Developing Semantic-based DDL Based on a Comparative Study of the Verb Use of British and Japanese Students

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Abstract

This study aims to develop semantic-based data-driven learning (DDL) for use in Japanese secondary school classrooms by comparing the use of verbs by British elementary and lower secondary school students and essays written by Japanese secondary school students. Three specialized corpora were used: entries from the *BBC's* 500 Words competition written by 5- to 9-year old (BBC_5–9) and 10- to 13-year old (BBC_10–13) British students from 2014 through 2017, and the learner corpus (LC_13–15) of Japanese secondary school students from 2006 through 2008. The collected data were collated as annotated corpora adopting both the POS (part of speech) and semantic tags. The study was designed to address three points: identifying the quantitative differences in verb use in each corpus, examining the qualitative difference of these verbs by correspondence analyses based on annotated POS and semantic tags, and developing DDL materials. The study compared the Type-Token Ratio of verb use and found that older British students use a wider variety of verbs than Japanese secondary school and younger British students. Furthermore, this study identified 17 characteristic verbs of the BBC_5–9 and BBC_10–13 corpora classified by semantic categories in the 100 most frequently used verbs. Based on the results, this study suggests four different types of DDL for a learner-centered approach to discovery learning to widen learners' knowledge of verb use by learning the different verbs classified within the same semantic categories through semantic-based DDL.

Keywords

VERBS, SEMANTIC ANALYSIS, DDL

1. Introduction

At present, English education in Japan is in the midst of its greatest transformation, as English is set to be taught from the early stages of elementary school. As evident in the Course of Study for Elementary Schools by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT), teaching English in elementary schools began in 2002; and in 2020, it will become an official subject in the 5th- and 6th-grade elementary curricula. With developing computer technology, IT education has gradually become popular in English education in lower secondary and secondary schools. However, the number of schools implementing DDL is relatively low in lower secondary and secondary school levels, and most reports regarding DDL are from the higher academic levels of colleges and universities. Many of the previous DDL practices have regarded the usage pattern observed in major L1 corpora, such as BNC as a model of learning. As other forms of DDL, it has been demonstrated that when developing a specialized corpus, it is beneficial for young learners or lower-level learners to use a small corpus such as textbook corpus, graded reader corpus, and L1 writing corpus as a reference corpus for L2 writing classrooms. Considering the present situation of English education, an appropriate target language setting for learners is essential and effective for DDL integrated vocabulary and grammar learning. Subsequently, this study attempts to build three specialized corpora as follows: BBC_5–9 and BBC_10–13 corpora from the BBC 500 Words competition of British students aged 5–9 years old and 10–13 years old, and a LC_13–15 corpus from a task of writing by Japanese secondary students aged 13–15 years old. The British students' corpora would be a model language for DDL as they are almost the same age as the Japanese young EFL learners, and therefore, unlike mega corpora such as the BNC and COCA, the learners would not have large vocabulary gaps. This study attempts to investigate the characteristic verbs in each corpus using quantitative and qualitative analyses through correspondence analyses based on the annotated parts of speech (POS) and semantic tags. Furthermore, this study provides sematic-based DDL by using the British students' data as an appropriate target language for elementary and secondary school Japanese EFL learners.

2. Literature Review

With an increase in corpus-based teaching in English education fields, the use of the DDL approach for learners at the university level has increased, not only in Japan but also overseas. Chujo, Utiyama, and Miura (2006), Chujo and Oghigian (2008), and Chujo, Kobayashi, Mizumoto, and Oghigian (2016) compiled a J-E parallel corpus for the

implementation of DDL for beginner-level learners in Japan and developed a KWIC concordance tool, *WebPara News,* and a lexical profiling tool, the *Lago WordProfiler.* Their studies investigated the effectiveness of using DDL for Japanese EFL learners in learning vocabulary and patterns of nouns. Miyakoshi (2012) investigated V + NP (verb + noun phrase) collocations and 18 error types in the free compositions of 60 Japanese college students. Other studies have focused on different angles by studying DDL overseas and demonstrating the effectiveness of DDL on grammar and vocabulary teaching (Johns 1994), grammar (Sidik and Zohairy 2017), and verb collocation (Serpil 2015); and on eight different POS collocations (Heyoung 2012). Chan and Liou (2005) found improvement in college EFL students on verb-noun collocations using a web-based Chinese-English concordance. Elke (2001) also investigated the appropriateness of a parallel corpus. In contrast to these DDL studies, (Nakagawa 2018) focused on learning based on cognitive linguistics when teaching phrasal verbs to first-year students at a private high school in Japan. Oka (2017) further suggested the importance of introducing a semantic point of view into English teaching to demonstrate the use of the deictic verb "*bring*" as compared to "*come*." Some researchers overseas have suggested that semantic prosody may be effectively integrated into ESL/EFL vocabulary teaching and learning (Zhang 2009). Lee and Liu (2009) investigated the effects of lexical collocation behaviors in semantic learning for near-synonym distinction for 40 English-major freshmen at a top-tier university in Taiwan and pointed out that "the process of organizing and identifying salient semantic features is favorable for and is accessible to a good portion of L2 learners (214)."

In a noteworthy related study, Niloofar (2014) attempted to teach Iranian male high school students aged 16–18 at the Farhang English language Institute in Talesh, Iran semantic prosody of English verbs through the data-driven learning (DDL) approach. The study pointed out that "surprisingly, little research has been done on SP; and there are not any reports of teaching prosodic behavior of lexical items particularly verbs and their near-synonyms through the DDL approach, and its effects on young students' vocabulary choice appropriateness in an EFL context" (151). Furthermore, Lee and Liu (2009) suggested that "process organizing and identifying salient semantic features are favorable for and is accessible to a good portion of L2 learners." Considering these previous studies, this study offers a unique focus on a DDL adopted semantic-based corpus analysis of British students aged 5–9 and 10–13 years old concerning the most frequent verbs used, compared with Japanese EFL learners aged 13–15 years old, to build specialized corpora to address the gap in previous studies of using mega corpora as

target languages for students in lower secondary and secondary school.

3. Research Design

This study examines the verb use of British elementary and lower secondary students and Japanese secondary school students in order to observe the specific characteristics of their verb use. A correspondence analysis and semantic analysis were conducted to identify the semantic categories of the verbs used. This study adopted the following two types of correspondence analyses: Part of Speech (POS) tag-based correspondence analysis by the CLWAS 7 and semantic-tag based correspondence analysis to identify the semantic categories of the verb use in the UCREL semantic analysis system. This study focused on the 100 most frequently used verbs to examine different types of verbs, considered the limitation of the Japanese EFL learners' verb use and influence of textbooks and the writing assignment style, and attempted to identify the different types of verb use of the British students.

