

2 ICLEHI 2015 64 Shin'ihicro Ishikawa

Noun/verb Ratio in L1 Japanese, L1 English, and L2 English: A Corpus-based Study

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ABSTRACT

It is often suggested that English is noun-oriented, while Japanese is verb-oriented (Toyama, 1973; Kimura, 1993). This difference is said to reflect the tendency that English and Japanese focus on persons or situations, respectively (Kunihiro, 1974; Hinds & Nishimisu, 1986; Kimura 1993). Many of the previous studies have discussed noun/verb ratios in varied languages (Dhillon, 2000; Sandhofer, Smith, and Luo, 2000; Shinya, 2003), but how this quantitatively differs between (i) L1 English and L1 Japanese, (ii) L1 English and L2 English, and (iii) varied types of L2 English produced by learners at different L2 proficiency levels has not been wholly elucidated. Our analysis of two kinds of corpora: English/Japanese Modern Fiction Corpus (EJ-MOFIC) (Ishikawa, 2015) and the International Corpus Network of Asian Learners of English (ICNALE) (Ishikawa, 2013; Ishikawa, 2014) has shown that nouns occur more often than verbs both in L1 Japanese and L1 English, and also in both L1 English and L2 English, although the degree of noun preference is relatively more salient for L2 English than for L1 English. It was also suggested that learners' L2 English levels and noun/verb ratios are not directly related.

Keywords: noun/verb ratio, English and Japanese, interlanguage, learner corpus

Introduction

Noun/Verb Ratio in English and Japanese

Noun/verb ratio or noun/verb orientation has attracted much attention in linguistics and L2 teaching. Concerning English and Japanese, it is widely pointed out that the former is noun-oriented, while the latter is verb-oriented. For example, "Take a close look!" is usually translated into "*Yoku minasai!*" (lit. Look closely!). Thus, not a few TESOL teachers repeatedly encourage Japanese learners to "think with nouns, not verbs" when writing and speaking in English, which leads some of the learners to try to use more verbs and fewer nouns in English than in their mother tongue. However, whether the frequencies of nouns and verbs really differ between L1 English and L1 Japanese has not been clear. In addition, how Japanese learners at different L2 English proficiency levels use nouns and verbs has not been wholly clarified.

Therefore, the current study aims to clarify how the noun/verb ratio quantitatively differs between (i) L1 English and L1 Japanese, (ii) L1 English and L2 English, and (iii) varied types of L2 English produced by learners at different L2 proficiency levels.

Literature Review

Noun/verb ratio, or more broadly, noun/verb orientation or noun/verb bias has been discussed in the research fields such as children's L1 acquisition, descriptive linguistics, comparative linguistics, and TESOL.

Noun/Verb Ratio in Children's L1 Acquisition

It is widely known that the number of nouns is larger than that of verbs in L1 English children's early vocabulary (Gentner, 1982). Children acquire nouns early, which generally represent concrete and palpable objects. However, it is not necessarily clear whether such noun orientation can be a universal trend across languages or not. According to Choi and Gopnik (1995) and Tardif, Shatz, and Naigles (1997), noun orientation is not necessarily observed in the early vocabularies of L1 Korean and L1 Mandarin children. Tardif (1996) says that noun orientation in children's vocabulary could be influenced by the input they receive and the syntactic structure of their L1s.

Sandhofer, Smith, and Luo (2000) pay attention to the L1 English and L1 Mandarin caregivers' speeches as linguistic inputs, and reveal that the quantitative relations between nouns and verbs are identical in the two languages. Dhillon (2010) reports that noun orientation is seen in the early vocabulary of L1 English and L1 Spanish children, but not of L1 Mandarin children; and noun orientation is not influenced by the inputs from their caregivers. Dhillon concludes that a degree of noun orientation is decided by the language type rather than the input. Ogura (2007) also suggests that the noun orientation seen in the early vocabulary of L1 Japanese children is not linked to their caregivers' speeches, which are reported to be verb-oriented.

