

Attitude toward the Use of Dual Subtitles by Japanese English Learners

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Abstract

In recent times, a lot of Massive Open Online Courses (“MOOC”) contents are offered with dual subtitles in the native and target languages. However, there is little research that examines the relationship between their learning behavior and the role of subtitles. This study investigates the effects of subtitles in dual language (“Dual subtitles”) English and Japanese through a MOOC video, a platform that allows students to watch academic topics and contents provided in English (mainly academic lectures delivered in English at prestigious universities in the United States) on MOOCs with dual subtitles. According to the findings, more than 70% of the participants used dual subtitles most frequently and more than 95% of the participants affirmed that dual subtitles were useful or preferable to other subtitle modes (i.e., either Japanese only or English only). Although it is often stated that subtitles may place a cognitive load on language learners, the finding demonstrates that most participants had relatively positive feedback or attitude toward the use of dual subtitles and that some of them watched the video by rewinding or pausing the video. The findings revealed that a dual subtitle mode helped participants learn about the video in a variety of ways.

Keywords: dual subtitles, English learners’ behavior toward dual subtitles, learning strategy with dual subtitles

1 Introduction

This study examines the effectiveness of dual subtitles in English learning by using Online Educational Resources (“OERs”), particularly MOOCs. To date and especially after the outbreak of COVID-19, OERs have been actively utilized for educational purposes helped by the spread of multimedia learning in English education. The use of multimedia learning in English education is these days commonplace and provides students with several opportunities for English learners to interact or get immersed in “authentic” English resources without going to study abroad or visiting a foreign country where English is spoken. According to Mayer’s 2001 multimedia learning theory, people learn better from words and pictures than from words alone [1]. To date, numerous studies on single subtitles in English learning have been conducted as described in Section 2.1 below. However, there are few studies on the use of dual subtitles in English learning as it is an emerging field and its effectiveness is not yet clear, especially in terms of the cognitive load theory and redundancy effects as stated by Hao [2]. Furthermore, there are no previous studies from the Japanese and English dual subtitles perspective, even though it can be assumed that dual subtitles could bring English learner’s new benefits that a single subtitle would not be able to bring.

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Focusing on the aforementioned, in this paper we aim to measure Japanese English learners' attitudes toward the use of dual subtitles in English learning by conducting a preliminary experiment with questionnaires by specifically focusing on what kind of learners' learning behavior and strategies would relate or link to the use of dual subtitles, and to discuss what we found from the experiment.

2 Previous Studies

2.1 Subtitles Research and Dual Subtitle Research to Date

Research into the effects of subtitles in English learning dates to Paivio's dual-coding theory [3], which proposes the theoretical framework that information presented through both visual and verbal forms stimulates learning in English learners as they are linked and make retrieval easier. Based on the dual-coding theory, Mayer [1] further developed the dual-coding theory in 2001 and suggested that with the original theory of multimedia learning people could learn better from words and pictures than from words alone. English learning with subtitles is supported by the above-mentioned theories and numerous studies conducted in the past demonstrate that English learning with captions or subtitles are effective for English learners. For example, findings by Rodgers and Webb [4] indicate that there was a significant difference between those who watched with captions and those who watched without captions. From the Japanese subtitle perspective, Anzai, both individually and with Akahori, conducted several studies including one using MOOCs and found that English learning with either English or Japanese subtitles is more effective compared to learning without subtitles [5,6].

However, the number of studies on dual subtitles is very limited. Especially, in the context of Japanese and English dual subtitles, we were unable to find any previous research as research is limited to those related to single subtitles (either English or Japanese), although it is assumed that dual subtitles can improve the efficiency of learning English by displaying both English and Japanese subtitles simultaneously on the same screen. Further, there are very few studies that focus on the learning behavior of learners although it is important to take each learner's learning behavior or strategy into consideration given that each learner has their own learning behavior, and such behavior cannot be generalized. From the learning analytics perspective, "there was a significant relationship between the students' online learning behaviors and their academic achievement" [7]. However, we were unable to find previous studies that examined the details of learners' learning behavior in English learning using subtitles. In the field of learning analytics, where learning behavioral data is highly utilized, additional learning factors have helped to improve the accuracy of clustering/prediction models. Specifically, Chen et al. emphasize the importance of including psychological factors like learning style data in addition to learning behavioral data [8].