3.1 Research Questions

RQ1: Can any quantitative differences in the verb use of students be observed among 5–9-year-old and 10–13-year-old British students and Japanese students?

RQ2: Can any qualitative differences in the verb use of students be observed among 5–9 year old and 10–13-year-old British students and Japanese students?

RQ3: Can the results of a semantic-based verb analysis be adopted into a new type of DDL?

3.2 Data Collection and Building Corpora

In considering an appropriate model for EFL learners in elementary and secondary school, this study used written language produced by British students who are younger than the Japanese secondary school students. This study collected written data from the BBC_5–9 corpus and BBC_10–13 corpus from 2014–2017, involving original stories written by British students for the BBC 500 Words competition. Furthermore, this study collected and built a Japanese EFL learner corpus of Japanese secondary school as the LC_13–15 corpus at the end of every year from 2006–2008 as a writing assignment involving an email to a pen pal of the same age in a foreign country.

Table1 Corpus size: BBC_5–9, BBC_10–13, and LC_13–15

	Tokens (total number of words)	Types	TTR
BBC_5–9	46,136	7,249	0.15
BBC_10–13	46,912	8,318	0.17
LC_13–15	33,308	2,347	0.07

Note. TTR is type-to-token ratio.

Table 1 illustrates information for each corpus; namely, the tokens, types, and type/token ratio (TTR) based on the corpus analyzing tool *Wmatrix 4*. Comparing BBC_5–9 and BBC_10–13 that were closely controlled, the TTR of BBC_10–13 is 0.02 more than BBC_5–9. It is difficult to compare the TTR of LC_13–15 with the other two corpora because its written type is different. Nevertheless, it would provide useful information on how Japanese EFL learners' vocabulary use differs from that of British students. The 0.07 TTR of LC_13–15 is the least among the three corpora, and is 0.08 and 0.10 less than that of BBC_5–9 and BBC_10–13, respectively. The results demonstrate that the number of vocabularies of Japanese EFL learners is very limited compared with younger British students. The older British students also use much more vocabulary than the younger British students and Japanese EFL learners.

3.3 Method

This study built an annotated corpus using CLAWS 7 (the Constituent Likelihood Automatic Word-tagging System) to extract a part of speech tag (POS tag). Moreover, this study conducted a semantic analysis to categorize the semantics of distinctive verbs in each corpus to develop semantic-based DDL. This study examined the three research questions through the following procedures: (1) a quantitative overview of the verb use seen in each of the three corpora, (2) an identification of the distribution of the 100 most frequently used verbs ranked $1^{st} - 50^{th}$ and ranked $51^{st} - 100^{th}$ among the three corpora with the POS-tag and semantic-tag correspondence analyses, and (3) a clarification of the characteristic verbs of the British and Japanese students, as well as the distinctive verb use of the 5–9-year-old and 10–13-year-old British students as a qualitative analysis. Furthermore, this study suggested four different new types of semantic-based DDL approaches for Japanese elementary EFL learners from elementary school to junior high school levels.

4. Results and Discussions

This study was designed to address the following three points: identify the quantitative differences in verb use in each corpus, examine the qualitative difference of these verbs using the correspondence analyses based on annotated POS-tags and semantic-tags, and develop DDL materials based on the results of these analyses.

RQ1: Can we observe specific characteristics of verb use among the three corpora: BBC_5–6, BBC_10–13, and LC_10–13?

Before examining the verb use in each corpus, calculating the number of types, tokens, and type/token ratio regarding verbs is necessary to compare the three. Table 2 illustrates the result of the number of types, token, and type/token ratio of the verbs use.

Table 2 Verb types, tokens, and type/token ratio in BBC_5–9, BBC_10–13, and LC_13–15

	Tokens (number of words)	Types	TTR
BBC_5-9	10,124	2,791	0.27
BBC_10-13	10,306	3,250	0.31
LC_13-15	33,308	2,347	0.07

Note. TTR is type-to-token ratio.

Table 2 illustrates that the TTR of verbs in BBC_10–13 is the most among the three corpora, and its TTR is 0.04 more than BBC_5–9 and 0.24 more than LC_13–15. The results suggest that older British students between the ages of 10 and 13 use a wider variety of verbs compared to younger British students between the age of 5 and 9 and Japanese EFL learners between the age of 13 and 15.

RQ2: Can any qualitative differences in the verb use of students be observed among 5–9 year old and 10–13-year-old British students and Japanese students?

The results of the quantitative analysis of the verbs in each corpus are insufficient to identify the verb use in detail. Therefore, a correspondence analysis is quite useful for understanding the distinction of the verb use in each corpus. Using an annotated semantic tag for a correspondence analysis also provides valuable information regarding what verbs are distinctly used in each corpus. However, there is no corpus tool that combines the features of annotated POS-tags and semantic-tags for a correspondence

analysis. Considering this, the analysis in this study attempts to make a list of 50 of the most frequently used verbs with the POS tag for the different types of verbs. Annotating the verbs with semantic tags using *Wmatrix 4* for the 50 most frequently used verbs in each corpus makes it possible to do a correspondence analysis with the annotated verbs. Figure 1 of the correspondence analysis of the 50 most frequently used verbs and their annotated semantic tags could then allow each verb to be classified into four dimensions. It also makes it possible to grasp the distinction of each verb for each corpus. Figure 1 illustrates the results of this correspondence analysis.

Figure 1. Results of POS-tag and semantic-tag based correspondence analyses of the 50 most frequent verbs ranked 1–50 among three corpora.

The aim of using the correspondence analysis is to identify the characteristic verbs by comparing British students and Japanese students in the first axis and 5–9-year-old British students and 10–13-year old British students in the second axis. The results demonstrate the distinction of each corpus in the three dimensions in the coordinate axis. From the coordinate axis, the BBC_5–9 corpus is in the third quadrant, and the result clearly illustrates the characteristic distribution of verbs used in BBC_5–9 as follows:

were_Z5, thought_X2.1, saw_X3.4, were_A3+, was_A3+, had_Z5, started_T2+, made_A1.1.1, did_Z5, tell_Q2.2, went_M1, and *want_X7+.* Furthermore, it can be seen that the 5–9-year old British students use the following nine different semantic tags: *Z5 (grammatical bin), X2.1 (thought, belief), X3.4 (sensory: sight), A3+ (existing), T2+ (time: beginning), A1.1.1 (general actions/making), Q2.2 (speech acts), M1 (moving, coming and going),* and *X7+ (wanted).* Meanwhile, the 5–9-year old British students use the three same semantic tags as *_Z5 (grammatical bin)* regarding different verbs such as *were, had,* and *did.*

