

# 日本人大学生英語学習者の日本語力が 英語力へ転移する際に必要な英語力閾値について

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## 概 要

第二言語 (L2) や外国語 (FL) の学習に第一言語 (L1) の能力が影響を及ぼすことは想像に難くない。Cummins (1991) は L1 から L2 への転移に関する 2 つの仮説を提案した。L1、L2 の相互依存性に関するものと L1 から L2 への転移には一定の 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 学習者のある一時点での言語能力を評価対象としており、L1 および L2 の学習による能力向上に伴う両者の関係の変化には言及していない。この課題に対し 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。そ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と結論した。しかしながら当該研究においては、研究遂行上の制約から日本語訓練の前・後のデータをそれぞれ別のグループから取得したため、結果の妥当性に課題が残っていた。そこで今回、この点を明らかにするため、授業目標の異なる 2 グループ (論理性涵養と情緒性涵養) の訓練前後 (日本語訓練期間中は全員英語授業を受講) の日本語力と英語力の変化を調べた。その結果、授業目標に関わらず学習者の日本語力および英語力双方が向上、特に論理性涵養を目標としたクラスで英語力が有意に向上することが分かった。また、論理性涵養クラスを受講前の英語力により 2 グループに分けて分析した結果、TOEIC トータルスコア 400 点未満のグループで国語力が、400 点以上のグループで英語力が有意に向上した (日本語・英語双方とも受講していない後期にもさらに英語力が向上)。後者において両言語の読解力および聴解力間の単回帰分析を行ったところ、受講前には弱かった日本語読解力と英語読解力との間の相関 ( $R^2 = 0.114$ 、 $p = 0.578$ ) が、受講後に非常に強くなること ( $R^2 = 0.961$ 、 $p = 0.003$ ) が判明した。以上および従前の結果から、大人においてもその

日本語力（特に読解力）は日本語訓練によって向上させることができ、かつ、一定の英語力（すなわち閾値）があれば英語力も向上させることが可能であると結論される。日本語力から英語力への転移に必要な英語力の具体的閾値（TOEIC トータルスコア 400 点）は、暫定的ではあるが、日本人学生の英語力を向上させる際の目標値となり得る。そして「まずは TOEIC400 点をクリアさせ、その後、日本語力の向上に伴う相乗的向上につなげていく」という新しい英語教育スタイルへの転換が期待される。

# **On the Threshold of English Proficiency Required for Japanese Language to Transfer to Specific English Skills for Japanese University Students Learning English**

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## **Introduction**

It is no doubt that L1 is somehow related to the outcome of L2 learning even though language transfer often occurs positively or negatively from L1 to L2. What causes this to happen? The linguistic threshold hypothesis so far proposed (Cummins, 1979, 1991; Bossers, 1991; Yamashita, 2002) indicates L1 reading ability transfers to L2 reading ability when a certain L2 threshold is fulfilled. Although the linguistic threshold hypothesis seems to be working on us, what it deals with is the static or at-a-point correlation between L1 and L2 reading ability found in L2 learners, not the developmental aspects of L1 and L2. There has been some research on college students inferring that L2 learning outcomes could be predicted by L1 proficiency at the beginning of L2 learning in college (Watanabe, 2011; Yamamoto, 2016), however how such a dynamic correlation between L1 and L2 occurs is not yet made clear.

Some neuroimaging technologies have recently become tools for addressing such an 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). Regarding to 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 apparent difference in the L1 of the participants even with differences in the brain network connectivity. One possible answer to the question: why does this happen? 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. In order to address this issue, 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, 2018). However, this work started after L1 training had begun due to budget restrictions and different groups for "before" and "after" taking L1 training had to be used, and hence the results needed to be further verified. Here we choose two classes, *Essay* and *Film*, receiving L1 training with different achievement goals, to improve students' *logicality* for the *Essay* class and *emotionality* for the *Film* class and report that L1 and L2 of the *Essay* class improved with statistical significance, and the correlation between reading skills of L1 and L2 of the participants in the *Essay* class with TOEIC scores above 400 points became much stronger ( $R^2$ : 0.114 to 0.961,  $p$ : 0.578 to 0.003) after L1 training practice.

