outcomes in two different language skills: lexical retrieval in spontaneous speech and reading speed, in which subjects were homogeneous in L1 proficiency based on a subjective questionnaire. The work indicates that the human capacity to learn a second language can be predicted by an individual's intrinsic functional connectivity within the language network in the brain.

According to the work by Chai et al. (2016), there was no surface difference in the L1 of the participants even with differences in the brain network connectivity. Why does this happen? One possible answer to the question is that the L1 proficiency was not properly assessed because only a questionnaire was used for the purpose in the experiment. It could be possible to differentiate participants with regard to L1 proficiency if a more accurate or suitable assessment were used. To address this issue, last year, we used a Japanese verbal aptitude test to assess the participants' L1 (Japanese) proficiency and reported that, even in adults, L1 proficiency improves after L1 training, and L2 (English) learning outcomes improve accordingly (Ikematsu et al., 2016, 2017). Here we further follow up on the results and report that L1 continued to improve, and the extra L2 improvement observed during L1 training diminished when the students stopped engaging in further L1 training practice and L2 learning.

Method

Participants: Two groups of participants: Group A & B were recruited from third-year students at Toyohashi University of Technology (TUT) (Ikematsu et al., 2016, 2017). Group A consisted of 20 students who were to take the Japanese expression skills training in the spring (first) semester and Group B, 10 students who were to take the same course in the fall (second) semester. Figure 1 shows the classification of learners by the language training they received. The first digit indicates whether or not learners received English language training (ET) while the second digit indicates Japanese expression skills training (JT) (1 = training; 0 = no training). Figure 2 shows a hypothetical learning process for learners classified in Figure 1. Both Groups A and B were required to take compulsory English classes in the spring semester and, therefore, Group A was in the process of transitioning from classification 00 to 11, and Group B from 00 to 10 in the spring semester. In the fall semester, most of the students did not take English courses and Group A took neither ET nor JT; Group B took only JT. Therefore, Group A remained classified as 11, but Group B was in transition from 10 to 11 in the fall semester.

Japanese expression skills training course: The objective of the Japanese expression skills training

course the participants of Group A took in the spring semester was to develop learners' *logicality*. As shown in Figure 3, the class activity consisted of three activities: First, students were given instruction for 45 minutes on a topic with its background at the beginning. Then the students were given another 45 minutes to write an essay on the topic of more than 800 characters in Japanese. Finally, the essay was checked and assessed by the instructor based on logicality, appropriateness of word usage and proper usage of expressions. The students completed this activity 15 times during one semester. The objective of the course the students of Group B took in the fall semester was mainly to develop learners' *simpathism*, unlike *logicality* set in the spring semester.

Assessment of language proficiency: Japanese verbal aptitude and English proficiency of the participants were assessed by Kokugo-ryoku Kentei (Kokugo-ryoku; Z-kai Incorporated) and EIKEN Institution Based Assessment (EIKEN IBA; Eiken Foundation of Japan), respectively.

Data analyses: Average scores from Kokugo-ryoku and EIKEN IBA before and after ET and JT were used to judge, either with a paired or an independent *t*-test, whether or not observed increases in the average scores were a result of the training conducted. R was used for the analyses.

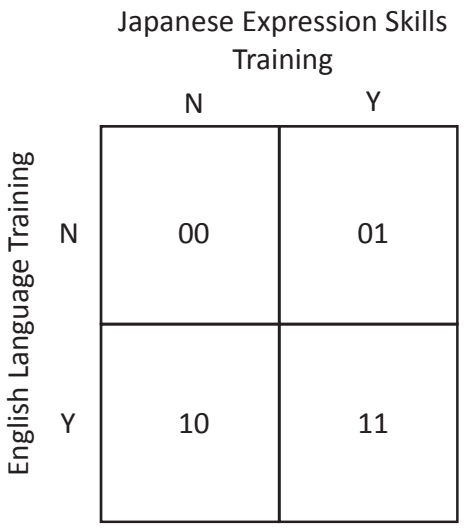

Figure 1. Learner classification by trainings received.

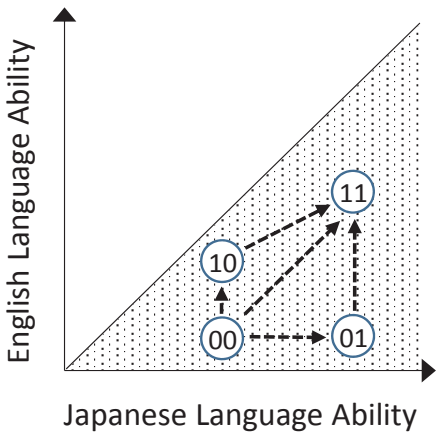

Figure 2. Hypothesis: English language (L2) ability develops in accordance with the improvement of Japanese language (L1) ability.

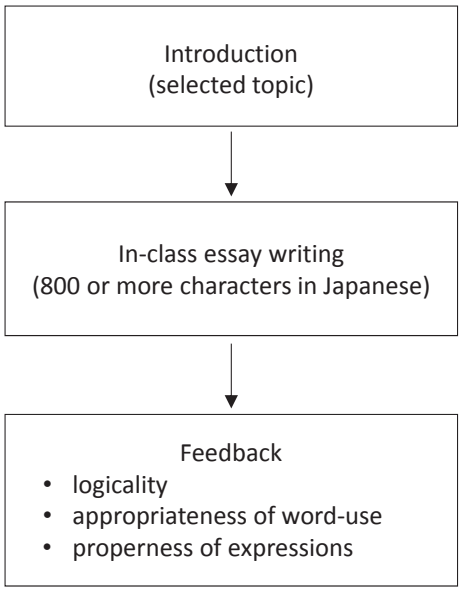

Figure 3. Activity flow of a writing-based, Japanese expression skills training course at TUT.