The BBC_10–13 corpus is in the second quadrant and has distinctive verbs as follows: *be_Z5, think_X2.1, been_A3+, be_A3+, get_A3+, been_Z5, was_Z5, see_X3.4,* and *know_X2.2+.* The result indicates that 10–13-year old British students adopt six different semantic tags as follows: *Z5 (grammatical bin), X2.1 (thought, belief), A3+ (existing), A9+ (getting and possession), X3.4 (sensory: sight),* and *X2.2 (knowledge).* The 10–13-year old students use the same three semantic tags as *_Z5 (grammatical bin)* concerning various verbs such as *be, been,* and *was.* Comparing the BBC_5–9 corpus with the BBC_10–13 corpus, five common semantic tags were identified as follows: *X2.2 (knowledge), X2.1 (thought, belief), A1.1.1 (general actions/making), A9+ (getting and giving; possession),* and *Z5 (grammatical bin).* With the notable features of the results, it can be said that the writing style of the BBC_5–9 and BBC_10–13 corpora for an original children's story uses character descriptions and the setting and background of the story in detail.

The LC_13–15 corpus is between the first and fourth quadrant. As notable features of the verbs in LC_13–15, the 13–15- year-old Japanese students use the following verbs: *are_Z5, go_M1, am_A3+, 'm_A3+, do_z5, have_A9+, like_E2+, belong_A9+, likes_E2+, play_K1, call_Q2.2, read_Q3, is_A3+, live_H4,* and *is_Z5.* The Japanese 13–15- year-old students use seven different types of semantic tags as follows: *Z5 (grammatical bin), M1 (moving, coming, and going), A3+ (being), A9+ (getting and possession), Q2.2 (speech acts), Q3 (language, speech, and grammar),* and *H4 (residence).* In addition, the following two semantics, A3+ (*being*) and Z5 (*grammatical bin*), are common semantic tags in the LC_13–15 corpus. The results also demonstrate the features of the Japanese 13–15-year-old students' email writing style to introduce their age, grade, nationality, address, club activity, and to express their like or dislike for something. Focusing on the 50 most frequently used verbs among the three corpora, the analysis results illustrate the features of verb use in each corpus to describe the characters or situations of their original children's story in the BBC_5–9 and BBC_10–13 corpora, and email writing in

narrating their daily lives in the LC_13–15 corpus. However, the most frequent verbs used were basic verbs used to describe their thoughts. Therefore, considering the limitation of verb use, focusing on the much lower frequency of verbs from ranks 51–100 would be valuable in identifying the features of verb use more clearly.

Therefore, by focusing on verbs ranked 51–100th, this section attempts to investigate the characteristic verbs used in each corpus. Figure 2 illustrates the result of the 50 verbs ranked from 51–100. Comparing the results of the lower frequency allows for an analysis regarding the different tendencies of verb use in each corpus.
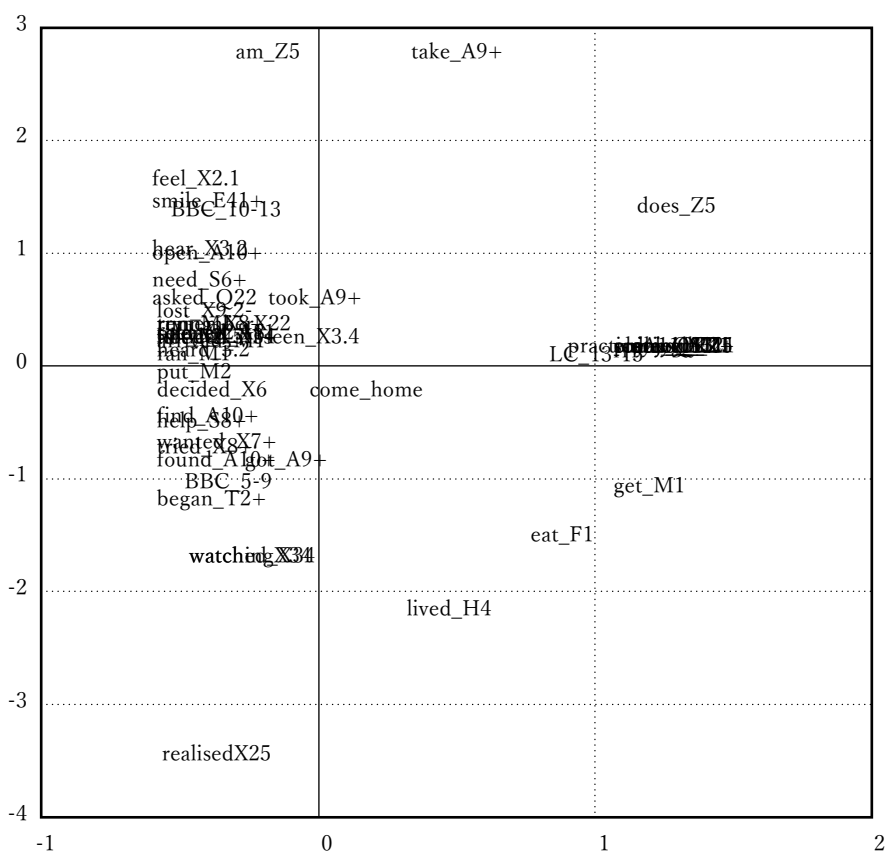

Fig. 2 Results of POS-tag and semantic-tag based correspondence analyses of verbs ranked 51–100 among three corpora.

Figure 2 illustrates the result of POS-tag- and sematic-tag- based correspondence analyses of verbs ranked 51–100 among the three corpora. Focusing on verbs in the BBC_5–9 corpus in the third quadrant, the following seven verbs can be observed distinctively: *began_T2+, found_A10+, tried_X8+, wanted_X7+, got_A9+, help_S8+, and*

