

Language learning with Netflix: Exploring the effects of dual subtitles on vocabulary learning and listening comprehension

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Abstract

While the use of dual subtitles (concurrent L1 subtitles and L2 captions) has been studied in L2 research, more studies are needed to better understand the impact that this on-screen textual aid can have on vocabulary learning and comprehension. Therefore, this study explored if there were significant differences in vocabulary learning and listening comprehension between EFL students who watched L2 videos with L1 subtitles, L2 captions, and dual subtitles. Participants (N=96) were quasi-randomly divided into three equal groups (n=32) under each on-screen textual aid condition and viewed an episode from a sitcom through Netflix. Pre- and post-tests were administered to measure gains in vocabulary learning at two different levels among 20 target words that appeared in the episode. A 15-item listening comprehension test was also administered post-viewing to determine if there were significant differences in comprehension. Results indicated that the L1 subtitles and dual subtitles groups performed better than the L2 captions group in terms of vocabulary learning, whereas the participants who viewed the episode with dual subtitles did significantly better than the other two groups in listening comprehension. These findings suggest that L1 subtitles, either alone or with L2 captions, are key to supporting vocabulary learning and comprehension of video.

Keywords: video streaming; L2 video; L2 subtitles; vocabulary learning; listening comprehension

Introduction

Over the past decade, on-demand video streaming such as Amazon Prime Video, Hulu, and Netflix has become a ubiquitous part of everyday life. While the use of video has been commonplace in the language classroom even before the advent of video streaming (Vanderplank, 2016), these services have made foreign language TV programs and movies much more accessible to both language teachers and students. Video libraries for these services include thousands of titles in multiple languages and subtitling options so that even novice learners can enjoy foreign-language content. Although initial studies on the use of video streaming for L2 learning have resulted in promising findings (Alm, 2019; Dizon, 2018; Wang & Chen, 2019), research in this area is still limited and in need of further investigation as none of these studies addressed if linguistic gains could be

made via video streaming. Thus, the present study aims to understand the impact of video streaming and the use of dual subtitles via a Chrome extension, namely Language Learning with Netflix, on L2 incidental vocabulary learning and listening comprehension.

This study is informed by the theory of multimedia learning by Mayer (1997, 2001). According to this theory, learners comprehend information most effectively through dual channels—a verbal channel that processes written text and a visual channel that processes images and video. When one of these channels is absent, such as in the case of L2 video without captions or subtitles, then learning is suboptimal. Instead, learning is facilitated through the simultaneous use of these two channels as an audiovisual presentation allows input to be processed by both the verbal and visual systems, which in turn, allows for more cognitive resources to be devoted to the processing of information compared to verbal or written information only (Brünken et al., 2002). However, the use of dual subtitles on-screen and the speed of native-speaker interaction in L2 video may present a cognitive burden that is too much for L2 learners to process within a limited amount of time; therefore, this study sought to investigate the influence of dual subtitles on vocabulary learning and listening comprehension of L2 video.

Literature Review

L1 subtitled video and L2 captioned video

As subtitled and captioned videos are one of the most accessible and increasingly common ways a person can be exposed to a foreign language, it is natural that research would crop up which analyzed the impact that they can have on foreign language learners. An earlier study by Markham and Peter (2003) revealed that subtitles in the learners' native language could facilitate comprehension in Spanish language multimedia to a statistically significant degree. The same study also noted that a separate group that viewed the same materials with L2 captions also experienced gains, but not as significant as those who used L1 subtitles. In 2008, Bianchi and Ciabattoni performed a study with English learners in Italy and split 107 students into three groups: English captions, Italian (learner L1) subtitles, and no aids. It was found that learner proficiency influenced vocabulary comprehension. Beginner students benefited the most from native language subtitles whereas more proficient learners benefited from L2 captions. For content comprehension, those that viewed with L1 subtitles outperformed the other groups irrespective of ability level. In another study, Peters et al. (2016) found that while there was an indication that L2 captions could increase from learning gains, there was no significant difference in word meaning gains across the L1 subtitle and L2 caption groups. Birulés-Muntané and Soto-Faraco (2016) also examined the impact of these two on-screen textual aid conditions in addition to a no subtitles condition on L2 English vocabulary learning and comprehension. Participants were split into three groups under each condition and viewed a single episode of an English-language drama. Although results from the study indicated that there were no significant differences in vocabulary learning between the three groups, the L1 subtitles group outperformed the others on plot comprehension. In an interesting study on extensive viewing, Frumuselu et al. (2015) examined the impact of English captions and Spanish subtitles on vocabulary learning.