Noun/Verb Ratio in Descriptive Linguistics

Linguists have also paid attention to the noun/verb ratio in a language. Biber, Conrad, and Reppen (1998) examine the noun/verb ratio in English in three ways: (a) all nouns/all verbs, (b) all nouns/ [verbs - auxiliaries], and (c) [nouns - pre-modifiers of other nouns] / [verbs - auxiliaries]; they reveal that method (b) produces the higher value and the ratio is between 2.2 to 2.9 in academic prose, 1.2 and 1.5 in fiction, and 1.2 and 1.6 in speeches. Although the degree may vary, noun orientation seems to be stable in English in spite of text genres (p.68).

The noun/verb ratio, however, may change considerably according to the word-count unit (i.e., tokens or types), the production mode (i.e., speeches or essays), and also language types. For example, WordNet 3.0, one of the largest lexical databases, includes 117,798 types of nouns and 11,529 types of verbs. In this case, the ratio amounts to 10.22. Moneglia (2014) reports that the noun/verb ratio is 0.83 in English speech, which is lower than the 1.2–2.9 reported in Biber, Conrad, and Reppen (1998). Moneglia also shows that the ratio is 0.99 in Italian speech, 0.85 in Portuguese speech, 0.78 in Spanish speech, and 0.85 in French speech, which shows the possibility that speech is relatively more verb-oriented than written texts.

Noun/Verb Ratio in Comparative Linguistics

Analyzing five languages, Seifart (2011) reports that languages with argument (subject and object) markings on verbs show a lower noun/verb ratio, as it is not necessary to show it with nouns. Comparing thirty languages, Polinsky (2012) suggests that head-initial (V+O) languages show lower noun/verb ratios, while head-final (O+V) languages show higher noun/verb ratios.

Concerning the relationship between English and Japanese, it is commonly said that the former is noun-oriented and the latter is verb-oriented. Toyama (1973) suggests that English and many European languages are characterized by the subject nouns, which control the object nouns and verbs in the cause/result relationship; while Japanese is characterized by verbs, which control the whole sentence, and where topics and subjects are marked by particles. Thus, Toyama advises translators to use verb-oriented structures when putting English into Japanese. As an example, the English sentence: "Recognition of this fact

contributes to solution of the problems” should be translated into “*Kore ga wakareba mondai wa zutto kaiketsu shiyasuku naru*” (If you recognize this, problems become much easier to solve) rather than its literal translation such as “*Kono jijitsu no ninshiki ga mondai no kaiketsu ni koken suru*” (p.10).

Many scholars relate the overall tendency of noun orientation in English and verb orientation in Japanese to the covert differences between the two languages. Thus, English and Japanese are said to be person-focused and situation-focused (Kunihiro, 1974; Hinds & Nishimisu, 1986; Kimura 1993), *suru* (doing)-oriented and *naru* (becoming)-oriented (Teramura, 1976), and also *mono* (objects)-oriented and *koto* (event)-oriented (Ikegami, 1981). Summarizing a series of related studies (e.g., Umegaki, 1974; Yanabu, 1979), Shinya (2003) concludes that noun-based English has a general orientation toward the subject, transitivity, activeness, intention, action, and logic, while verb-based Japanese is oriented toward topic, intransitivity, inactiveness, unintentionality, event, and emotion.

However, in reality, noun orientation in English and verb orientation in Japanese are not necessarily stable trends. Comparing an English TV drama for kids and its Japanese version, Iwahata (2011) reports that Japanese seems to be somewhat more verb-oriented than English, but the difference is not as much as widely believed. Shinya (2003) illustrates that a particular type of Japanese, an announcement in a public place, for example, includes many nouns; she concludes that both English and Japanese are essentially noun-oriented, though nouns clarify the relationship between a subject and a complement in English, and the described event itself in Japanese.

Noun/Verb Ratio in TESOL

Noun/verb ratio has also been mentioned in the context of English teaching. Hanratty (2015) writes, people “tend to use more nouns than verbs so a regular sentence will usually contain slightly more nouns than verbs. By comparison, in poor writing, particularly in bad legal writing, there will be many more nouns than verbs.” Moxley (n.d.) also encourages writers in English to create “a persuasive, dynamic voice” and “a sense of vigor” by eliminating unnecessary nouns. Moxley says the sentence “The assumption that creative ability has a relationship to intelligence warrants further examination.” should be changed into “We must examine how creative ability relates to intelligence.”