Moreover, Hao et al. investigated the effectiveness of dual subtitles in Chinese and English on vocabulary and listening comprehension skills by dividing participants into two groups - advanced and intermediate EFL students - and using TED talks as learning materials [2]. The experiment was conducted by dividing students into four groups, (i) no subtitles, (ii) Chinese subtitles, (iii) English subtitles, and (iv) dual subtitle groups. The finding revealed that the no subtitle and dual subtitle groups performed significantly better than the English subtitle group on vocabulary learning, and dual subtitles improved vocabulary learning for advanced learners despite their prediction that adding dual subtitles may not contribute to learners' improvement as dual subtitles may impose high cognitive load on learners when watching and therefore may impose

such learners on redundancy effects. Hao et al. stated that advanced learners could take advantage of dual subtitles for helping them figure out the meanings of difficult words they encountered rather than getting overwhelmed while processing information when using dual subtitles [2].

According to the authors, dual subtitles can benefit English learners by considering students' proficiency levels and the conditions under which dual subtitles are to be used [2]. With regard to the cognitive load theory mentioned above, the research by Mayer, Lee, and Peebles [9], presented on p. 658, states that there is a possibility that subtitles will not overload the visual channel if learners quickly translate them into inner speech, although having both printed words and graphics on the screen simultaneously can potentially create a split attention effect. Further, the finding by Garcia described on p. 477 reveals that dual subtitles "encompasses all of the benefits of using video, subtitles, listening, and translation at the same time. The combination of aural, visual, and written elements required to subtitle competently makes it unique for L2 learners" [10].

Another finding by Wang and Pellicer-Sánchez showed that bilingual subtitles were superior to other forms of subtitling in the acquisition of meaning, whereas they were less effective than captions for form recognition [11].

Further, in terms of learners' learning behavior, Hwang, Hsu and Hsieh mention that students can benefit from their study if teachers take the student's learning styles and the caption/ subtitle approaches into account. This implies that teachers could also benefit from the study by developing more effective learning activities. In addition, it could inspire researchers who intend to develop innovative and effective English learning approaches [12].

2.2 Issues not Addressed in Previous Studies

Although there are several studies about dual subtitles, there are issues that continue to remain unsolved, which are as follows. (1) A large number of studies are based on comprehension test scores and do not pay close attention to how learners use each subtitle when they are allowed to use all types of subtitles (i.e., English, Japanese, and dual subtitles) when they watch a video, (2) there is no research on learners' learning behavior or strategy when they use dual subtitles, (3) there has been no research that has been conducted on an individual basis, and (4) there are no studies that examine dual subtitles in both English and Japanese.

In relation to (1) above, numerous studies have been conducted by dividing students into categories that allowed them to use only one type of subtitle or based on the results of post-test scores. This means they do not have enough details about how each learner used the subtitles when they watched the video in question. In relation to (2) above, experiments conducted in the past do not reflect learners' learning behavior or strategy and tend to focus only on the post-test scores. Based on our assumption that it is important in English language studies to consider learners' personality, features, or learning behavior to maximize the effects of English learning, we anticipate this is what we will need to resolve in our future studies. Furthermore, in relation to (3) above, research to date tends to focus on quotative analysis and we lack data on an individual learner's basis from which we may determine how or what kind of strategy or pattern can be extracted when learners use dual subtitles. Finally, existing research is limited to studies of languages other than Japanese and we do not have any research focused on the use of Japanese and English dual subtitles.

3 Experiment

3.1 Study Purpose

We conducted the research to understand how participants use three types of subtitles during a lecture in English with (1) Japanese subtitles only, (2) English subtitles only, and (3) dual subtitles in both Japanese and English. A total of 21 students, who major in education, English education, linguistics including second language acquisition, anthropology, or comparative cultures participated in the experiment. We classified those who had a TOEIC score of 800 or more and its equivalent as advanced learners ($n = 5$) and other students as intermediate learners ($n = 16$). The mean age was 20.2381 and their grades varies from freshman in undergraduate to the first grader of the master degree in the University of Tsukuba. We focused on each learner's learning behavior throughout the experiment.

3.2 Procedures and Materials

During the experiment, we asked each participant to watch a lecture by Professor Paul Bloom titled "Introduction to Psychology" [11]. It was dated January 22, 2018, and is available on Yale University's Open Yale Courses via Asuka Academy, a platform that offers dual subtitles in both Japanese and English. The video lasts for roughly 56 minutes, however, we required the participants to view it from the beginning till the timestamp of 9:35. This indicates that the average viewing time was ten minutes.

