〈Research Report〉

Linguistic Coding Differences in University, First-year, English as a Foreign Language Learners

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Abstract

Research was done to study linguistic coding differences in first-year students' English ability in broad relation to their first language (i.e., Japanese) ability. The following steps were taken to get a general sense of the participants' range of ability with language to eventually create future assessment models, e.g., a Japanese aptitude test. First, participants (N=101) completed a three-part Japanese assessment covering specific grammar points, vocabulary, and reading interventions. Next, data from these assessments were used to correlate with the participants' scores on like-assessments in their English language classes. The assessments in English included a 50 question TOEIC-modeled test, divided into an aural section with 25 questions and a reading section with 25 questions. Finally, the participants' semester English language course grades were used as a benchmark. This research was developed with a 2020 grant from research funds administered by the President of Josai International University.

This report of the process and outcomes aims to satisfy the final requirement of our grant reward.

Key words: English as a foreign language, Linguistic coding differences, First language transfer

Introduction

The genesis of this research was the Linguistic Coding Differences Hypothesis (LCDH), which posits that an individual's capacity to learn a second language (L2) is closely related to their first language (L1) learning skills, and L2 learning difficulties stem partly from native language difficulties (Sparks & Granschow, 1991). Affective differences between learners with lower and higher levels of L2 skills (e.g., differences in grammar ability) are suggested to be a consequence of the differing levels of their L1 learning skills. Linguistic coding differences are significant for learners, yet there are few studies that look at LCDH-type differences within Japanese L1 students entering university English courses, despite numerous studies on Japanese learners' second language acquisition at the university level.

This report outlines research into how differences in L1 ability might be revealed in first-year,

university-level participants' L2 ability, by way of looking at broad correlations between L1 and L2 aural and reading assessments, as well as at how L2 grades might be predicted by L1 proficiency. The research was done for the purpose of creating future assessment models. The authors planned this current study to be one part of a multi-part process to develop a Japanese aptitude test.

Background Literature

This section contains a brief overview of the background literature for L1 transfer. Numerous studies have been done to show native-language skills are strongly related to L1 attainment (Melby-Lervåg and Lervåg, 2011; Sparks et al., 2012, 2009). Moreover, subskills such as phonological processing and language comprehension are shared across L1 and L2 learning, meaning that they are linked skills.

Sparks, Patton, and Granschow (2012) questioned whether there might be distinct cognitive profiles among high school students enrolled in L2 courses. They specifically looked for differing patterns of L1 skills, L2 aptitude, and intelligence. A battery of cognitive (language aptitude, intelligence) and L1 achievement tests were used to enable the authors to analyze a broad range of skills for the purpose of examining students' cognitive and L1 achievement skills in relation to L2 proficiency. Sparks et al. found that prior achievement in L1 skills developed prior to L2 exposure strongly related to and was consistent with their L2 aptitude and proficiency, level of attainment in L2 is tempered by level of attainment in L1, and L2 learning falls within a spectrum of learners with stronger to weaker language skills.

The current study concerned L1 transfer, and L1 ability is a necessary variable to gauge transfer. Therefore, learning disabilities, which often play a key role in gauging ability, were also a consideration with the L1. Learning disability studies focusing on Japanese learners have become more common, especially studies focusing on dyslexia, which is a disability associated with symbol-sound mapping. In Japan, dyslexia rates were once thought to be too low (less than .01% according to a 1968 study by Makita) to warrant special focus. However, more recent studies have shown that, while still low, dyslexia rates should be a consideration in education. Uno et al. (2009) studied four hundred and ninety-five Japanese primary-school children with ages ranging from 8 to 12. The researchers tested the children's abilities to read/write Hiragana, Katakana, and Kanji, for their vocabulary size, and for arithmetic, visuo-spatial, and phonological processing. They found that language skill, especially vocabulary size, was the best predictor of Kanji reading performance for most of the participants and found that participants with disabilities were likely to have developmental dyslexia. Learning disabilities seem to affect L1 English speakers more because of the varied phonology-to-text relationships of the script.

Furthermore, Otsuka and Murai (2020) found different patterns of age-related effects on the abilities

of two different Japanese high school graduating cohorts between 2006 and 2016 with kanji writing, which suggested reduced writing ability and stagnation in integrated mastery of kanji orthography and semantics in current Japanese adults. The decline appears in an era of common use of digital writing devices and/or increased attention to learning English or internationalization. Effects of this interplay are relevant to university first-year students.