find_A10+. The six types of semantic tags for the characteristic verbs in the BBC_5–9 corpus are as follows: *T2 (time: beginning and ending), A10 (open/closed; hiding/hidden; finding; showing), X8 (trying), X7 (wanting; planning; choosing), A9 (getting and giving; possession),* and *S8 (helping/hindering).* The following semantic *_A10 (open/closed; hiding/hidden; finding; showing)* can be observed as the common semantics of verbs such as *found* and *find.* Concerning verbs in the BBC_10–13 corpus in the second quadrant, there are 17 verbs as follows: *smile_E4.1+, feel_X2.1, hear_X3.2, open_A10+, need_S6+, trying_X8+, arrived_M1, asked_Q2.2, remember_X2.2, lost_X9.2, run_M1, filled_N5.1+, seemed_A8, opened_A11, told_Q2.1, noticed_X3.4,* and *left_M1.* The semantic tag *_M1 (moving, coming and going)* are common in the use of verbs such as *arrived* and *left.* The number of distinctive verb-semantic tags in the BBC_10–13 corpus is 15, and they are as follows; *E4.1 (happy/sad), X2.1 (thought, belief), X3.2 (sensory: sound), A10 (open/closed; hiding/hidden; finding; showing), S6 (obligation and necessity), X8 (trying), M1 (moving, coming and going), Q2.2 (speech acts), X2.2 (knowledge), X.9.2 (ability: success and failure), N5.1 (entirety; maximum), A8 (seem/appear), A11 (importance), Q2.1(speech, etc.: communicative),* and *X3.4 (sensory: sight).* The following four verbs situate between the BBC_5–9 and the BBC_10–13 corpus and demonstrate the common use in both corpora; *heard_X3.2, ran_M1, put_M2,* and *decide_X6.* In relation to the LC_13–15 corpus in the first quadrant, the following 13 verbs can be observed; *practiced_A1.1.1, meet_S3.1, enjoyed_E2, speak_Q2.1, played_K1, write_Q1.2, playing_K1, does_A1.1.1, 'm_Z5 does_Z5, get_M1, eat_F1,* and *lived_H4.* Three of the 13 semantic tag types are common: *A1.1.1 (general actions, making, etc.), K1 (entertainment generally),* and *Z5 (grammatical bin).* The following 10 verbs are characteristic verb-semantic tags in the LC_13–15 corpus; *A1.1.1 (general actions, making, etc.), S3.1 (relationship), E2 (liking), Q2.1 (speech, etc.: communicative), K1 (entertainment generally), Q1.2 (paper documents and writing), Z5 (grammatical bin), M1 (moving, coming and going), F1 (food),* and *H4 (residence).*

The results of correspondence analysis based on the annotated POS-tag and semantic-tag identified not only distinctive verbs in each corpus but also semantic tag categories, which can be used to develop a semantic-based DDL as a new type of DDL approach in the classroom.

RQ3: Can the results of a semantic-based verb analysis be adopted into a new type of DDL?

(1) Identifying characteristic verbs and their related semantic categories of the BBC_5–
9 and BBC_10–13 corpora for DDL

Focusing on the top ten loadings values, using the POS-tag and semantic-tag analyses makes it possible to explain the difference in verb use between the British students and Japanese students in the first axis and the second axis, as illustrated in Table 3.

Table 3. The top ten loading values of verbs from the POS-tag and semantic-tag correspondence analyses

The first axis（British students vs. Japanese students）				The second axis（BBC_5-9 vs. BBC_10-13）			
negative values		positive values		negative values		positive values	
thought_X2.1	-1.4399	play_K1	1.3627	saw_X3.4	-2.0800	said_Q2.1	6.8224
were_Z5	-1.4340	is_Z5	1.3627	thought_X2.1	-1.6057	has_Z5	3.4329
started_T2+	-1.4143	likes_E2+	1.3627	were_Z5	-1.4600	have_Z5	2.9191
knew_X2.2+	-1.4078	belong_A9+	1.3627	want_X7+	-1.0420	get_A9+	1.6256
had_Z5	-1.3950	m_A3+	1.2242	had_A9+	-1.0222	be_Z5	1.5606
felt_X2.1	-1.3792	live_H4	1.2201	started_T2+	-0.9764	been_Z5	1.4977
been_Z5	-1.3134	like_E2+	1.1228	knew_X2.2+	-0.8170	think_X2.1	1.2347
be_Z5	-1.3108	is_A3+	0.9857	made_A.1.1.1	-0.7770	s_Z5	0.8377
get_A9+	-1.3082	do_Z5	0.9244	were_A3+	-0.7000	are_A3+	0.7045
saw_X3.4	-1.2372	call_Q2.2	0.8626	had_Z5	-0.5036	been_A3+	0.4050

Notes: Based on the 50 most frequent verbs ranked 1–50 among the three corpora

The top ten loading values in the first axis based on the POS-tag and semantic-tag correspondence analyses indicate the features of the 50 most frequent verbs ranked 1–50 of the British students as negative values and of the Japanese students as positive values. In addition, the results of the top ten loading values in the second axis of the 5–9-year-old British students are negative values, and the 10–13-year-old British students are positive values.

The first axis indicates distinctive verb use of the British students classified as negative values, and Japanese students classified as positive values. From the results, the characteristic verbs and semantic categories of the British students are as follows: *felt_X2.1 (thought, belief), saw_X3.4 (sensory: sight), were_Z5, been_Z5, and be_Z5 (grammatical bin)*. In addition, the following verbs can be observed; *thought_X2.1 (thought, belief), started_T2+ (time: beginning and ending), knew_X2.2+ (knowledge),*

had_Z5 (grammatical bin), and *get_A9+ (getting and giving; possession).* Whereas, the characteristic verbs of the Japanese students are verbs and the semantic categories *are_Z5* (grammatical bin), *m_A3+* and *is_A3* (being), *play_K1* (entertainment generally), *likes_E2+* (liking), *belong_A9* (getting and giving; possession), *live_H4* (residence), *like_E2+* (liking), *do_Z5* (grammatical bin), and *call_Q2.2* (speech acts). These were influenced by the email writing tasks they were required to introduce themselves and talk about their school and daily lives.

The second axis also illustrates distinctive verb use between BBC_5–9 classified as negative values and BBC_10–13 classified as positive values. From the results, the characteristic verbs and semantic categories of BBC_5–9 are as follows; *saw_X3.4 (sensory: sight), were_Z5 (grammatical bin), were_A3+ (being), thought_X2.1 (knowledge), want_X7 (wanting; planning; choosing), had_A9+ (getting and giving; possession), started_T2+ (time: beginning and ending), knew_X2.2 (knowledge), made_A1.1.1 (general actions, making, etc.),* and *had_Z5 (grammatical bin).* Whereas, the characteristic verbs and semantic categories of BBC_10–13 are as follows; *be_Z5, been_Z5, s_Z5, has_Z5, have_Z5 (grammatical bin), are_A3, been_A3+ (being), get_A9+ (getting and giving; possession),* and *think_X2.1 (thought, belief).* These are illustrated in Table 4.