The lecture itself is about psychology, however, the content we asked the participants to watch was about how people communicate with each other using a language and how some languages were developed throughout their history.

The participants were instructed to switch between the three different subtitle options whenever they want to while viewing to the lecture. In addition, we informed them that they could pause or rewind the video if required to check if there was anything they missed or wanted to view again.

Figure 1 below shows how dual subtitles appeared on the screen.

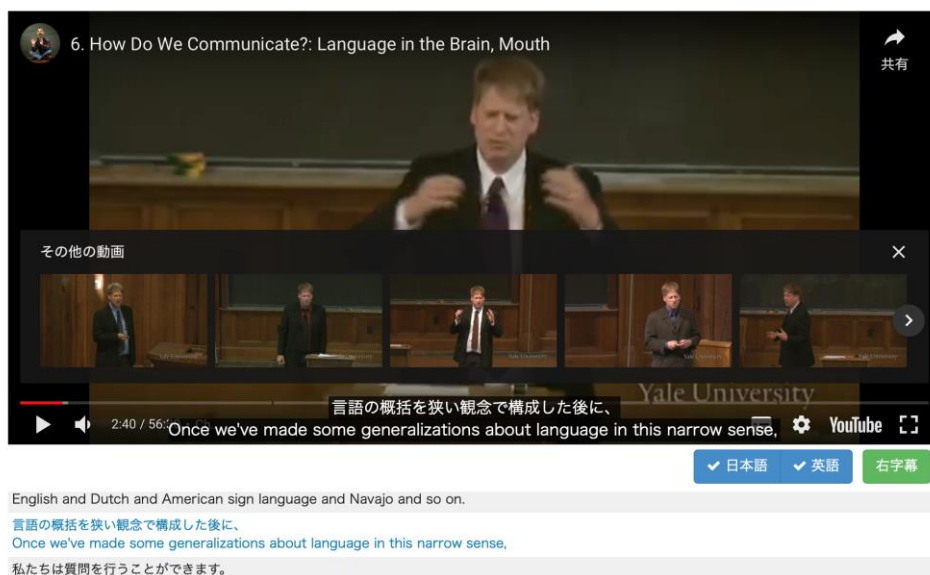


Figure 1: "Introduction to Psychology" a lecture by Professor Paul Bloom from Yale University available on their Open Yale Course dated January 22, 2018 [13].

Following the lecture, the participants completed a post-test for vocabulary and comprehension as well as surveys about their learning behavior, opinions on the use of dual subtitles, whether they thought dual subtitles were useful for their English learning, etc. based on a five-point Likert scale and other methods.

4 Results

4.1 Results and Findings

We excluded three participants who equally divided the time into 10-minute durations to use three types of subtitles. Subsequently, we summarized the results of 18 participants, which is presented below. We found that 15 out of 18 participants used dual subtitles most frequently, which is illustrated in Tables 1 and 2 below. Two out of 18 participants used the only dual subtitle mode despite our specific instructions to use all three subtitle modes (i.e., English, Japanese, and dual subtitles). However, we have included the data for these two participants as well in Table 1 below. In addition, 17 out of 18 participants, i.e., about 95%, answered in the questionnaire conducted after the experiment that the dual subtitles were more useful than other subtitle modes. As for the advanced learners, 100% of the participants answered that the dual subtitles are the most useful. As for the intermediate learners, 85% of the participants answered the dual subtitles are the most useful. From these figures, we can say that the dual subtitles are the most useful among the participants, although there is a slight difference in the ratio between the advanced learners and intermediate learners. Through the experiment, we found that individuals who use multimedia learning with dual subtitles have a few common characteristics, which are listed below.

- there are a few “frequent language changers,” learners who frequently change the language mode;
- some learners tend to repeat the lecture a lot;
- we can categorize the type of learners’ behavior as indicated in Tables 3 and 4 below; and
- some common contents were frequently repeated by a lot of participants.

Interestingly, we found that two participants were categorized as “top-down” type learners, who watched the whole lecture without rewinding or pausing to repeat, however, they repeated the entire lecture when they had finished first watching. The other participants are not classified into this category and we call these participants “bottom-up” type learners, who carefully watch the entire lecture in one sitting.