The current cross-sectional study aimed to track the performance of learners moving from high school into completing their first year of university English classes. We want to track their progress from their L1 (Japanese) proficiency baseline to find correlation with their L2 (English) ability on graded assessments, which included a proficiency test and course grades.

Research Questions for the current study were as follows:

1. Do first language proficiency test scores correlate with second language proficiency test scores?

2. Do first language proficiency test scores correlate with second language course grades?

In the next section, we will outline the methodology used in the current study. We will discuss the educational setting, participants, instrumentation, including the proficiency testing and course grade parameters.

Methodology

In this section we discuss the methodology used in the current study. We first outline the Educational Setting, including the type of class the participants were taking. Next, we discuss the Participants. We then outline the Instrumentation used in the current study, which include the proficiency testing and course grade parameters.

Educational Setting

The setting for the study was a private, coeducational university located in Chiba, Japan, specifically first-year communications courses in a four-year, humanities curriculum. The courses were a two-credit required integrated skills courses that met for 90 minutes bi-weekly for 15 weeks (i.e., for one semester). At the first meeting, students were directed to a link for Google docs, which then took them to a three-part Japanese assessment. In the second, class meeting, students were given the TOEIC test.

Participants

The participants' ($N = 101$) ages ranged from 18 to 19 ($M = 18.2$). The study was limited to Japanese L1 participants who had attended and graduated from Japanese high school, had not studied abroad, and were currently taking first-year English courses as non-English majors

The participants had up-to high school Japanese ability, and from 6 to 10 years ($M = 7.2$) of English

education, with the majority having a minimum of six years of formal English education in secondary school (junior high and high school) and university.

Instrumentation

Three instruments were used in the current study to gauge L1 and L2 ability. First, participants completed a three-part Japanese assessment (i.e., covering specific grammar points, vocabulary, and reading interventions). The assessment was created on Google docs, and participants accessed the documents via a link posted on a course management system used within the institution. Each of the three assessments consisted of 15 questions leveled to Japanese high school grammar levels for typical first-, second-, and third-year learners. Within the same document, students were also asked for their gender, their country of elementary, junior high, and high school. After each assessment, students were asked to give their opinions on the quiz difficulty, and their Japanese grammar and vocabulary ability using a Likert scale. Next, participants completed a two-part abridged TOEIC test. This was completed in class as part of a course proficiency check, after the institutional level placement test given to students prior to the semester. The assessments in English included a 50 question TOEIC-modeled test, divided into an aural section (25 questions) and a reading section (25 questions). Scores were self-reported via the online meeting software Webex. Finally, students' semester-final course grades were used as a benchmark. All grades were registered by the primary researcher only. Grades ranged from S (i.e., students acquiring 90-100 points for work done during the semester) to C (i.e., students acquiring 60-69 points during the semester). No students scored below the grade of C during the research. For this study, the Japanese test scores were the independent variable and the English test scores, and grades were the dependent variable.

Data from the Japanese language assessments, English language assessments, and semester grades were collected. The data were processed for duplication or other errors (e.g., a participant attended an education system outside of Japan), and 51 participants' data were removed. The data were then analyzed using IBM SPSS Statistics 27 for descriptive statistics and bivariate correlation as z-scores.

In the following section we look at the descriptive statistics and the correlation coefficient computation results from the dependent and independent variables. Results are given for descriptive statistics and the correlation coefficients.

Results

This section is an abridged version of the results of analyses done for the two research questions. A bivariate correlation was conducted on the results of Japanese language assessments, English language assessments, and English language course grades converted to z-scores.

First, descriptive statistics are given for the Japanese and English Assessments. Table 1 shows the descriptive statistics for items for the three English assessment scales used. Although mean statistics vary slightly, the total number of items for each of the aptitude scales were different. TOEIC Listening and Reading consisted of 25 items each. Semester grades consisted of 101 individual grades for each participant. Distributions were normal.