Table 4. The top ten loading values of verbs by POS-tag and semantic-tag correspondence analyses

The first axis （British students vs. Japanese students）				The second axis （BBC_5-9 vs. BBC_10-13）			
negative values		positive values		negative values		positive values	
feel_X2.1	-0.7497	lived_H4	0.1587	realisedX2.5	-3.4812	ran_M1	0.0507
smile_E4.1+	-0.7484	take_A9+	0.1907	watched_X3.4	-1.7399	heard_X3.2	0.0676
hear_X3.2	-0.7450	eat_F1	0.6110	watchingX3.4	-1.7341	arrived_M1	0.1785
open_A10+	-0.7446	get_M1	0.9093	began_T2+	-1.2506	filled_N5.1+	0.1928
need_S6+	-0.7429	does_Z5	0.9939	found_A10+	-0.8788	left_M1	0.2095
asked_Q2.2	-0.7417	does_A1.1.1	1.7439	got_A9+	-0.8771	seen_X3.4	0.2163
lost_X9.2-	-0.7407	write_Q1.2	1.7439	tried_X8+	-0.7577	noticed_X3.4	0.2170
trying_X8+	-0.7399	enjoy_E2+	1.7439	wanted_X7+	-0.7418	opened_A10	0.2366
run_M1	-0.7399	playing_K1	1.7439	help_S8+	-0.5351	seemed_A8	0.2366
rememberX22	-0.7398	m_Z5	1.7439	find_A10+	-0.5002	told_Q2.1	0.2527

Notes: Based on 50 verbs ranked 51–100 among the three corpora.

The top ten loading values in the first axis based on the POS-tag and semantic-tag based correspondence analyses indicate the differences in the verbs ranked 51–100 between British students as negative values and Japanese students as positive values. The results of the top ten loading values in the second axis based on the correspondence analyses also show the differences in the verbs ranked 51–100 between 5–9-year-old British students as negative values and 10–13-year-old-British students as positive values.

The results illustrate that negative values in the first axis present ten characteristic verbs of the British students, and its positive values are those of the Japanese students. The features of verbs by the British students are the semantic categories such as *feel_X2.1 (mental actions and processes), hear_X3.2 (sensory: sound)*, and *smile_E4.1 (happy/sad: happy), open_A10 (open/closed; hiding/hidden; finding; showing), need_S6+ (obligation and necessity), asked_Q2.2 (speech acts), lost_X9.2 (ability: success and failure), trying_X8+ (trying)*, and *remember_X2.2 (knowledge)*. Whereas, the characteristic verbs of the Japanese students mainly concern their introduction and daily lives in their use of the following verbs: *lived_H4 (residence), take_A9+ (getting and giving; possession), eat_F1 (food), get_M1 (moving, coming and going), write_Q1.2 (paper documents and writing), enjoy_E2+ (liking), playing_K1 (entertainment generally)*, and *m_Z5 (grammatical bin)*. The results of the second axis illustrate the characteristic verbs between BBC_5–9 and BBC_10–13. The negative values present ten distinctive verbs of BBC_5–9 and the semantic categories are as follows; *realise_X2.5 (understand), found_A10+ and find_A10+ (open/closed; hiding/hidden; finding; showing), watched_X_3.4 and watching_X3.4 (sensory: sight)), began_T2+ (time: beginning and ending), got_A9 (getting and giving; possession), tried_X8+ (trying)*, and *wanted_X7 (wanting; planning; choosing)*. Whereas, the plus values in the second axis indicate ten characteristic verbs of BBC_10–13 and semantic categories as follows: *heard_X3.2 (sensory: sound), seen_X3.4 and noticed_X3.4 (sensory: sight), seem_A8 (seem/appear), told_Q2.1 (speech acts), ran_M1 and left_M1 (moving, coming and going), arrived_X3.2 (sensory: sound), filled_N5.1 (entirely; maximum)*, and *opened_A10 (open/closed; hiding/hidden; finding; showing)*.

The results of the top ten loadings values based on the POS-tag and semantic-tag analyses of 100 verbs resulted in the following characteristic 17 verbs of BBC_5–9 and BBC_10- 13, illustrated in Table 5.

Table 5. 17 characteristic verbs of BBC_5–9 and BBC_10–13 classified by semantic categories based on *Wmatrix 4* in the 100 most frequently used verbs

Sem. Tag	Discourse field	Category labels	Verb
A1.1.1	General and abstract terms	General actions, making, etc.	Make, did, do, make, opened
A10	General and abstract terms	Open/closed; Hidden; Finding; Showing	Find, found, open
A3	General and abstract terms	Being	Am, are, be, been, was, were, is, 'm, 's
A8	General and abstract terms	Seem/Appear	Seemed
A9	General and abstract terms	Getting and giving; possession	Get, got, had, has, have, take, took
M1	Movement, location, travel, and transport	Moving, coming, and going	Arrived, get, go, left, ran, run, went
N5.1	Numbers and measurement	Entirely; maximum	Filled
Q2.1	Language and communication	Speech etc.: Communicative	Said, told
S8	Social actions, states, and processes	Helping/hindering	Help
T2	Time	Time: Beginning and ending	Began, started
X2.1	Psychological actions, states, and processes	Thought, belief	Feel, felt, think, thought
X2.2	Psychological actions, states, and processes	Knowledge	Knew, know, remember

X2.5	Psychological actions, states, and processes	Understand	Realized
X3.4	Psychological actions, states, and processes	Sensory: Sight	Saw, see, seen, watched, watching, noticed
X7	Psychological actions, states, and processes	Wanting; planning; choosing	Want, wanted
X8	Psychological actions, states, and processes	Trying	Tried, trying
Z5	Names and grammar	Grammatical bin	Am, are, be, been, did, do, does, had, has, have, like, s, was, were

（2）Developing different types of DDL materials based on verb semantic analysis

The 17 characteristic verbs in table 5 will be highly valuable for Japanese EFL learners in learning a variety of verbs with the same semantic categories. The following four different types of DDL can possibly be used for Japanese EFL learners from elementary to lower secondary school levels. The advantage of this semantic-based DDL is to provide an appropriate level DDL regarding vocabulary and language in concordance lines for Japanese EFL learners from elementary to lower secondary school levels, based on the written language of British teenagers from elementary to lower secondary school levels. Furthermore, this semantic-based DDL enables the implementation of the following four different types of DDL approaches from a unique and different angle. The DDL approach was originally proposed by Tim Jones (1994), and the present study is based on the sematic-based DDL that is described below.

DDL-Type 1: Guessing a verb as a keyword word in concordance lines and trying to discover some features of the language use (see Appendix 1). This type of DDL is a basic DDL approach (vocabulary level regarding verbs), wherein learners read the concordances and guess the keyword in the concordance lines as Task 1. In Task 2, learners focus on the left of the keyword and discover some features of the language use, such as vocabulary use, collocation, grammar, and expressions. In Task 3, learners try

to focus on the right of the keyword and discover characteristic language use. Learners report the proper keyword and features of language use on the right and left of the keyword.