When translating Japanese into English and vice versa, learners need to notice the structural difference between the two languages. Thus, Kawamura (2014) encourages learners to look for noun objects embedded in the situation. Gally (2006) advises learners not to literally put *suru*-compound verbs into an auxiliary verb plus a main verb in English: “*kansoku suru*” should be translated into “observe,” not “do observation.” Unlike the conventional view, Gally suggests that it is a noun in Japanese and a verb in English that expresses the core message. Okuda (2007) advises learners to see English nouns as verbs in reading. As an example, he says, “students” needs to be understood as “those who study,” which leads to understanding why “students” means not only pupils but also scholars.

Research Design

Aim and Research Questions

Although previous studies have revealed many noteworthy facts about noun/verb orientation in English and Japanese, how a noun/verb ratio (N/V, hereafter) changes between L1 English fictions (L1Ef), L1 Japanese fictions (L1Jf), L1 English essays (L1Ee), and L2 English essays (L2Ee) by varied learners at different L2 proficiency levels largely remains uncertain. Thus, four research questions have been posed.

RQ1: How is N/V different between L1Ef and L1Jf?

RQ2: How is N/V different between L1Ee and L2Ee?

RQ3: How is N/V different between L2Ee by learners at different proficiency levels?

RQ4: How are L1Ef, L1Jf, L1Ee, and different types of L2Ee clustered?

When the major findings from the previous studies are taken into account, we have hypotheses that (i) N/V is higher in noun-oriented English than in verb-oriented Japanese; (ii) as Japanese learners are expected to apply verb orientation in their L1 to their L2, N/V is lower in L2 English than in L1 English; (iii) as children's vocabulary largely comprises nouns and then gradually shifts into verbs in proportion to their acquisition of grammar, N/V is higher in L2 English by novice learners than in L2 English by advanced learners; and (iv) L2 English by advanced learners is clustered together with L1 English, while L2 English by novice learners is clustered with L1 Japanese, as the increase in learners' proficiency level is expected to reflect their gradual shift from L1 to L2.

Data

When conducting a quantitative comparison, we need to pay attention to comparability of the data. Considering this, we will use two kinds of corpora in the current study, both of which collect the data in a highly controlled way.

The data we use for RQ1 and RQ4 is the English-Japanese Modern Fiction Corpus (EJ-MOFIC) (Ishikawa, 2015). Its data is re-sampled from the texts included in three existing corpora: Freiburg Brown Corpus (FROWN), including American written English texts published in 1992; Freiburg LOB Corpus (FLOB), including British written English texts published in 1991; and Balanced Corpus of Contemporary Written Japanese (BCCWJ), including varied types of written Japanese texts published from 1971 to 2008. FROWN and FLOB are based on the sampling framework of BROWN Corpus, whose imaginary fiction module consists of 29 samples from each of the three genres: general fiction, adventure, and romance, as well as 24 samples from mysteries, 9 texts from humor, and 6 texts from science fiction. In order to make English and Japanese data mutually comparable, we have investigated the contents of fiction samples included in BCCWJ and chosen the same number of texts from six genres. In addition, we have chosen only the texts published in 1990–1993, considering the possibility that the year of publication may influence the distribution of words. English texts and Japanese texts are POS-tagged by Penn Treebank and Unidic, respectively. The sizes of English MOFIC and Japanese MOFIC are 522,487 words and 303,380 morphemes, respectively. The EJ-MOFIC seems to be suitable for comparison of N/V in English and Japanese.

The data we use for RQ2, RQ3, and RQ4 is the International Corpus Network of Asian Learners of English (ICNALE) (Ishikawa, 2013; Ishikawa, 2014). The ICNALE includes 1.8 million tokens of speeches and essays by college students in ten countries and areas in Asia as well as English native speakers. Both of speeches and essays are about two common topics: “a part-time job for college students” and “non-smoking at the restaurants.” All the data is POS-tagged with Penn Treebank. The current study analyzes essays by English native speakers as well as Japanese learners at A2, B1_1, B1_2, and B2+ CEFR proficiency levels. The size of the data used for the comparison is shown below:

Table 1

The Size of the ICNALE Data used for the Current Analysis

Module	# of participants	# of essays	# of tokens
ENS_total	200	400	44,749
JPN_total	400	800	109,330
JPN_A2	(154)	(308)	(67,925)
JPN_B11	(179)	(358)	(78,769)
JPN_B12	(49)	(98)	(22,132)
JPN_B12	(18)	(36)	(8,429)

Procedure

Utilizing the POS codes, which are assigned by automatic tagging, we classify nouns into four types and verbs into three types.