Results and discussion

Table 1 shows how the average scores of language skills improved after the Japanese expression skills training was conducted in the spring semester. Here the average scores of Group B were used as the pre-course scores because the current study began after the course had already started

(Ikematsu, 2016, 2017). Therefore, the positive differences between the scores of Group A and B were recognized as a potential educational effect derived from taking the course. As seen in the table, there are many skills that showed improvement both in Japanese and English. However, as the result of an independent *t*-test, we can see that English reading ability and Japanese reading ability were the only ones that showed significant improvement. It should be emphasized again that both groups received English training in the spring semester, and, hence, the enhancement of English ability is inferred to somehow correlate with the Japanese training.

Table 1

Language skill improvement after the Japanese expression skills training course (Ikematsu et al., 2016)

Language	Skill	Average		
		Group A	Group B	difference
English	total	1019.2	977.8	41.4
	reading	524.6	496.7	**27.9** *
	listening	494.8	481.1	13.7
Japanese	total	199.0	189.2	9.8
	reading	66.1	58.3	**7.8** *
	transmission	73.8	71.3	2.5
	constitution	66.4	61.6	4.8
	analytic listening	83.8	80.0	3.8
	enthusiastic listening	67.5	55.0	12.5

*$p < 0.05$

Note. The above are the language skills that showed increases in the average scores of English and Japanese proficiency tests after the Japanese expression skills training course. Only English and Japanese reading proficiency were judged significant ($p < 0.05$) by an independent *t*-test.

In the fall semester, Group B received Japanese training and the results are shown in Table 2. Note again that most students from both groups received no English training in the fall semester. As seen in the table, for both groups, Japanese reading ability improved while English reading ability remained unchanged during the fall semester. In addition, the additional or extra improvement in English reading ability for Group A observed in the spring semester disappeared as a result of what could be called the "priming" effect of L1 on L2. In sum, what we observed during this year-long educational experiment was that the learners' Japanese reading ability continued to improve once they received Japanese training; however, their English reading ability remained unchanged from the start of the study, although it did show the "priming" effect of L1 on L2 when the students learned English and Japanese concurrently.

The cause of the priming effect is possibly in the objective of the Japanese expression skills course given in the spring semester. The aim of the course was to develop learners' *logicality*.

English is known to be more of a logical language unlike Japanese, and the logicality that improved through the essay writing even in Japanese might transfer to English reading ability. On the other hand, in the fall semester, Group B received the course with an objective to develop learners' *sympathism* and, hence, no transfer from Japanese to English was seen even though Japanese reading ability improved (Table 2). The priming effect could be seen as a "seed" from which L2 further improves and the ongoing improvements would need successive training much in the way seeds need water to grow.

Table 2
Language skill variation in the fall semester.

Language-skill / Group	Average		
	before Fall	after Fall	difference
English-reading			
Group A	524.6	518.7	-5.8
Group B	496.7	496.3	-0.4
Japanese-reading			
Group A	64.1	70.6	**6.5** *
Group B	58.3	67.3	**9.1** *

* $p < 0.05$.

Note. Group A received Japanese expression skills training in the spring semester, Group B in the fall. Groups A and B received almost no English training in the fall semester.

A dynamic correlation between L1 and L2 during the course of Japanese and English training is another focus of the present study. Table 3 shows a simple regression analysis between the English and Japanese reading ability of both groups in the spring and fall semesters. As seen in the table, Group B showed a moderate correlation (R^2 = 0.65) with high significance in the spring semester. However, the degree of correlation somewhat decreased (R^2 = 0.47) after the Japanese training in the fall semester. This is considered due to L2 improvement, not L1 improvement as seen in Table 2. The trend could also be understood in the way L1 needs some time to transfer to L2 or there is a delay in L1 transfer to L2. The trend of Group A seems different from that of Group B. However, this can be explained in the same way as above. The relatively weak correlation in the spring semester (R^2 = 0.22) is considered a result of the increase in L1 reading ability and a delayed transfer of L1 to L2. In the fall semester, the weak correlation remained almost unchanged (R^2 = 0.23) even during the development of L1 (Table 2). Therefore, the correlation between L1 and L2 for Group A in the fall semester is considered increasing and the possible result of L1 transfer to L2.

Table 3
Simple linear regression analysis between English and Japanese reading ability of Groups A and B.

Group / Term	R^2	F	p
Group A			
Spring (J & E)	0.22	4.63	0.047
Fall (none)	0.23	4.29	0.057
Group B			
Spring (E)	0.65	15	0.005
Fall (J)	0.47	5.35	0.060

Note. J and E represent Japanese training and English training participants received, respectively.

To accumulate similar results is needed to make the transfer process of L1 to L2 clear during the course of language training. However, the results obtained in the present study on the dynamic characteristics of the transfer process of L1 should lead to improved teaching methods for Japanese language to Japanese learners of English with regard to improving English proficiency through Japanese training.

Conclusions

In the development of L2 proficiency, L1 transfer should completely be understood because L1 and L2 are known to be correlated with each other. In order to gain insight into the details of the transfer process, the dynamic correlation between Japanese (L1) and English (L2) during the course of L1 training for college students was examined. The results showed a priming effect of L1 on L2 that could be a seed for further improvement of L2. In addition, we suspect *logicality* may be the key to the priming effect. Our research addresses an important process that will hopefully lead to an ideal teaching method for L1 (Japanese), especially to Japanese learners of other languages.

Acknowledgements

This study was supported by the TUT Education Activation Fund 2017 (through discretionary funds of the president).

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