DDL-Type 2: Guessing different verbs and classifying different verb usage, which have almost the same meaning but have similar and different usage (see Appendix 2). This type of DDL approach is an intermediate DDL approach (vocabulary level required to distinguish different verb uses that are divided into the same semantic category). It is done by reading the concordance lines of different verbs based on the same semantic categories as a keyword and trying to guess an appropriate verb to read different concordance lines for each verb.

DDL-Type 3: Discovering features of verb collocations with different parts of speech as modifying words and guessing the proper modifying words regarding the verb (see Appendix 3). This type of DDL approach (collocation and phrase-level required a knowledge of the verb collocations as modifying words [adverb, adjective, preposition]) is an advanced intermediate level. Learners read concordances and try to discover the appropriate collocations with different POS modifying words.

DDL-Type 4: Discovering grammar rules and guessing the appropriate verb to read concordances (see Appendix 4). This type of DDL approach (grammar level) is an advanced level to discover grammar rules and guess the proper verb to read concordances. Learners need to focus on a keyword in the concordance lines and read on the right and left of the keyword to discover the grammar rules and learn the variety of verbs for the target grammar structure. Learners report their discoveries and share their ideas with group members in group work (see Appendix 4).

5. Conclusion

This study identified the features of language use, focusing on verbs to compare 5–9 and 10–13-year-old British students using data from two specialized corpora, BBC_5–9 and BBC_10–13, which collected original stories from the BBC 500 Words competition from 2014 to 2016. Furthermore, this study built Japanese EFL learner corpora using written texts wherein students were tasked to write an email to a pen pal in a foreign country, based on a longitudinal study from 2004 to 2006 at a national secondary school. The aim of the study was to set a proper target language for Japanese EFL learners in elementary and junior high school by using British students' written data. It fills a gap in the adoption of mega corpora, such as the British National Corpus (BNC) and

American National Corpus (ANC). The significance of this study lies in the clarified characteristic verb use for different age groups involved in BBC_5–9 and BBC_10–13 as the target language for Japanese EFL learners by comparing the use of the Japanese EFL learner corpus, LC_13–15. This was based on correspondence analyses of POS-tag and semantic-tag for verbs divided into two ranking groups from 1st to 50th and from 51st to 100th.

Furthermore, this study adopted the perspective of semantic-tag information for correspondence analyses. Its aim was to investigate what semantic categories are distinct among these three corpora and to adopt the results for a semantic based-DDL as a new type of DDL approach for English classes of lower secondary school levels. This study clarified the distinct semantic categories of these three corpora and examined the characteristic verbs and the semantic categories of BBC_5–9 and BBC_10–13. These can then be adopted as a resource for a semantic-based DDL approach for Japanese EFL learners. The semantic-based DLL approach would be effective in widening Japanese EFL learners' knowledge of language use of verbs to acquire a variety of collocations that they are not familiar with in their use of Japanese textbooks for English and learn different verbs in the same semantic categories.

Based on the results of the sematic-based correspondence analyses, this study suggests the following four types of sematic based-DDL activities. DDL-Type 1: Guessing a verb as a node word in concordance lines and trying to discover some features of language use. DDL-Type 2: Guessing different verbs and classifying different verb usages, which have almost the same meaning, but have the same and different usage. DDL-Type 3: Discovering features of verb collocations with different parts of speech as modifying words and guessing the proper modifying words regarding the verb. DDL-Type 4: Discovering grammar rules and guessing the proper verb to read concordances. The four types of semantic-based DDL in this study for elementary and lower secondary school levels of Japanese EFL learners offer a new type of DDL that is valuable in setting the proper target language. Furthermore, adopting the data of this research could contribute greatly to English education from the early stages of elementary and junior high schools in Japan. It could help English teachers in providing the correct level of education for their students through paper- and semantic-based DDL materials in daily English classes.

However, a notable limitation of this study is its corpus size; it is small, and adequate corpus data is not available to create DDL materials for a variety of verbs. For further research, increasing the size of the BBC 500 Word competition corpus is planned.

Given the present English educational environment in Japan, providing personal computers or tablets for educational use in the classroom is necessary for teachers and learners. Therefore, offering semantic-based DDL as ELT books or supplementary materials would be very valuable and helpful for teachers and Japanese EFL learners in the future.

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Appendices

Appendix 1

DDL-Type 1: Guessing a verb as a keyword in concordance lines and trying to discover some features of language use. (The answer to this keyword is "*began*").

TASK 1 Read the following concordances and guess the keyword, based on the context.
TASK 2 Focus on the left of the keyword and read the concordances. Note some features of the word usage on the left.
TASK 3 Focus on the right of the keyword and read the concordances. Note some features of the word use on the right.

1	. The beautiful , glossy red paint	to peel and lose its shine . One day
2	uddenly the wind scooped him up and	tossing him around like a pancake .
3	or bed . Before he could reply , he	whirling around like he was in a was
4	et off at the next station . People	to barge past him as the train enter
5	sy he could hardly breathe . Daniel	to run blindly back towards the stat
6	e popped the sweet in his mouth and	to think . He felt very alone and he
7	nagged a lot but he loved them . He	to look at photographs that he had t
8	wer ? She was no longer sure . Lila	to imagine drifting on a cloud , soa
9	r the little crack as a tiny dragon	to work his way out into the world .
10	nch rats to a fire pit , where they	to slowly roast her . Alive . She se
11	wns can have problems . The trouble	with the bank robbery . The bank had
12	ere the only two there . As the sun	to lower on the west horizon , my mo
13	havent harmed my parents . The sun	to rise , red and shimmering ; red f
14	little tree and the leaves suddenly	to glow in response . From then on ,
15	s had landed on his windscreen . He	swinging his head side to side , duc
16	amongst the legs of the crowds they	their adventure . After a long time
17	n on the machine next to him and it	to shake violently . Looking down ,
18	homemade horrors . Then the judging	. Everyone left the tent , looking s
19	banana skin across the floor , and	stamping on it . Do nt do that ! sai
20	layer of gleaming frost on it . He	to scrape the frost off with his paw
21	ing very fast , but he dived in and	to swim . The current was very stron
22	grown even thicker . The polar bear	to beat on the ice with all his migh
23	he polar bear beat harder . The fox	to weep . Then the ice split with a
24	on . What on earth was that . Sammy	frantically swimming up and down cal
25	le as the snow melted the colts leg	to heal and it grew tamer . When Mic