Table 2

POS Lists for English and Japanese

	English (Pen Treebank)	Japanese (Unidic)
N1	NN (S): noun (singular/ plural)	N.c/aux: noun (common/ auxiliary)
N2	NP (S): proper noun (singular/ plural)	N.prop.g/n/p: proper noun (general/ person/ place)
N3	PP (\$): pronoun (general/ possessive)	Pron: pronoun
N4	CD: cardinal	N.num: noun numeral
V1	VV (D/G/N/P/Z) verb (base/ past/ ing/ pp/ present/ present-3 rd person)	V.g: verb general
V2	VB (D/G/N/P/Z): <i>be</i> VH (D/G/N/P/Z): <i>have</i>	V.bnd: verb bound (e.g., <i>nai</i> , <i>kureru</i>)
V3	MD: modal verb	Aux: auxiliary verb

N1-4 represent general nouns, proper nouns, pronouns, and cardinals, while V1-3 represents general verbs, auxiliary types of verbs, and modal verbs. V2 includes the English *be* and *have* and Japanese bound verbs, such as *nai*, *kureru*, *iru*, *oku*, and *hajimeru*. These verbs often collocate with other main verbs and function rather as auxiliary verbs (e.g., He is playing tennis/*Kare ga utai hajimeta* [He began to sing]), which should be dealt with separately from general verbs. We call all the noun groups (N1 to N4) and all the verb groups (V1 to V4) Na and Va, respectively.

Although some of the previous studies discuss type frequency and other token frequency, we will limit ourselves to discussing token frequency, which reflects the textual features more clearly. Based on the per 10,000-words adjusted frequencies, we calculate N/V in two ways: (a) N1/V1 and (b) Na/Va. For discussion of RQ4, two statistical measures, hierarchical cluster analysis (distances are calculated with correlation r and the Ward-method) and correspondence analysis are adopted. Then, we observe how L1 English fiction, L1 Japanese fiction, L1 English essay, and varied types of L2 English essay are clustered based on the tree diagram and the scatter plot obtained from two statistical measures.

Results and Discussions**RQ1: Noun/verb ratio between L1 English and L1 Japanese**

As summarized above, previous studies have suggested that English is noun-oriented, while Japanese is verb-oriented, which naturally makes us expect that N/V is higher in English, in comparison to Japanese.

The N/V ratios obtained from the English and Japanese MOFIC are shown below.

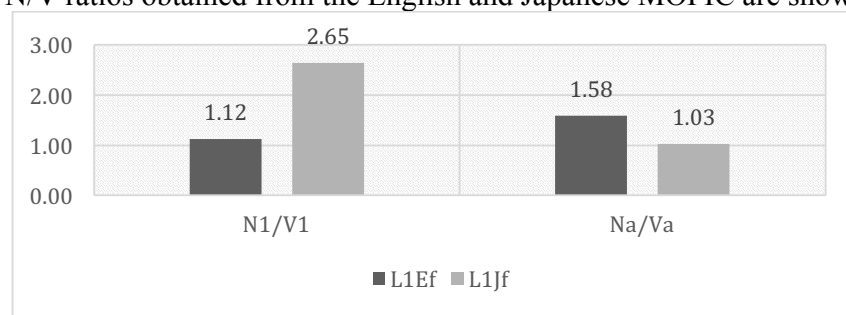


Figure. 1. N/V in L1 English Fiction and L1 Japanese Fiction

The analysis show that (i) nouns occur more often than verbs both in English and Japanese, which supports the findings in Shinya (2003), (ii) the degree of noun orientation is lower in L1 English than in L1 Japanese when considering general types of nouns and verbs, but (iii) it is rather higher in English when considering all types of nouns and verbs.