## Method

*Participants:* Two classes: *Essay* and *Film* were chosen from several Japanese training classes for third-year students at Toyohashi University of Technology (TUT) called Japanese Expression Skills Course, in which their achievement goals differ depending on classes. *Essay* and *Film* have the objectives to improve students' *logicality* and *emotionality*, respectively, and were held in the spring semester. *Essay* and *Film* consisted of 12 and six students, respectively. 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 *Essay* and *Film* took compulsory English classes in the spring semester and, therefore, they were considered in the process of transitioning from classification 00 to 11.

*Japanese expression skills training course:* The objective of JT the participants of *Essay* and *Film* took in the spring semester was again to develop learners' *logicality* and *emotionality*. Figure 3 shows the class activity consisting of three sub-activities for both classes. For *Essay*, students were

first 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 logicity, appropriateness of word usage and proper usage of expressions. The students completed this activity 15 times during one semester. For the *Film*, students were first given instruction for 45 minutes on a selected film with its background at the beginning. Then the students were given another 45 minutes to watch the film and told to write an essay at home on the film including a summary, impression, and opinions about the characters' act. Finally, the essay was checked and assessed by the instructor based on understanding the characters' situation and behavior, appropriateness of word usage and persuasive usage of expressions. The students completed this activity 15 times during one semester.

*Assessment of language proficiency:* Japanese verbal aptitude and English proficiency of the participants were assessed by the Kokugo-ryoku Kentei (Kokugo-ryoku; Z-kai Incorporated) and the TOEIC (The Institute for International Business Communication), respectively.

*Data analyses:* Average scores from the Kokugo-ryoku Kentei and the TOEIC before and after JT were used to judge, with a paired *t*-test, whether or not observed increases in the average scores were a result of the training conducted. Individual scores of the reading section from both tests were used for a simple linear regression analysis. R was used for the analyses.

		Japanese Expression Skills Training	
		N	Y
English Language Training	N	00	01
	Y	10	11

Figure 1. Learner classification by trainings received.

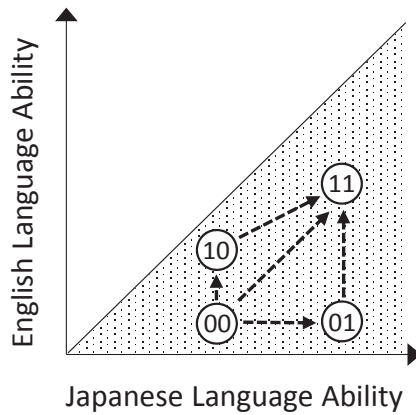


Figure 2. Hypothesis: English language (L2) ability develops in accordance with the improvement of Japanese language (L1) ability.

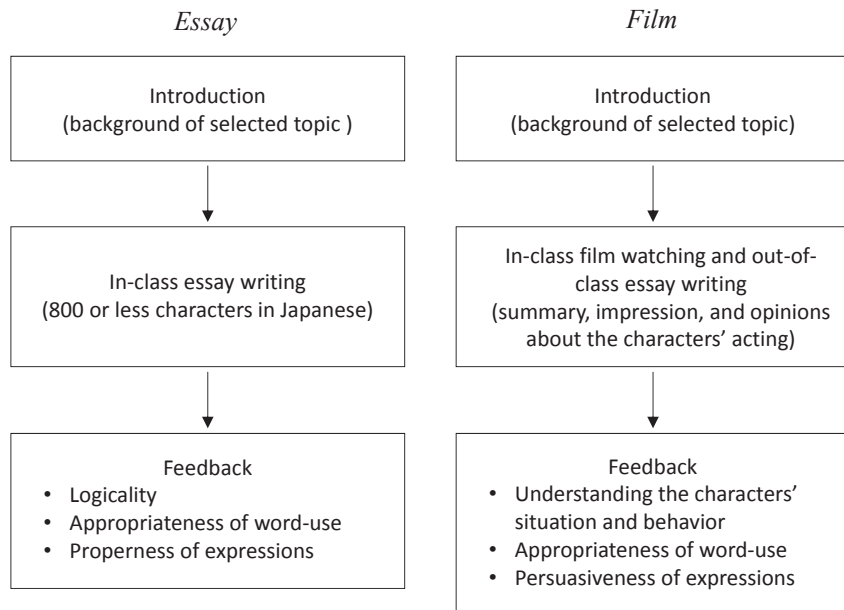


Figure 3. Activity flow of an essay writing-based (“*Essay*”) and a film watching-based (“*Film*”) Japanese expression skills training course at TUT.

