

## An Analysis of Vocabulary in Collaborative Writing Performance of Japanese Learners of English at University

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### Abstract

The present study is an attempt to analyze the vocabulary of Japanese English as a Foreign Language (EFL) learners' collaborative writing performance, as compared to individual writing performance, especially focusing on tokens (i.e. the total number of words), types (i.e. the number of different words), lexical diversity, and lexical sophistication: in this study, the Guiraid index is used as a measure of lexical diversity and the Lexical Frequency Profile (LFP) as a measure of lexical sophistication. Prior to the study, 128 university students in Japan were administered a Productive Vocabulary Levels Test (PVLTL). Study participants were selected based on their productive vocabulary as determined by this test. As a result, a total of 90 Japanese EFL learners were chosen as participants in the comparative analysis: 30 participants engaged in a picture description task individually, whereas 60 did the same task in pairs, leading to 30 paired texts in total. The results of this study revealed that the participants who engaged in pair work produced more varied and lower-frequency words in comparison with those who worked individually, although pair work did not result in a significant improvement in the number of word tokens. In sum, collaborative writing involving peer interaction can help EFL learners improve access to their vocabulary and function as a pedagogical tool facilitating language learning and teaching.

**Keywords:** collaborative writing, vocabulary, picture description task

### 1. Introduction

Although writing is well recognized as a critical dimension in language learning, writing properly in English cannot be achieved easily in the English as a Foreign Language (EFL) context. It has been observed that Japanese EFL learners with even moderate English competency have a great deal of difficulty communicating their thoughts and ideas in writing, finding it challenging and rather stressful to write in English. This may be due to the fact that they have little experience of being formally trained to write in English.<sup>1</sup> Moreover, writing has traditionally been practiced through individual and solitary classroom work not relying on help and support from classmates. That could aggravate EFL learners' negative perceptions of and emotions towards writing, including nervousness, worry and frustration, all of which have been identified as forms of so-called 'writing apprehension.' 'Writing apprehension', as originally introduced by Daly and Miller (1975)<sup>2</sup>, refers to anxiety about writing, and this concept is often associated with second language (L2) learning; consequently, it can be used as an indicator of the level of English language proficiency.<sup>1</sup> That is,

anxiety towards writing can reduce learners' motivation, resulting in poor performance on writing tasks.

In our previous study,<sup>3</sup> cooperative learning was incorporated into an English for Special Purposes (ESP) setting, wherein a video-clip description task was presented in which Japanese university students worked together in groups. Before the task, most of them were found to have lower levels of self-confidence, interest, and enjoyment in writing even though they were aware of the necessity to obtain writing skills as a means of improving their future careers opportunities. The results of the questionnaire-based survey from this study revealed that cooperative learning had a positive influence on Japanese first-year university students' attitudes towards writing, leading to much greater self-confidence at writing in particular. In other words, it was suggested that cooperative learning can ease the burden of writing in English for EFL learners, minimizing writing apprehension. This study, however, left unresolved the question of whether collaborative writing could also be effective in maximally enhancing writing performance; accordingly, this study analyzes actual written content to determine whether texts produced

collaboratively are better than ones written individually. Furthermore, to achieve this, it is important to clarify which difficulties Japanese EFL learners first encounter on their way to mastery of English writing. In our experience, we have often heard students expressing sentiments such as “I cannot find the word for it” when they are asked to write in English; in fact, it seems to us that the most frequently mentioned difficulties for coping with writing for students are those related to vocabulary use. Communicative competence depends heavily on vocabulary, and the size/level of vocabulary has long been regarded as a useful predictor of L2 performance and proficiency.<sup>4</sup> Considering that a large and extensive vocabulary is inarguably crucial for overall L2 learning, it is of vital importance to shed light on the lexical differences and similarities in collaboratively and individually produced written texts in order to verify the effects of cooperative learning.

## 2. Literature review

### 2.1 An analysis of vocabulary

With vocabulary being a multi-dimensional component of language proficiency, it is hard to determine what vocabulary means in the L2 context: knowing a word involves different degrees of understanding. According to Henriksen (1999),<sup>5</sup> vocabulary is broadly evaluated according to three aspects: size, depth, and receptive/productive knowledge. According to this definition, vocabulary size means the number of words one knows; vocabulary depth indicates how well a word is known. The third dimension is the level of receptive/productive vocabulary, which is often paraphrased as passive and active knowledge. Although there is not a clear distinction between these two modes, it is generally claimed that receptive vocabulary refers to words which are recognized and productive vocabulary concerns words which are used correctly. These two are strongly associated with listening/reading or speaking/writing skills, respectively. By and large, receptive vocabulary is larger than productive vocabulary.