This exemplifies the fact that calling English a noun-oriented language and Japanese a verb-oriented language may not always be appropriate, at least in terms of token frequency. When considering the core nouns and core verbs, we can also say that English is relatively more verb-oriented, while Japanese is more noun-oriented.

RQ2: Noun/verb ratio between L1 English and L2 English

As suggested in many of the literature in second language acquisition (SLA), learners' L2 use is often influenced by L1 transfer. Taking this into consideration, learners are expected to apply the relationship between nouns and verbs in their L1 to their L2 English use.

The N/V obtained from the ICNALE essays by native speakers and Japanese learners of English are shown below.

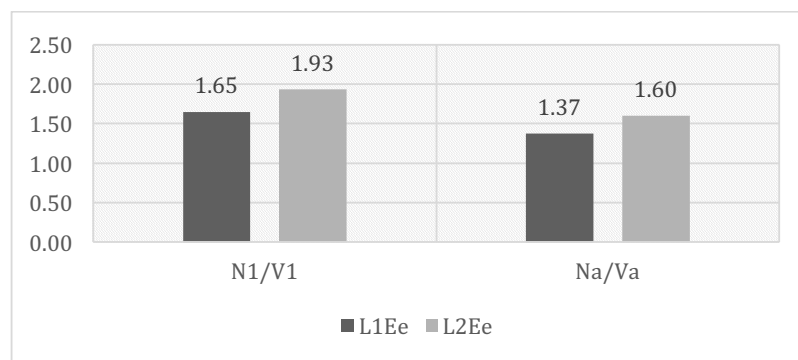


Figure 2. N/V in L1 English Essay and L2 English Essay

The analysis show that (i) nouns occur more often than verbs in both L1 English and L2 English by Japanese learners, (ii) L2 English by Japanese learners is a little more noun-oriented than L1 English, and (iii) this trend seems stable in spite of the counting method of N/V. What should be noted here is that L1 transfer from Japanese, if any, leads to a greater degree of noun orientation in learners' L2 English, rather than verb orientation.

RQ3: Noun/Verb Ratio between L2 English by Learners at Different Proficiency Levels

If an increase in L2 proficiency can be linked to a gradual shift from learners' L1 to the target language, it is expected that the N/V in L2 English becomes closer to that in L1 English.

The N/V obtained from the ICNALE essays by native speakers and Japanese learners of English at A1, B1_1, B1_2, and B2+ levels are shown below.

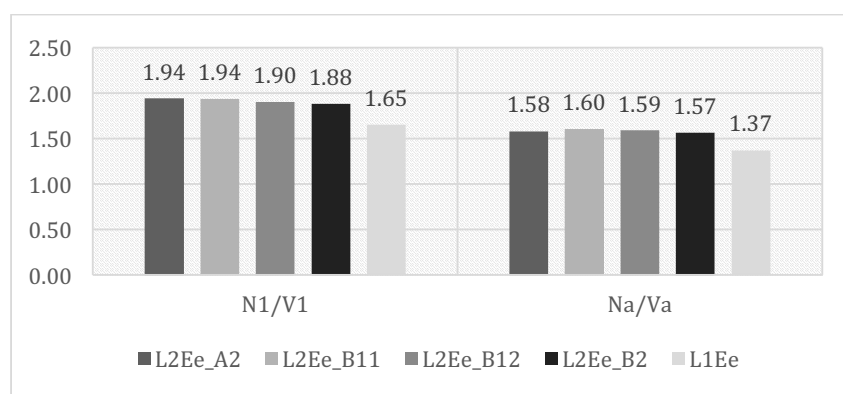


Figure 3. N/V in L2 English Essays by Japanese Learners at Four Proficiency Levels

The analyses show that (i) Japanese learners at all of the proficiency levels use more nouns than verbs, (ii) the degree of noun orientation hardly changes across proficiency levels, and therefore (iii) learners' L2 English does not come closer to L1 English in terms of N/V. The data suggests that N/V and proficiencies are not directly linked.

RQ4: Clustering Writers

If learners' L2 English use gradually develops and comes closer to L1 English use, it is expected that L2 English by advanced learners shows affinity to L1 English, while L2 English by novice learners shows affinity to L1 Japanese.