## Results and discussion

Figure 4 shows how the average scores of language skills improved after JT was conducted in the spring semester. TOEIC was further conducted at the beginning of the next spring semester. As seen in the left half of (a) and (b) of Figure 4, both Japanese and English proficiency improved after

JT irrespective of their class objectives. English proficiency continued to improve even in the fall semester, namely EPT2 to EPT3. Among the improvements, JPT1 to JPT2 and EPT1 to EPT2 for the *Essay* were statistically significant ( $p < 0.05$ ). The *Essay* results were divided into two sub-groups, the total  $< 400$  and that  $> 400$  depending on EPT1 below and above 400 points, respectively, as in the right half of (a) and (b) of Figure 4 because of the reason discussed below using Figure 5. Figure 5 shows the relation between JPT1 and EPT1 for *Essay* class. As in Figure 5 (a), the trend shows somehow weak to moderate relation between both languages at the onset of JT ( $R^2=0.3728$ ). However, when taking a closer look, we could recognize that the trend is formed by two different subgroups, namely one with EPT1 below 400 points and the other above 400 points as extracted and separately shown in Figure 5 (b) and (c) giving  $R^2$  of 0.4019 (moderate) and 0.6028 (strong), respectively. Returning to the right half of Figure 4 (a) and (b), we can see that the improvement of JPT1 to JPT2 for the *Essay* was from  $< 400$  subgroup and EPT1 to EPT2 from  $> 400$  subgroup. These score variations along with their statistical judgement were also shown in Table 1.

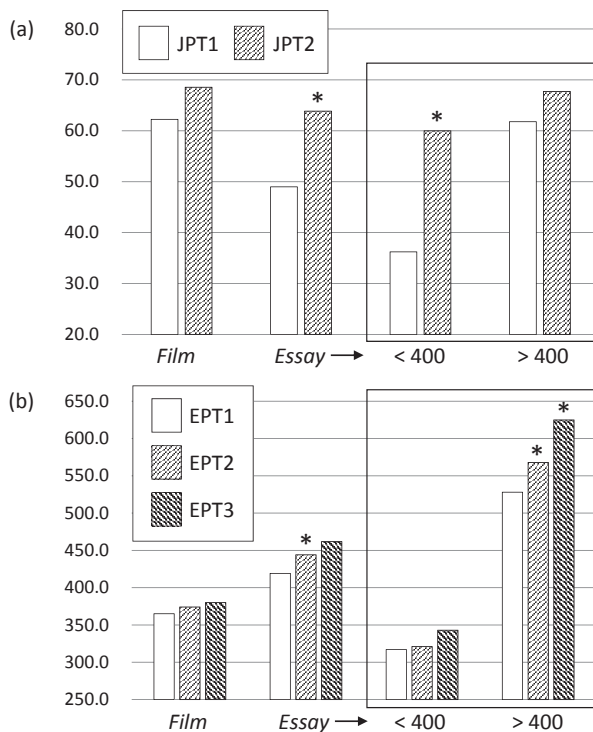


Figure 4. Language skill variation in the total score of (a) Japanese proficiency test (JPT) and (b) TOEIC as English proficiency test (EPT) for the *Film and Essay* class in the spring and fall semester. The numeral 1, 2 and 3 put after JT or ET represent before taking the course, after taking the course and the end of the fall semester, respectively. “< 400” and “>400” in the boxes on (a) and (b) denote ET1 below and above 400 points for the *Essay*, respectively.