Measuring vocabulary use involves examining the quality of the vocabulary, or lexical richness, used in a given written/spoken sample, and there are several aspects to be considered. These include: 1) the total number of words (token); 2) the number of different words (type); 3) the ratio of different words to total words used (lexical diversity); and 4) the proportion of low-frequency words used (lexical sophistication). Lexical diversity serves as a measure of how many different words are used in a text:

the more types there are in a text in comparison to tokens, or the more vocabulary variation in a text, the greater the index. Although the best-known measure of lexical diversity is Type-Token Ratio (TTR), one basic problem with TTR is that it is sensitive to text length. As a longer text has more tokens, TTR values tend to be lower. In order to reduce the influence of text length, the Guiraud index has been proposed as a revised TTR index.<sup>6</sup> Meanwhile, lexical sophistication concerns the use of words as defined by frequency level: lower-frequency words are generally considered to be more sophisticated and advanced.<sup>7</sup> In order to measure lexical sophistication, Laufer & Nation (1995)<sup>7</sup> proposed the Lexical Frequency Profile (LFP), which is intended to give proportions of words at four different levels of frequency: the first 1,000 most frequent words (1<sup>st</sup> 1000), the second 1,000 (2<sup>nd</sup> 1000), the Academic Word List (AWL) and less frequent words not included in either of these lists (Not in List: NiL). While the words in 1<sup>st</sup> 1000 and 2<sup>nd</sup> 1000 levels are a set of important 2,000 words based on the General Service List by West (1953),<sup>8</sup> the AWL includes highly frequent words in academic textbooks.<sup>9</sup> It is generally recognized that the LFP measure is able to distinguish between different proficiency levels: there is a certain tendency for lower-level learners to produce words of higher frequency, while advanced learners show greater use of lower frequency vocabulary.<sup>7</sup>

### 2.2 Collaborative writing

Collaborative writing is defined as “the joint production or the coauthoring of a text by two or more writers.”<sup>10</sup> More specifically, this means writing in groups together, eventually producing a text: multiple members cooperate and work jointly and collaboratively by sharing all stages of the writing process (e.g. planning, drafting and revising). Numerous studies have pointed out that collaborative work in writing is an important tool for improving language learning and teaching.<sup>10-12</sup> In particular, it has been relatively consistently demonstrated in much questionnaire-based research that collaborative writing tasks can enhance EFL learners’ awareness and lower their anxiety towards writing.

Empirical studies to measure collaborative writing performance have not gained much popularity yet compared to those for spoken performance,<sup>10</sup> but research on collaborative writing in L2 settings have reported that jointly written texts were better and of higher-quality than individually written ones on several different measures, most especially in terms of complexity, accuracy, and

fluency (CAF for short), which have been identified three components of L2 performance and proficiency.<sup>11,12</sup> In applied linguistics research, CAF has been widely used to measure interlanguage progress in the course of language development.<sup>6</sup> Storch (2005)<sup>11</sup> for example revealed that texts produced in pairs were less fluent, that is, the texts were shorter, but more accurate/complex than ones produced individually, suggesting that collaborative writing encourages students to achieve greater grammatical accuracy and complexity despite the fact that there was no statistically significant difference between individuals in the two groups. Subsequently, Wigglesworth and Storch (2009)<sup>12</sup> conducted a large scale empirical analysis of collaborative writing, suggesting that the difference between two groups (pair/individual) was statistically significant only with respect to accuracy, not complexity/fluency. However, results of other experiments to measure the importance of CAF in collaborative writing have not been consistent with this. One reason may be that the measuring scales have varied widely in studies, leading to mixed results: how CAF should be defined in terms of language constructs remains controversial due to its multi-component nature.<sup>6</sup> With regard to the lexical dimension, although it is generally agreed that fluency can be measured through the total number of words (i.e. token number) and that lexical diversity/sophistication can be used as an index of complexity, not all research on collaborative writing has conducted in-depth analysis of EFL learners' lexical use.

### 3. Methodology

#### 3.1 Research questions

This study aims to investigate the effects of collaborative writing on vocabulary use in Japanese EFL learners' written texts. For the comparative analysis, individually produced texts were also gathered and analyzed. The data from the picture description task was analyzed so as to answer the following research questions: (a) does

collaborative writing enhance the number of tokens, types, and Guiraud index of participants' written performance compared to individual writing?; and (b) how different is the lexical sophistication in collaborative versus individual writing?