In order to probe this, we apply hierarchical cluster analysis and correspondence analysis to the contingency table shown below. Seven POS types are regarded as cases (or Item 2), while eight kinds of texts are regarded as variables (or Item 1).

Table 3

Adjusted Frequencies for Different Types of Nouns and Verbs

	L1Ef	L1Jf	L1Ee	L2Ee_A2	L2Ee_B11	L2Ee_B12	L2Ee_B2
N1	1057.38	1807.71	1969.74	2239.45	2247.39	2219.83	2201.48
N2	339.12	258.39	60.28	3.11	37.03	28.70	17.73
N3	790.10	210.36	745.05	840.89	841.25	838.42	830.12
N4	53.96	93.97	38.54	47.44	42.94	43.46	29.20
V1	941.82	683.17	1193.53	1153.69	1160.55	1167.72	1170.09
V2	376.20	594.93	609.83	584.23	565.22	557.35	531.86
V3	95.89	1027.00	248.79	242.79	251.38	244.39	263.84

The tree diagram obtained from a cluster analysis is shown below:

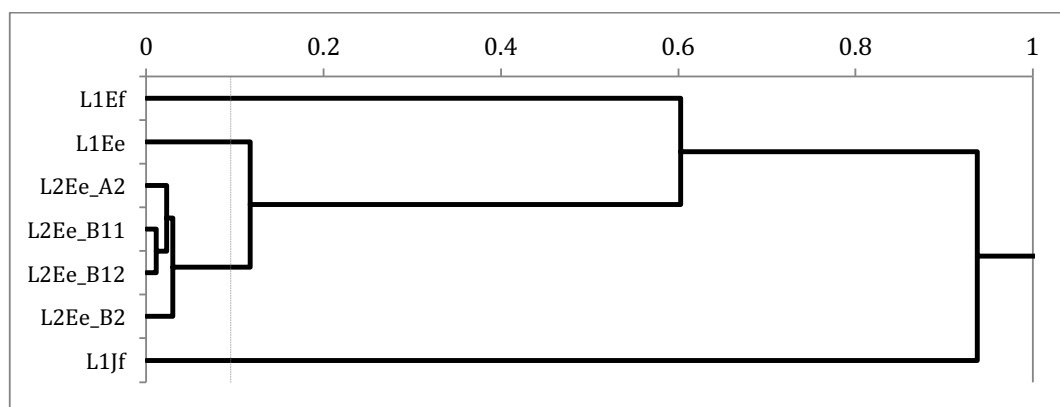


Figure 4. Tree Diagram Showing the Relationship between Seven Types of Texts

The tree diagram exemplifies that L2 English essays by B1_1 and B1_2 learners are first clustered together. Next, they agglomerate with essays by A2 learners, and then with essays by B2 learners. This cluster of L2 English essays agglomerate with L1 English essays, then with L1 English fiction, and finally with L1 Japanese fiction.

The analyses show that (i) learners at A2, B1, and B2+ levels use nouns and verbs in somewhat different way, which might reflect developments in L2 proficiency, and (ii) learners' L2 English is closer to L1 English than to L1 Japanese, which suggests that learners try to adopt a new L2 system rather than depending on their L1 system when writing in L2. It should be noted that, unlike N/V, the token frequencies of different types of nouns and verbs classifies learners' L2 proficiency levels.

What types of nouns and verbs characterize different writer groups? The scatter plot obtained from a correspondence analysis is shown below:

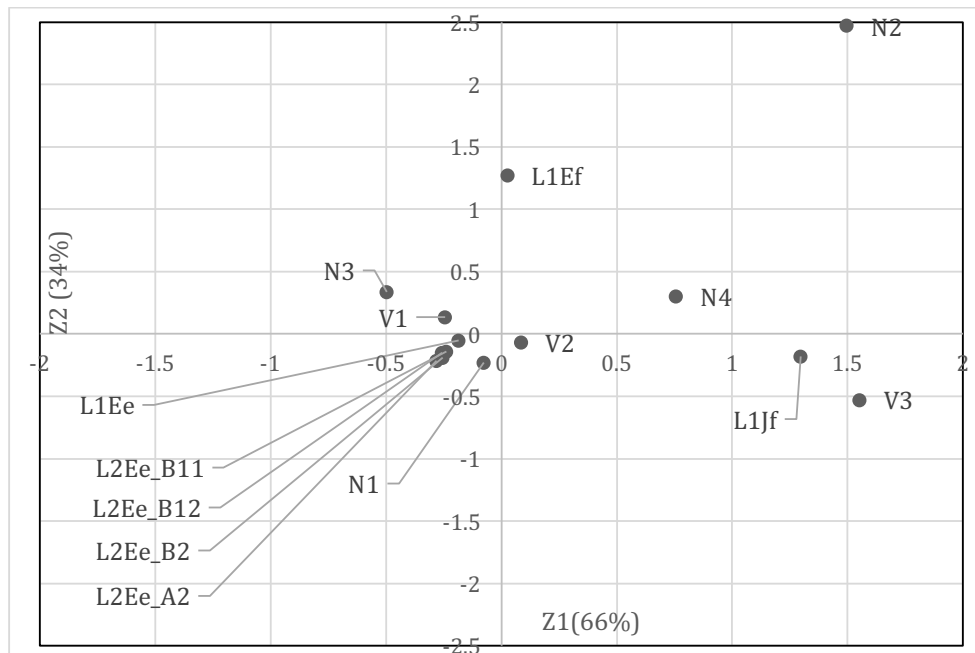


Figure 5. Scatterplot Showing the Relationship between Text Types and POS Types

The Z1 horizontal axis, which explains 66% of the variance of the data, distinguishes L1 Japanese fiction in the right half from L1 and L2 English essays in the left half. L1 English fiction is at a neutral position. Japanese fiction is characterized most strongly by

proper nouns (N2) and modal verbs (V3), and then by cardinal nouns (N4), and English essays are characterized by pronouns (N3) and general verbs (V1). However, whether the Z1 axis distinguishes between Japanese and English or between fictions and essays is not necessarily clear.

Meanwhile, the Z2 vertical axis, which explains approximately 34%, discriminates English fiction in the upper half from English essays in the lower half. L1 Japanese fiction is close at a neutral position. English fiction is characterized by proper nouns (N2), pronouns (N3) and general verbs (V1); and English essays are characterized by general nouns (N1) and modal verbs (V3). It is likely that the Z2 axis classifies the two different text types in English.

Next, in order to see the relationship between English essays more closely, we exclude L1Jf and L1Ef from Item 1, and conduct an additional correspondence analysis. The obtained scatter plot is shown below, where N2 (Z1: 2.8; Z2: 0.6) is placed outside the grid.

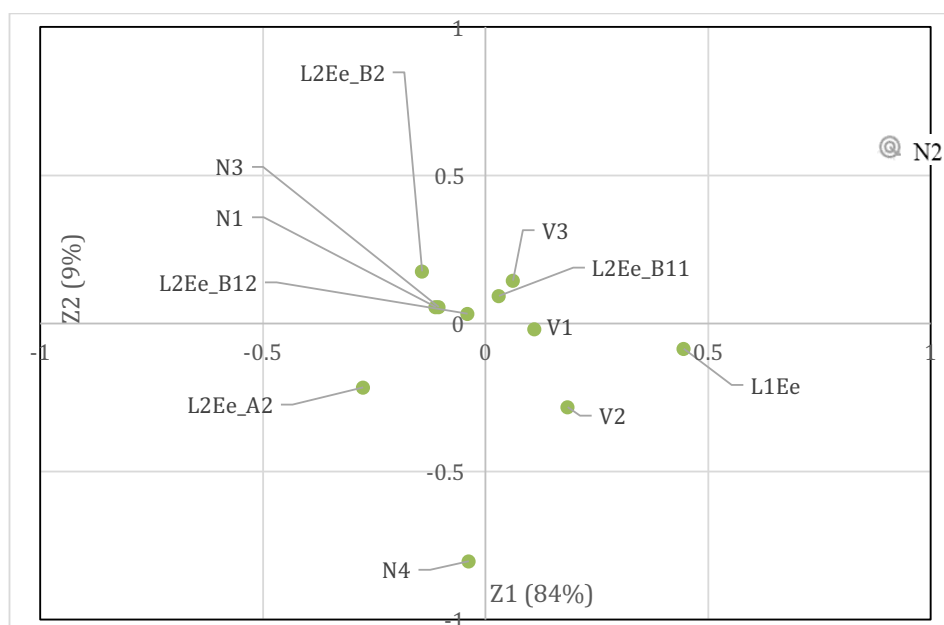


Figure 6. Scatterplot Showing the Relationship between English Essay Types and POS Types