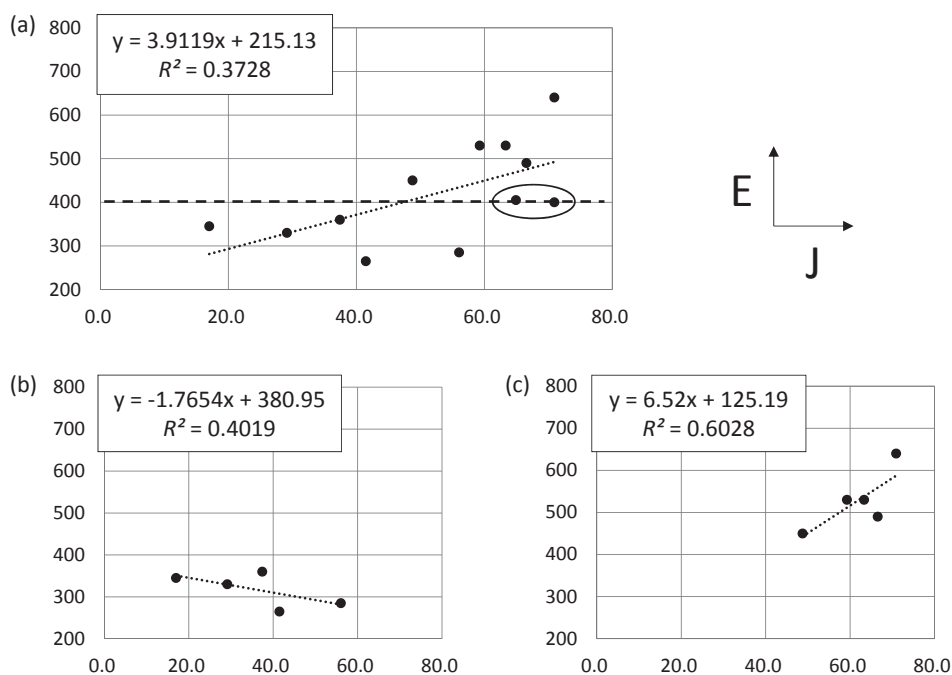


Figure 5. The relation between the total scores of Japanese and English proficiency test for the participants before taking an essay writing-based (“Essay”) Japanese expression skills training course. (a) For all *Essay* participants. Two data circled were omitted for further analysis because of the lack of data in the year end. (b) For participants with below and (c) above 400 points on TOEIC, the level of which is shown with a broken line in (a).

Table 1. *Language skill variation in the spring and fall semester*

Group	Average Difference		
	JT1 - T2	ET1 - ET2	ET2 - ET3
<i>Film</i>	6.3	9.2	5.8
<i>Essay</i>	<b>12.6 *</b>	<b>25.0 *</b>	17.7
ET1 < 400	<b>23.8 *</b>	4.0	22.0
ET1 > 400	6.0	<b>40.0 *</b>	<b>57.0 *</b>

Note. “*Film*” and “*Essay*” received Japanese expression skills training in the spring semester. Both classes received almost no English training in the fall semester. JT and ET represent a total score of TOEIC and Japanese Proficiency Test, respectively. The numeral 1, 2 and 3 put after JT or ET represent before, after taking the course and the end of the fall semester, respectively.

\*  $p < 0.05$ .



From the results above, we can perceive that *Essay* class is effective in improving Japanese as well as English proficiency unlike *Film* class that is not necessarily working in improving either of the two language skills. The cause of the improvement by the *Essay* class is probably in the objective of JT 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 could help understand what is written in English, and thus transfers to English skill. On the other hand, *Film* class received the course with an objective to develop learners' *emotionality* or *sympathism* which is considered difficult to be applicable to understanding reading script in English unless the learners have words expressing emotions in English, which are often on a list of difficult words, and hence, scarce transfer from Japanese to English occurred (Table 1). The improvement in Japanese skill for the *Essay* < 400 subgroup is probably due to their low proficiency in Japanese skill before taking the course (Figure 4 (a)). The Japanese to English transfer seems to happen only when Japanese skill is high enough as seen in the *Essay* > 400 subgroup (Figure 4 (a) and (b)) although the reason for the transfer is not necessarily clear and further discussion is needed by way of accumulating the educational results from the classes onward. However, it seems likely that a certain level of proficiency in Japanese should be attained if the Japanese people learning English need to express something in mind in English. If this is truly the case, what the Japanese people learning English or other languages generally need is to improve their proficiency of English or the learning languages to a certain level and enhance it through many kinds of inputs including their L1, namely Japanese language.