Table 1: Ratio of each subtitle type used by each participant

	D	E	J		D	E	J
P1	64.5%	13.0%	22.6%	P10	100.0%	0.0%	0.0%
P2	84.9%	7.5%	7.6%	P11	30.6%	26.3%	43.1%
P3	52.3%	39.0%	8.7%	P12	57.1%	29.3%	13.5%
P4	44.8%	28.1%	27.1%	P13	74.3%	21.0%	4.7%
P5	34.6%	50.4%	14.9%	P14	89.8%	7.6%	2.5%
P6	100.0%	0.0%	0.0%	P15	50.7%	34.2%	15.1%
P7	32.7%	32.0%	35.3%	P16	60.5%	34.4%	5.1%
P8	47.8%	23.9%	28.4%	P17	43.8%	22.4%	33.8%
P9	51.3%	20.7%	28.1%	P18	89.0%	7.8%	3.2%

*Numbers in red indicate which subtitle mode was used the most by the same participant.

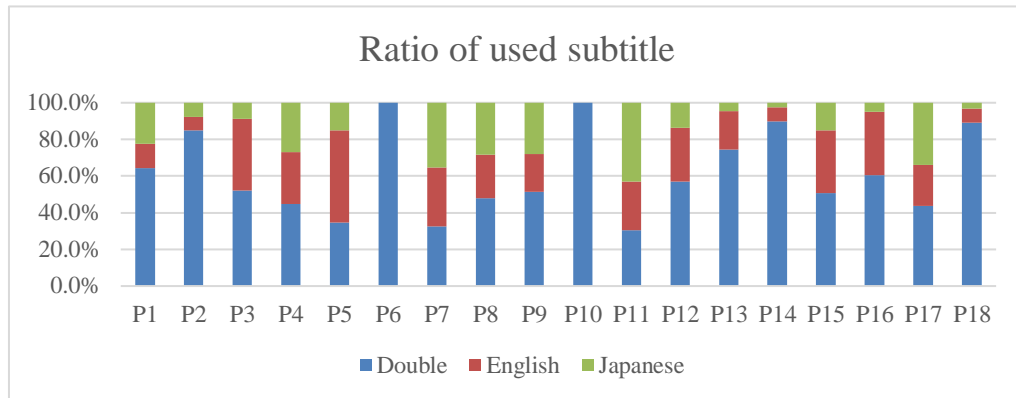


Figure 2: Ratio of each subtitle type used

We sorted each feature of the participants as indicated in Tables 2 and 3. As shown in Table 3 below, we can sort learners into four main categories. That is, (1) frequent language changer and repeater, (2) frequent language changer but not a repeater, (3) not frequent language changer but repeater, and (4) neither frequent language changer nor repeater. Through this experiment, we found that the category of the learners who are not frequent language changers but repeaters (i.e., category (3) above) account for the most, and category (4) follows next.

The details for frequent language changers and repeaters will be explained in Sections 4.2 and 4.3 below.

Table 2: The details of participants' watching behavior

	Frequent language changer (*) *changed language type 5 times or more		Repeater		Type of most-used subtitles			Focused attention on the most important parts in the chunks listed in section 4.4 below	
	Yes (+)	No (-)	Yes (+)	No (-)	English	Japanese	Dual	Yes (+)	No (-)
P1		✓		✓			✓		✓
P2		✓	✓				✓		✓
P3		✓	✓				✓	✓	
P4	✓			✓			✓		✓
P5	✓			✓	✓				✓
P6		✓		✓			✓		✓
P7		✓		✓		✓			✓
P8		✓	✓				✓	✓	
P9	✓		✓				✓		✓
P10		✓		✓			✓		✓
P11		✓	✓			✓			✓
P12		✓		✓			✓		✓
P13	✓		✓				✓	✓	
P14		✓	✓				✓		✓
P15	✓		✓				✓		✓

P16	✓		✓				✓	✓	
P17		✓	✓				✓		✓
P18		✓	✓				✓		✓

* Participant shaded in green = top-down type

Table 3: Learners' pattern and the language used the most when watching the video

	Most used language		
	English	Japanese	Dual
Frequent changer? / Repeater?			
Yes (+)/Yes (+)	0	0	4
Yes (+)/No (-)	1	0	1
No (-)/Yes (+)	0	1	6
No (-)/No (-)	0	1	4
Total	1	2	15

4.2 Feature 1: Frequent Language Change

Through the experiment, we found that some learners changed the language mode very often and we referred to these characteristics of the learners who switched the language mode five times or more as “frequent language changers.” For example, some learners such as P5, P15, or P16 switched the language mode more than ten times. All participants other than P5 used dual subtitles the most while watching the video. From this observation, it can be ascertained that some learners have their own learning strategy when they use subtitles in language learning including the top-down type learners, P3 and P8, who displayed a similar learning pattern.