Table 1. *Descriptive Statistics for English Assessments (*N *= 101)*

	TOEIC Listening	TOEIC Reading	Semester Grades
M	11.67	13.18	76.15
SE	.47	.43	1.34
95% CI	[10.74, 12.60]	[12.32, 14.04]	[73.49, 78.81]
SD	4.71	4.34	13.47
Skewness	.28	.36	-1.39
SES	.24	.24	.24
Kurtosis	-.26	.86	4.25
SEK	.48	.48	.48

Note. All statistics were based on raw scores.

Table 2 shows an average of the Sum of Scores for Japanese Assessments. For each level, scores were combined and averaged. The Level 1 score was highest at 12.78, meaning that the participants were most successful on this assessment. Distributions were normal. The decreasing scores show that the variation of difficulty among the three assessments.

Table 2. *Sum of Scores for Japanese Assessments Averages (*N *= 101)*

Level 1	Level 2	Level 3
12.78	12.68	11.40

Note. All statistics were based on raw scores. Levels equate to high school grade-levels, e.g., Level 3 = 高校 3 年生 [*Kōkō 3-nensei*] or *high school senior grade*.

Next, Pearson correlation coefficients were computed among the Japanese and English assessments for individual test questions. A correlation matrix for Japanese ability and English showed that there were no significant linear relationships between all the possible pairs of values in the variables tested in this study. No further analyses were done. Further representation of the data, including the correlation

matrix, were not included in this report but are available through the primary researcher of this study.

Discussion

In this section we discuss the results of the analyses in relation to the research questions. We then discuss possible reasons for the results and problems with the current study. Finally, we make suggestions for further research.

Research Question 1 asked if first language proficiency test scores correlate with second language proficiency test scores. Pearson point-biserial correlation tests revealed that points scored on three Japanese tests for grammar and vocabulary were not related to Japanese first-year English as a foreign language students' TOEIC test scores in listening and reading. The results indicate that the variables are not correlated.

Research Question 2 asked if first-language proficiency test scores correlate with second language course grades. A Pearson point-biserial correlation tests revealed that points scored on three Japanese tests for grammar and vocabulary were not related to Japanese first-year English as a foreign language students' course grades their integrated skills course. The results indicate that the variables are not correlated.

Therefore, none of the variance found in the English tests was explained by the variance in the Japanese Tests. This finding was surprising for us.

Several drawbacks to the design of this study were found to exist. First, participant scores were not varied for L1 proficiency. In other words, the L1 proficiency tests needed to find more variance in participant abilities to be useful testing variables. Second, a more heterogenous pool of participants might have allowed for more variation in the assessment scores.

Future research should reinvestigate using more rigorous assessment of L1 proficiency. Also, future research should find a more varied pool of participants to reveal more individual differences, thereby improving the possibility for any correlation between L1 and L2 to be revealed.

Conclusion

This research aimed to track the performance of learners moving from high school into completing their first year of university English classes. We examined whether their L1 (Japanese) proficiency baseline correlated with their L2 (English) ability on assessments, including a proficiency test and course grades. However, we found no significant correlation in the variables.

Finally, language ability differs among individuals, meaning each speaker has a different vocabulary size, knowledge of grammar, and fluency to name a very small set of possible comparative differences

in their L1. L2 curriculums (i.e., course content designed for languages learned after a learner's first language) often ignore the learner differences within the curriculum design. L2 curriculums often generalize learners, creating a target group of an L1, thereby approaching learners as if they have the same abilities, aptitudes, and culture because the L1 works optically as a one-size-fits-all standard. Understanding differences as an L2 instructor, materials writer, or curriculum designer would benefit the target learners. Although this study ultimately did not produce any significant results, the discussion for increasing measures to support learners in their L1 as they study an L2 is warranted.

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大学一年生英語学習者を対象とした言語コーディングの相違

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【要旨】

　本稿は、大学一年生の第二言語能力（英語）における言語コーディングの違いを、第一言語能力（日本語）と関連づけ調査研究を行った報告である。将来的に日本語適正テストのような評価モデルを構築することも視野に入れ、まずは調査対象者の言語能力を把握することから研究を始めた。そして、調査対象者（N=101）の日本語能力を、文法、語彙、読解の 3 つの側面から測定した。次に、それらのデータと英語能力測定から得られたデータとの相関を見出した。英語能力は、TOEIC 形式で全 50 問から構成され、それぞれ聴解 25 問、読解 25 問である。そして最後に、英語コースの授業評価を基準として含め、分析を行った。

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