26	is field and closed the gate . Mick	to make his living by breeding amazi
27	d become something so beautiful . I	life as brownish lump in the cold ea
28	ght during the First World War that	in 1914 . Each of us represented a b
29	picking the thread . Slowly , Wishy	to unravel the wet fibre and with ea
30	wet fibre and with each pull washy	rolling it into a ball . Once comple
31	ent down to the washing machine and	sorting the now clean clothes into t
32	p of the lab . The pilot cautiously	to increase the power . The lab bega
33	gan to increase the power . The lab	to move up but the chains started to
34	ng , this must be where the trouble	. Inside there was a piece of paper
35	um and dad noticed a difference and	to watch Charlotte very carefully .
36	occoli and ripe tomatoes . This all	after Reggie had an unfortunate expe
37	made a trap . The terrified workers	to slip and slide across the floor l
38	lax and feel the beat . At first he	to jiggle , and then to really wrigg
39	o the beat . As he jived , the tree	to shake . The crocodile was at the
40	rling winds eased , and our courage	to return when the hope rose and str

Appendix 2

DDL-Type 2: Guessing different verbs and classifying different verb usages for words almost having the same meaning, but some of those are the same and different usages (the answers to these keywords are "*watched*," "*seen,*" and "*noticed*").

TASK 1 Read the following concordances and guess the keyword, based on the context.
TASK 2 Focus on the left of the keyword and read the concordances. Note some features of the word usage on the left.
TASK 3 Focus on the right of the keyword and read the concordances. Note some features of the word usage on the right.
TASK 4 Compare the use of each keyword and share the features of each keyword in your group.

【A】

1	ife ? Now he was very afraid as he	his family walk away from him . He
2	m in arm with mum and dad and they	granddad snoring in his deckchair w
3	g . I hid behind the lawnmower and	him set to work . Dad got his toolk
4	t the toes of the children as they	the shows with excitement and happi
5	n Alice switched on her tablet and	, not much happened . She fast forw
6	let routine almost perfectly . She	as her shoes moved in time with the
7	ancing , ghosts cant dance . Alice	in amazement as the little ghost st
8	chool Alice checked her tablet and	as the little ghosts dancing got be
9	etter and better . One day , Alice	her tablet and saw another ghostly
10	wiggled wildly with laughter as I	helpless Syndro screaming like a sc

11	or ? he thought to himself , as he	the curious object begin to glow my
12	nded as Sammy was hurled about and	helplessly as his entire family wer
13	ce cream . Mr Jones and Mrs Simons	on , knowing that there would be li
14	al water started to seep in . As I	the last tiny slips of light fade a
15	mer holiday . It was wonderful . I	while Emily ran in and out of her b
16	ster " , she said and ran off . He	her disappear into the darkness of
17	ains . Wendy hid behind a bush and	. They could see the problem , lots

【B】

1	looked nervous , unsettled : I had	the first suspect . Hola , oops hell
2	ed to the back , hoping never to be	again . Kazanzibar and the party By
3	he most magnificent view I had ever	. The whole universe seemed to be wi
4	lest Mexican wrestler they had ever	. Who are you ? Scribble asked . The
5	memories in my trinket box . I have	what makes my little girls happy and
6	es my little girls happy and I have	their sadness too . The light and th
7	The doll and the ladybird had both	better days , their stitching was lo
8	tmare . I ducked hoping she had not	me . I sat back up , my heart poundi
9	k cap catches my eye . Where have I	that before ? Thought I had nt notic
10	do nt think that there is , but Ive	it . But let me tell you Nick that d
11	air around me was surprisingly hot	as it was winter and almost 2100 . M
12	ow at this but continued , Have you	the maid since ? Maggie will be sobb
13	ace home , exhilarated . No one has	me as no one ever leaves their compu
14	veryone except me ; no one has ever	me sprinting through the fields beca
15	and hide hoping we are safe and not	. We are worried , everyone around u
16	we keep off the path so we are not	. We stop for a break , the water ta
17	rgencies . I do n't think I 'd ever	them be used before . They popped th
18	rfectly magnificent square dog ever	by the world . At the front of the h
19	's not the biggest house I 've ever	. Shame you did n't put us any close
20	gest murder enquiry that London had	since the Ripper case , over 15 year

【C】

1	s it always been there ? Ive never	it before . Shabby plants grow betw
2	er a few minutes of immobility , I	how dishevelled the floor was . It
3	was . It was unbelievable . Then I	my apparent genocide : I was all al
4	meone else ? She asks . She has nt	it yet . I do nt have anyone else ,
5	scarf that covers my cheek . Shes	. She does nt look away , though ,
6	een that before ? Thought I had nt	you ? said the policeman , in a you
7	en the musician came into view , I	people throwing coins into a hat in
8	ing her thumbs . While waiting she	an old door , partly open . Esme de
9	r pencil case . In the kitchen she	her Mum sobbing hard , her tears dr
10	ning the corner towards home , she	a Robin bobbing from branch to bran
11	sts did not seem the same . Morgan	the Robin on her windowsill on Chri
12	ng grew into a merry tune . Morgan	bulbs pushing their firm green leav

13	of best friends . So did she . He	her . She did nt know . He would ca
14	g inside her was Disappearing . He	a difference In her . She was more
15	front of the bus trying not to be	. Eventually the bus stops near the
16	running into the ward . The doctor	something especially peculiar about
17	a few minutes until Mrs Isosceles	him . She walked over to him and ki
18	the sonographer stuttered . Alice	his expression . Her spirits crashe

Appendix 3

DDL-Type 3: Discovering features of verb collocations with different parts of speech as modifying words, and guessing the proper modifying words for the verb (the answer to this keyword is "*get*").

TASK 1 Read the following concordances and guess the keyword, based on the context.

TASK 2 Focus on the left of the keyword and read the concordances. Note some features of the word usage on the left.

TASK 3 Focus on the right of the keyword and read the concordances. Note some features of the word usage on the right.

TASK 4 Compare the use of each keyword and share the features of each keyword in your group.