Table 4: Frequency of language mode change while watching a video

	P1	P2	P3	P4	P5	P6	P7	P8	P9
English	1	1	1	1	4	0	1	1	2
Japanese	1	1	1	2	2	0	1	1	1
Dual	1	1	0	2	5	0	0	0	2
Total	3	3	2	5	11	0	2	2	5
	P10	P11	P12	P13	P14	P15	P16	P17	P18
English	0	1	2	5	1	5	5	2	1
Japanese	0	1	1	1	1	2	2	1	1
Dual	0	1	1	3	1	4	6	0	1
Total	0	3	4	9	3	11	13	3	3

4.3 Feature 2: Repeat

In addition to the findings described in Section 4.2 above, we observed the following:

- some learners repeated the video a lot compared to other participants as shown in Table 5 below;
- certain portions in the video were repeated or paused by a lot of learners;

- some portions in the video were repeated or paused by a number of participants very frequently (we have listed and sorted such data from Chunk 1 to Chunk 5); and
- learners seem to have repeated or paused the video to check the details of the lecture itself rather than to check some vocabulary or grammar (this point will be detailed in Section 4.4 below).

Table 5: Participants who repeated chunks 1 to 5 in the video

	P1	P2	P3	P4	P5	P6	P7	P8	P9
Chunk 1	-	-	-	-	-	✓	-	✓	-
Chunk 2	-	✓	✓	-	-	-	-	✓	-
Chunk 3	-	-	✓	-	-	-	-	✓	-
Chunk 4	-	-	✓	-	-	-	-	✓	✓
Chunk 5	-	-	✓	-	-	-	-	✓	✓
	P10	P11	P12	P13	P14	P15	P16	P17	P18
Chunk 1	-	-	-	✓	✓	-	✓	-	-
Chunk 2	-	✓	-	✓	✓	-	✓	-	-
Chunk 3	-	✓	-	✓	✓	✓	✓	✓	-
Chunk 4	-	-	-	✓	-	-	✓	-	✓
Chunk 5	-	-	-	✓	-	-	✓	-	-

* Participant shaded in green = top-down type

4.4 Characteristics of Content Frequently Repeated

We have listed and sorted some content that several participants repeated or paused when watching the video in Chunk 1 to Chunk 5 and analyzed the word level by using CEFR-J via New Word Level Checker (“NWLC”) provided by Atsushi Mizumoto [14]. Before we started the analysis, we made a tentative assumption that the learners repeated or paused the video because some words or the grammar was difficult. Interestingly, we found that it is not the level of words but the content of the lecture itself that triggered them to repeat or pause the video. As displayed below in Figures 3 and 4, more than 75% of the words used in each chunk is CEFR-J A1 level and this means that the level of the words in each chunk was not very difficult. However, our findings revealed that the content frequently repeated or paused by the participants was where they thought important (such as the peculiarity of language or history of language) but a bit unfamiliar to them, especially to learners whose major is not linguistics and therefore not familiar with technical words for linguistics.

Based on this fact, we concluded that learners repeated or paused the video based on their evaluation of the content that was important by considering the theme of the lecture and what they need to understand thoroughly. The use of subtitles in language learning tends to focus on the impact of learning vocabulary or grammar, that is, the single aspect of English skills, however, it can be concluded that dual subtitles can help learners deeply understand the lecture itself rather than only lexical challenges.