#### 3.2 Participants

In order to obtain sufficiently rich data, for our analysis, this study required participants with at least an intermediate-level proficiency in English. Data was originally collected from 128 students with supposedly similar language backgrounds and experiences/abilities. At the time of the survey, they were all first-year and sophomore non-English-major students at a university in Japan attending English language courses offered by the same researcher/instructor. The students were between 18 and 22 years of age. None of the participants had visited an English speaking country for more than two months.

The picture description task required participants to develop a story; consequently, a minimum requirement was that the participating EFL learners have a significant productive vocabulary. Therefore, prior to the study the original cohort of participants was screened through administration of the Productive Vocabulary Levels Test (PVLTL)<sup>13</sup> at a 2000-word level. This test has been widely used to assess gains in productive vocabulary. Only those who scored 9 or more out of 18 on the PVLTL were included in the analysis stage of the study, as they were determined to have the required level of productive vocabulary, yielding a total of 90 participants to be analyzed: 60 did pair work (i.e. pair work produced 30 joint written texts in total), and the remaining 30 did the task individually. The results of an independent *t*-test comparing the two groups (pair/individual), as Table 1 shows, indicated that there is no statistical significant at  $p < .05$  in productive vocabulary size ( $t(58) = -1.22$ ,  $p = .23$ ,  $r = .13$ ) between the individuals in these two groups.

Table 1. The results of *t*-test

	Participants in PW ( $n=60$ ) (male=27, female=33)		Participants in IW ( $n=30$ ) (male=13, female=17)		<i>t</i>
	M	SD	M	SD	
PVLT	9.97	1.91	10.53	2.24	-1.22 <i>ns</i>

Note. PW = Pair Work, IW = Individual Work, M = Mean, SD = Standard Deviation, *ns* = not significant

### 3.3 Data-gathering procedure

After administering the PVLIT, all the students were instructed to write a narration based on a series of six pictures in either pairs or individually, within a limited time. This experiment was conducted randomly in several classrooms: as a part of their regular English classes: some classes were asked to engage in the picture description task in teacher-selected pairs, while the other classes did the same task individually. The reason for selecting pair work as opposed to larger group work (i.e. with more than 2 people) is that pair interaction seems to prompt more active involvement in the task as each member shares greater responsibility.<sup>3</sup> A picture description task was chosen because it presents visual stimuli, possibly improving participants' performance. The picture series, which depicts a boy and a girl going for a picnic, was from Heaton (1996),<sup>14</sup> and is presented below in the Appendix. The primary reason for selection of this series was that it was considered to have the more complex storyline. According to Tavakoli and Foster (2008),<sup>15</sup> storyline complexity including foreground and background information encourages learners to use more complex language; hence, EFL learners were expected to engage more thoroughly in the writing task.

Using these identical visual prompts for the plot, the picture description task was carried out under almost identical conditions in each classroom except for group size (pair/individual) and allotted time. To determine the appropriate time for completion of the task, individual work was tested on 27 intermediate Japanese university students not participating in the study, and based on their performance 25 minutes was allotted for the individual task. Pair work needs more time to be completed;<sup>11</sup> therefore 50 minutes was allotted for the pair version of the narration. The participants did not have the permission to use any dictionaries or other reference books, during the task. The teacher's role was to encourage them to engage actively in their task without giving any linguistic

clues, and then to provide some feedback to their written products later in the class.

Participants' handwritten final drafts were collected immediately after accomplishing the task. For the lexical analysis, the 60 texts (i.e. 30 each in the pair/individual groups, respectively) were converted into electronic text files with minor spelling errors being corrected. Then, the *Range*<sup>16</sup> textual analysis software package was used in order to extract the relevant data.