1	looked as small as pixels . I did nt	much use as the boy who was previousl
2	es today . March 19th 2875 . Today I	my countdown . That 's where my time
3	at envelope comes , that 's when you	your number . The number is the amoun
4	The countdown starts as soon as you	the letter , so there 's no point in
5	Lab 922 after School today and well	started . The bell clanged and Form 7
6	asked himself how did this bird dog	here ? A few weeks earlier a puppy la
7	human from the shoulders up , but I	put in a cave . They say I 'm monstro
8	nd him . I know that if I could only	close enough , his personality would
9	s stare at one another ; you need to	over it . Easy for you to say , I thi
10	the eyes for thousands of years ; we	picked up and taken away . Some are c
11	Such pain attracts more eyes and we	plunged into a pool of despair . Some
12	from our troubles enlightened , they	joy through our sorrows . But not eve
13	ing the same thing over and over can	tedious and eventually we take even t
14	ts . Chatter is the new god . Now we	picked up less and less for the good

15	ece of this life And was prepared to	it at any price . He was sad and lone
16	smic interference . It was Houston ,	... out ... now ! It wasnt very clear
17	Scribble But do nt blame me when you	into trouble Ignoring the advice of B
18	hanges is just too strange for me to	my head around . The leaders certainl
19	y Maia Roberts , aged 12 Let 's just	something straight . This is not a fa
20	er the street lights , I was able to	a glance at the shadowy figures . The
21	him to his car . Safe at last . As I	in the doors lock with a thud . As I
22	lettuces . Unfortunately , just as I	to know them , they seem to leave . O
23	n . Then , when I think my luck cant	any worse I am dropped into a pan of
24	cruel to each other , and seemed to	pleasure out of doing each other harm
25	uldnt move because the humans would	angry if I splashed a city with water
26	it " The Fourth Plinth ") trying to	a robin 's attention , when I heard f
27	g confused creatures , now forced to	their bearings in this new tundra wor
28	all scatter , desperately trying to	away , but the peregrine is too fast
29	thout assistance . If I was going to	anything done I was going to have to
30	gathering as we enter the camp . We	checked to make sure we are not intru
31	watch once again . 7.30 pm . Time to	to work . I swivel around to see the
32	to draw closer and I was starting to	ready for my departure . Tic toc . Ti
33	should start with a publicity stunt	on the news . How about the supermark
34	l use up my words so no one else can	in blah blah blah 490 blah blah blah
35	o see Lady Adams . " Why did n't she	a degree , she clearly came to Oxford
36	days women did n't have the right to	degrees , no matter how clever . Is t
37	the funfair . Furiously fighting to	to the blue sky . I felt a strong tug
38	eet tune of a piano . How did I ever	into this position ? I thought I was
39	bout how to change the world . Youll	used to it . So that was it just as I
40	tes Later Mum still in the kitchen .	commando gear on . Wait till Mum is d
41	eshift balaclava I pick the lock and	a cookie . This is so easy ! Take a b
42	de . I start pressing some buttons .	ejected and shaken before finally fin
43	spital bed . Is there anything I can	you ? asks a nurse kindly . Yes , I r
44	l without my hat , but I 'm sure Ill	new a new , far more feathery one aft
45	errified people or to demand them to	out of our way . Suddenly , amongst t
46	. With renewed interest , I rush to	them from under her bed and blow off
47	sharp swords that you did nt want to	too close to . As tight as a spring ,
48	s he slops out of bed . He starts to	ready , thinking about the day ahead
49	as to be spent at the Word Mine - to	500 words . I was taken to a Word Hou
50	s and now I could n't mine enough to	the 500 I needed . A young girl , abo

51	do n't go , it 's only natural , you	used to the smell , eventually . Oh w
52	feel sad . So sad that I do n't even	excited when the smartly dressed lady
53	ed his gun into the air . " Come and	me then ! If you can kill him , why n
54	Cheese by Jack Doran Did you know I	judged ? Just because I am sliced ; b
55	an towards the meat draw . Trying to	to the sausage cops . I looked down ,
56	front door he realised he could n't	through no matter what angle he tried
57	irl known as Rita replied , " Do n't	your tail in a twist Dragon-boy , she
58	ed the enemy , desperately trying to	to cover . One man attempted climbing
59	that the pilot has the experience to	us to safety . Up , up , up we climb
60	ghable how easy it is , to literally	away with murder , when the supposedl

Appendix 4

DDL-Type 4: Discovering grammar rules and guessing the proper verb to read concordances (the answer to this keyword is "*started*").

TASK 1 Read the following concordances and guess the keyword, based on the context.
TASK 2 Focus on the left of the keyword and read the concordances. Note some features of the word usage on the left.
TASK 3 Focus on the right of the keyword and read the concordances. Note some features of the word usages on the right.
TASK 4 Compare the use of each keyword and share the features of each keyword in your group.

1	faces gazed up at him . It had all	fairly well . It was nearly the end
2	22 after School today and well get	. The bell clanged and Form 7092 cr
3	ered and shook . The pushy parents	to point . The science teachers wen
4	rn Checkpoint the emergency system	to beep . Something was wrong . The
5	, very different to the one it had	at , human made , lifeless . In the
6	th ran to meet me . I sat down and	to cry . Mother Nature says that Su
7	with that Giraffe walked home and	to cry . Oh Mama , Oh Mama what sha
8	placed inside of me and instantly	sweating like a geyser erupting fro
9	squashed when the roof of the cave	pushing down on me . Whenever I was
10	there was a screeching noise and I	going round and round in the giant
11	Cloud . Her body convulsed and she	to drift into the blackness . Her f
12	g eyes staring back at them . They	to wonder if they had made the righ

13	ar-piercing scream Aahh ! Scribble	scribbling in his notebook . The sp
14	ep and recorded his first word . I	to feel yes , actually feel - warmt
15	s up to no good he thought , as he	to fill up with rage . The Prince t
16	, but they were very friendly . We	taking bets as to who was going to
17	r hardened around the edge . I had	new life . I housed animals , plant
18	. My tired eyes closed . Lava then	leaking in towards me at the centre
19	sat down calmly next to them , and	chucking birdseed on the ground lik
20	n , Im a depressed sheep . Day 4 I	to plan my escape today , but got d
21	suggested he try the gardens . He	with a thorough search of the flowe
22	perate to take my first flight . I	competing and signed myself up for
23	. Roaring its ugly growl the time	to rear at me . My limbs were feeli
24	of theft ? And thats where it all	, The Silver Crime Wave and their c
25	It was so small and cute and as it	to run outside I began to be aware
26	They talked on the bus . Then they	talking Outside of school . In thei
27	a huge bite and then another . She	to turn red , then purple , then fe
28	back and stomped off . The corpse	to cough and a huge piece of cake f
29	an old , battered football and had	a match . He felt a smile creep ont
30	gular prism . Shortly after , they	a family and Mrs Isosceles had many
31	t a pale-ginger kitsune hair . She	to grab multiple items before stuff
32	. It was time . Dark granite horns	to slowly protrude from her forehea
33	d as dappled brown feathered wings	to grow out of her back . " What to
34	l influences came into play . Some	cautiously then , swelled with incr
35	le , lapping ever quicker . He had	on wet tyres and now they were perf
36	ting . He picked up the letter and	to read the contents : " Dear Davey