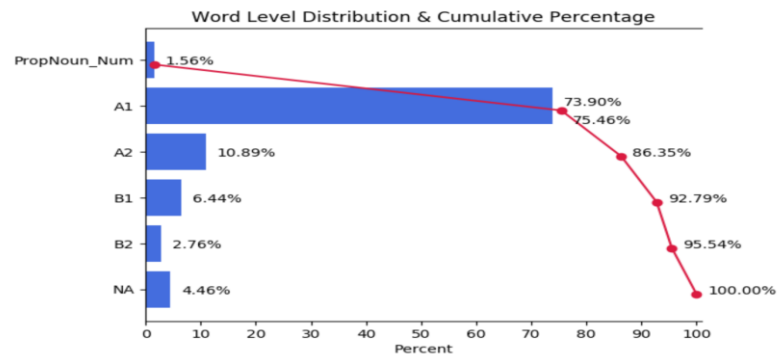
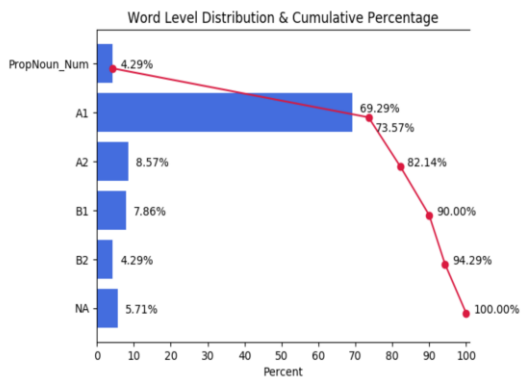
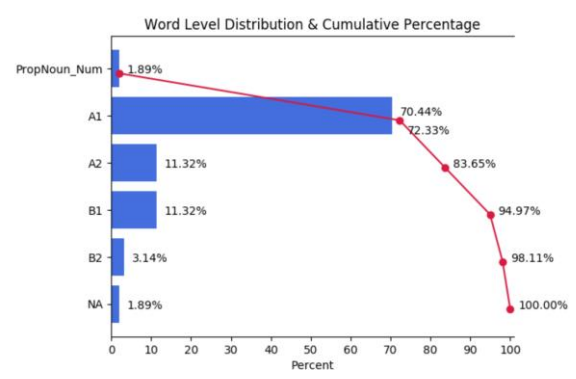


Figure 3: Analyzed word level used in the lecture

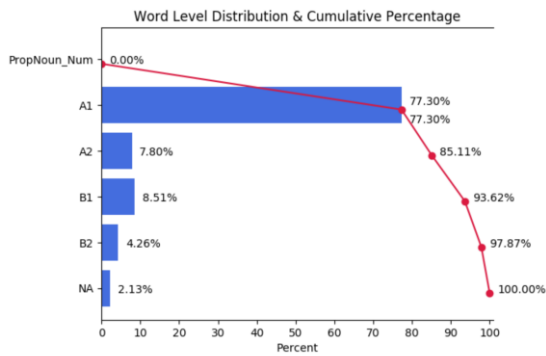
Chunk 1



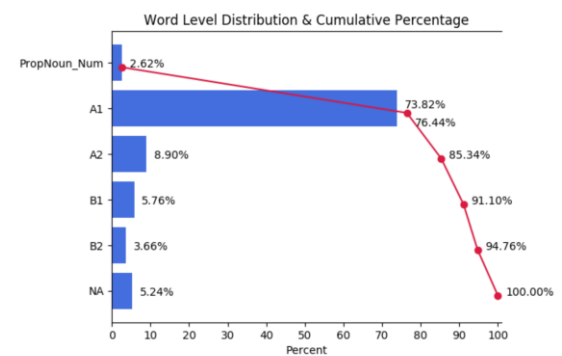
Chunk 2



Chunk 3



Chunk 4



Chunk 5

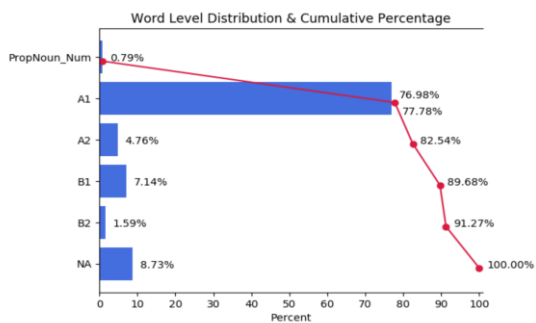


Figure 4: Analyzed word level of each chunk (i.e., chunks 1 to 5)

5 Conclusion and Recommendations for Future Studies

The findings of this study are:

- learners have a positive attitude toward the use of dual subtitles despite a greater cognitive load or redundancy effect, as suggested by a few previous studies;
- there are certain kinds of learning strategies or learning behaviors learners display when using dual subtitles, which is detailed in Section 4.1 above; and
- dual subtitles can help learners in terms of learning both lexicon and multimedia learning materials, which can lead to the exploration of new types of modality in multimedia learning.

This study was unable to examine in depth what kind of learning strategy or behaviors are employed when learners use dual subtitles and how such learners view dual subtitles when two languages appear on one screen simultaneously. Furthermore, the number of participants was relatively limited in our research. Future studies must delve deeper into these to understand or establish the most effective ways to learn English while using dual subtitles - a new type of modality in learning English with subtitles to match each learner's learning behavior or strategy.

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