### 4. Results and discussion

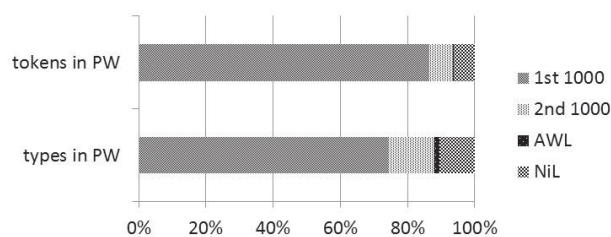
In order to answer the first research question, Excel was used to calculate the Guiraud index by measuring the number of tokens and types for each text: the Guiraud index is calculated by dividing the number of types by the square root of the number of tokens ( $\text{type}/\sqrt{\text{token}}$ ). Since there were only two independent groups (pair/individual) involved in this study, a *t*-test with an alpha level of .05 was carried out on each item to determine if there was a statistically significant difference between them (Table 2). The descriptive analyses and independent *t*-test were run using R 3.1.0 for Windows. With regard to token number, collaborative writing resulted in higher scores because the collaboratively writing texts ( $M = 202.17$ ,  $SD = 42.38$ ) showed a higher mean token number than the individual writing texts ( $M = 183.20$ ,  $SD = 31.96$ ); however no significant differences were found in the results of mean token number between two groups ( $t(58) = -1.96$ ,  $p = .06$ ,  $r = .21$ ). On the other hand, the analysis of the type and the Guiraud index indicated that there was a statistically significant difference in mean of these measures between the two groups (types:  $t(58) = 6.51$ ,  $p = .00$ ,  $r = .57$ ; Guiraud index:  $t(58) = 7.33$ ,  $p = .00$ ,  $r = .62$ ). That is, that collaborative writing significantly enhanced the number of types and the Guiraud index, not the number of tokens: the participants in the pair work used more varied vocabulary than those in the individual work.

Table 2. The summary of token, type and the Guiraud index in the participants' texts

	Texts in PW ( $n=30$ )	Texts in IW ( $n=30$ )	$t$	$p$
	M (SD)	M (SD)		
token	202.17 (42.38)	183.20 (31.96)	1.96	.06 <i>ns</i>
type	95.57 (18.02)	71.60 (9.04)	6.51	.00 ***
Guiraud index	6.73 (0.85)	5.32 (0.62)	7.33	.00 ***

Note. PW = Pair Work, IW = Individual Work, *ns* = not significant, \*\*\* $p < .001$



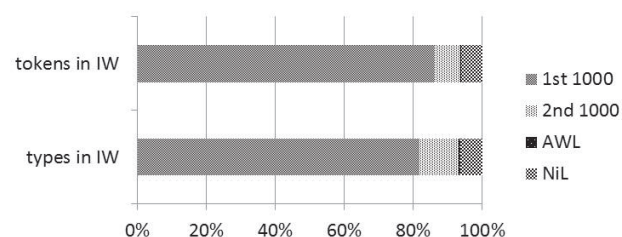


Word list	Token/%	Type/%
1 <sup>st</sup> 1000	5235/86.43	490/74.47
2 <sup>nd</sup> 1000	432/7.13	89/13.53
AWL	16/0.26	10/1.52
NiL	374/6.17	69/10.49
Total	6057	658

Fig. 1. Percentages of word tokens/types at different frequency levels across whole texts of Pair Work (PW).

The *Range* program provides us with an LFP, or a profile of writing based on the frequency of the words in a given text, thus addressing this study's second research question. Overall, the participants in the pair work produced a total of 6057 word tokens and 658 word types, whereas those in individual work did a total of 5488 word tokens and 419 word types. Figure 1 shows the frequency distribution across whole texts in the pair work, and Figure 2 indicates the frequency distribution of those in individual work. The percentage of 1<sup>st</sup> 1000 words tends to decrease as proficiency increases. As for word types, the percentage of beyond 1000 levels (i.e. 2<sup>nd</sup> 1000, AWL and NiL (not in list)) in pair work was larger than that in individual work: about 25% of word types used in the pair work whole texts belonged to the beyond 1000 levels, whereas only less than 20% in those of individual work did, suggesting that pair work yielded more low-frequency (i.e. sophisticated) vocabulary use. As for 2<sup>nd</sup> 1000 level and AWL, the number of word types in pair writing was approximately twice as large as that in individual writing (2<sup>nd</sup> 1000 level: 89 vs. 47; AWL: 10 vs. 3). Nevertheless, it should be pointed out that NiL level needs to be carefully considered: it could include words with major spelling errors. Furthermore, a word in the NiL level is not necessarily a low-frequency one.<sup>17</sup> As mentioned above, the other three levels (i.e. 1<sup>st</sup> 1000, 2<sup>nd</sup> 1000 and AWL) based on West's list and academic textbooks often fail to contain everyday words such as *picnic*, or *sandwich*, which thereby ended up falling into the NiL level, but which often appeared in this task.