The Z1 horizontal axis, which explains more than 80% of the variance of the data, distinguishes L1 English essay in the right half from most of L2 English essays in the left half. L1 essays are characterized most strongly by proper nouns (N2), and by the auxiliary verbs *be* and *have* (V2), general verbs (V1), and modal verbs (V3), while L2 essays are characterized by varied types of nouns excluding proper nouns (N2).

Meanwhile, the Z2 vertical axis, whose contribution is only 9%, seems to classify Japanese learners' L2 proficiency. A2, B1 (B1_1 and B1_2), and B2+ are positioned in this order from the bottom to the top on the Z2 axis. A2 is placed in the lower half, but the others in the upper half, which suggests a kind of boundary between A2 and the other levels. The A2 novice learners are characterized most typically by cardinal nouns (N4) and auxiliary verbs (V2). The more advanced learners are characterized by general nouns (N1), pronouns (N3), and modal verbs (V3), which might reflect that they pay a greater attention to cohesion and stance or attitude. In addition, we need to notice that this cline from A2 to B2+ does never lead to L1 English.

The analyses show that (i) Japanese learners' L2 English essays are characterized by nouns rather than by verbs, (ii) an increase in learners' L2 proficiency may influence to some extent the pattern of using varied types of nouns and verbs, although it is not directly related

to N/V as discussed before, (iii) intermediate and advanced learners' L2 English may be characterized by nouns and verbs expressing textual cohesion or stance, and (iv) an increase in learners' L2 proficiency does not necessarily mean getting closer to L1 English.

Conclusion

Using the fiction corpus and learners' essay corpus, the current study examined the difference in noun/verb ratios between L1 English and L1 Japanese, between L1 English and L2 English, and between varied types of L2 English by learners at four different proficiency levels. Findings are summarized as follows.

First, concerning RQ1 (How is N/V different between L1Ef and L1Jf?), it was shown that nouns occur more often than verbs both in English and Japanese, and that N1/V1 is higher in Japanese than in English, while Na/Va is higher in English than in Japanese. In terms of the token frequency, as Shinya (2003) emphasizes, English and Japanese are essentially noun-oriented, which rejects our hypothesis that English shows noun orientation, while Japanese shows verb orientation. We may need to reconsider the traditional view about noun/verb orientation in English and Japanese.

Next, concerning RQ2 (How is N/V different between L1Ee and L2Ee?), it was shown that nouns occur more often than verbs both in L1 English and L2 English, and that L2 English is relatively a little more noun-oriented than L1 English. This finding also rejects our hypothesis that L2 English by Japanese learners is influenced by L1 Japanese and therefore it is more verb-oriented.

Third, concerning RQ3 (How is N/V different between L2Ee by learners at different proficiency levels?), it was shown that Japanese learners at all of the proficiency levels use more nouns than verbs, and that N/V is basically stable in spite of proficiency levels. This finding also rejects our hypothesis that Japanese learners' L2 English gradually shifts from Japanese-like verb orientation to English-like noun orientation.

Finally, concerning RQ4 (How are L1Ef, L1Jf, L1Ee, different types of L2Ee clustered?), it was revealed that L2 English essays are clustered with L1 English essays rather than with L1 Japanese fiction. Learners do not necessarily rely on their L1 system when writing in English. Our hypothesis that L2 English by advanced learners shows affinity to L1 English, while L2 English by novice learners shows affinity to L1 Japanese is not supported. In addition, it was revealed that developments in L2 proficiency does not directly mean getting closer to L1 English.

The current study based on quantitative analysis of corpus data has illuminated several new facts about noun/verb ratios in L1 English, L1 Japanese, and varied types of L2 English. However, how native speakers and learners use individual nouns and verbs still remains largely unclear, which suggests the need to integrate a closer qualitative textual analysis into the statistical approach we have adopted here.

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