As mentioned above, no improvement with statistical significance in Japanese skill was seen in the *Essay* > 400 subgroup, however Japanese reading skill, Y, and English reading skill, R, of the group are found only correlated and strengthened as JT progresses judging from a simple regression analysis as shown in Table 2.

Table 2. Simple linear regression analysis between English and Japanese reading ability of the *Essay* participants with TOEIC scores above 400 points

Variables	<i>slope</i>	$R^2$	<i>F</i>	<i>p</i>
R1-Y1	0.987	0.114	0.39	0.578
R1-Y2	2.623	0.474	2.69	0.199
R2-Y2	2.765	<b>0.961 *</b>	72.9	<b>0.003</b>

Note. R stands for "Reading" of English and Y for "Yomi" meaning reading in Japanese. R1 and Y1 represent participant's reading score of TOEIC and Japanese Proficiency Test before taking the *Essay* class, respectively and R2 and Y2 after the class.

\*  $p < 0.01$ .

Their Japanese reading score before taking the *Essay* course, Y1, had a weak correlation ( $R^2$ : 0.114,  $p$ : 0.578) with their English reading score, R1. The correlation is found a little stronger ( $R^2$ : 0.474,  $p$ : 0.199) when R1 is correlated with Y2, their Japanese reading score after taking the *Essay* course, indicating that R1 could predict Y2 and vice versa. At the end of the JT, the correlation between R2 and Y2 became very strong ( $R^2$ : 0.961) with a  $p$ -value of 0.003 showing statistical significance at the 1% level. More than interesting for the result is that we see such a drastic change in the correlation between reading skills of both languages even though there was no statistically significant improvement in either of their reading averaged scores (not shown). Why the correlation is seen only in mutual reading skills probably, as mentioned earlier, comes from the class objective to improve students' *logicality* through writing essays with a related feedback because we obtained similar results previously (Ikematsu et al., 2017, 2018). The improvement in average scores in reading skills of both languages was not significant probably because the number of participants was rather small ( $n=12$ ) as compared with that of previous work ( $n=20$ ). Even in such a condition, there was found a clear correlation between both reading skills and hence, considered inherent. From the trend in the variation in  $R^2$  and  $p$ -value, we could tentatively understand the linguistic transfer process, in which L1 and L2 are dynamic enough to affect with each other during the learning process until they reach to a point where L1 and L2 become substantially equivalent. We see the phenomenon only in the reading skill for the *Essay* class. This indicates, from a view point of language teaching, that we should take account of the typical or substantial difference between L1 and L2 or Ln and teach the target languages by focusing on such a difference, *logicality* in the case of Japanese and English although L1-related factors other than a particular difference between L1 and L2 is no doubt considered affecting the transfer process because L1 must be a basis of thought of individuals.

The accumulation of 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 of English 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. Here we chose two groups receiving L1 training with different achievement goals, the *Essay* subgroup to improve students' *logicality* and the

*Film* subgroup to improve *emotionality* and examined their performance in L1 and L2 before and after taking the L1 training. As a result, we found that both groups showed improvement in L1 and L2, and the improvement of the *Essay* group was statistically significant. We further found the *Essay* with TOEIC score below 400 points (*Essay* < 400) improved L1 and the other above 400 points (*Essay* > 400) improved L2. A simple regression analysis for the *Essay* > 400 showed that the correlation between reading skill of L1 and L2 became stronger after the L1 training ( $R^2$ : 0.114 to 0.961 and  $p$ : 0.578 to 0.003).

The results first showed an L2 threshold at 400 points in the average total score of TOEIC, below which only L1 improved after L1 training, and above which only L2 improved, inferring L1 transfer to L2. The results further showed a mutual compensation between L1 and L2 during the course of L1 and L2 training. We suggest *logicality* may be the key to the L1 (Japanese) to L2 (English) transfer and to the mutual compensation between L1 and L2. Our research addresses an important process that will hopefully lead to an ideal teaching method of L1 (Japanese) to Japanese learners of L2 (English) or other languages.

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