Taken together, the results showed that the



Word list	Token/%	Type/%
1 <sup>st</sup> 1000	4759/86.72	340/81.15
2 <sup>nd</sup> 1000	405/7.38	47/11.22
AWL	14/0.26	3/0.72
NiL	310/6.17	29/6.29
Total	5488	419

Fig. 2. Percentages of word tokens/types at different frequency levels across whole texts of Individual Work (IW).

participants in pairs produced greater lexical diversity/sophistication: they tended to use a large number of more diverse and sophisticated words. With regards to word tokens, these findings support those of previous research<sup>10,12</sup> claiming that pair work did not improve the fluency of the texts. Yet, as Engber (1995)<sup>18</sup> asserts, lexical knowledge, or lexical proficiency is related to writing proficiency, and thus reflects overall writing quality; therefore it might be argued that collaboratively written texts are better than individually written ones.

## 5. Conclusion

Our primary goal was to investigate lexical aspects of EFL learners' performance when engaged in the same writing task in either pairs or individually. The findings of this study revealed that pair work can prompt Japanese EFL learners to access a wider range of vocabulary. Certainly, it is of great importance to examine whether the lexical measures used in this study were reliable/valid enough to draw further conclusions; however this empirical study appeared to have some pedagogical implications for L2 teaching: constructing a written text together could facilitate students attending to English vocabulary usage which would probably be recalled or retrieved individually. As is commonly claimed in previous studies,<sup>10-12</sup> EFL learners can reflect on their language consciously through collaborative work. That is, collaborative writing can generally afford adequate opportunity for students to offer each other constructive feedback to improve not only their writing performance but communication skills, providing a contrast to the

prevalent situation in many EFL classrooms in which students do not receive sufficient feedback even passively on their performance from teachers due to various restrictions they work under such as large class size or limited class time.

### Competing Interests

Authors have declared that no competing interests exist.

### References

1. Takahashi, A. (2010). Foreign language writing apprehension: Its relationships with motivation, self-perceived target language ability, and actual language ability. *Niigata Studies in Foreign Languages and Cultures*, 15, 89-100.
2. Daly, J. A., & Miller, M. D. (1975). The empirical development of an instrument to measure writing apprehension. *Research in Teaching of English*, 9, 242-249.
3. Fujiwara, Y., & Sato, E. (2015). Effects of cooperative learning on writing activity of English for special purposes in Japanese university students. *Journal of Academic Society for Quality of Life* 1(1), 32-39.
4. Schmitt, N. (2010). *Researching vocabulary*. New York: Palgrave MacMillan.
5. Henriksen, B. (1999). Three dimensions of vocabulary development. *Studies in Second Language Acquisition* 21(2), 303-317.
6. Housen, A., Kuiken, F., & Vedder, I. (Eds) (2012). *Dimensions of L2 Performance and Proficiency: Complexity, Accuracy and Fluency in SLA*. Amsterdam: John Benjamins Publishing Company.
7. Laufer, B., & Nation, I. S. P. (1995). Vocabulary size and use: Lexical richness in L2 written production. *Applied Linguistics* 16(3), 307-322.
8. West, M. (1953). *A General Service List of English Words*. London: Longman. Green & Co.
9. Coxhead, A. (2000). A new academic word list. *TESOL Quarterly*, 34, 213-238.
10. Storch, N. (2011). Collaborative writing in L2 contexts: Processes, outcomes, and future directions. *Annual Review of Applied Linguistics* 31, 275-288.
11. Storch, N. (2005). Collaborative writing: Product, process, and students' reflections. *Journal of Second Language Writing*, 14, 153-173.
12. Wigglesworth, G., & Storch, N. (2009). Pair versus individual writing: Effects on fluency, complexity and accuracy. *Language Testing*, 26(3), 445-466.
13. Laufer, B., & Nation, I. S. P. (1999). A vocabulary-size test of controlled productive ability. *Language Testing*, 16, 33-51.
14. Heaton, J. B. (1966). *Composition through pictures*. Essex: Longman.
15. Tavakoli, P., & Foster, P. (2008). Task design and second language performance: The effect of narrative type on learner output. *Language Learning*, 58(2), 439-473.
16. Nation, I. S. P., & Heatley, A. (1994). *Range: A program for the analysis of vocabulary in texts*. [computer software].
17. Sugimori, N. (2009). Assessing lexical richness in L2 writing using the Lexical Frequency Profile. *Ritsumeikan Studies in Language and Culture* 21(2), 183-190. (in Japanese)
18. Engber, C. A. (1995). The relationship of lexical Proficiency to the quality of ESL compositions. *Journal of Second Language Writing*, 4(2), 139-55.

## Appendix

### A Picture Story from Heaton (1966)

*(Translation in English from the original instruction in Japanese)*

Try to describe one picture in as much detail as possible and construct one story within twenty five minutes (in pair work, fifty minutes) as a whole. You are not allowed to use a dictionary during the task.