The participants viewed 13 episodes of the sitcom *Friends* over 7 weeks. Results showed that those who watched with English captions outperformed participants who viewed the episodes with Spanish subtitles, regardless of proficiency in the L2. Finally, in the most recent study, Pujadas and Munoz (2020) focused on extensive TV viewing of secondary school students over eight months. Students watched 24 episodes of a TV series throughout this time in conjunction with English classes. Two main groups were made, one that watched the series with L1 subtitles and another with L2 captions. After the study, it was found that L1 subtitles facilitated more content comprehension than L2 captions and that prior vocabulary knowledge was key in predicting success with either intervention. From the above-mentioned studies, it can be gathered that L1 subtitles tend to be more beneficial in improving comprehension of content (Bianchi & Ciabattini, 2008; Birulés-Muntané & Soto-Faraco, 2016; Markham & Peter, 2003; Pujadas & Munoz, 2020). However, results are mixed concerning vocabulary learning, which suggests that other factors such as proficiency (e.g., Bianchi & Ciabattini, 2008) may be more impactful compared to the on-screen textual aid used.

Dual subtitles

Although research involving L1 subtitles and L2 captions has received ample attention in L2 literature, the topic of dual subtitles has been understudied. Using a quasi-experimental design, Lwo and Lin (2012) investigated the role of different subtitling and captioning options with a group of EFL learners at a junior high school in Taiwan. The participants were divided into four groups—no captions, L1 subtitles, L2 captions, and dual subtitles—and watched two animations through a multimedia program. While L2 proficiency influenced vocabulary acquisition and reading comprehension among the participants, results from the post-tests indicated that textual aids did not significantly impact vocabulary learning nor comprehension. In a more recent study, Wang (2019) examined the effects of the same conditions (L1 Chinese, L2 English, dual subtitles, and no captions) with Chinese university students. The study utilized a counterbalanced design, meaning that all of the participants watched a video under each of the conditions. Based on her findings, mixed results were found regarding both vocabulary learning and listening comprehension. That is, the differing subtitling and captioning conditions affected students differently depending on their class or grade level. In a study in the Japanese EFL context, Raine (2013) compared the use of four subtitling conditions (L1 Japanese subtitles, L2 English captions, dual subtitles, and no subtitles) among four classes of university students, each under one of the viewing conditions. The participants in his study watched a short TED talk video and also took vocabulary pre-test/post-tests to measure if there were any gains in the depth of vocabulary knowledge. The results indicated that most of the students did not improve upon their vocabulary scores, suggesting that dual subtitles may not enhance vocabulary learning to a greater degree than other subtitling conditions. While the findings in these three dual-subtitle studies resulted in mixed findings, more research is needed to better understand the affordances of dual subtitles for L2 learning.

Video streaming for L2 learning

Another area that has received little attention in empirical L2 research is the use of video streaming. However, existing literature on the topic highlights the affordances of the technology for L2 learning. For instance, Wang and Chen (2019) conducted interviews with a group of Taiwanese EFL students who often watched YouTubers for English learning and found several pertinent findings. First, the participants' responses showed that the students primarily used YouTube to access language resources and obtain cultural knowledge. In addition, the participants perceived English learning via YouTube to be a more flexible and interesting method of studying a foreign language compared to formal language instruction. That said, a few disadvantages were also noted by the participants, namely, they commented that watching English YouTubers may not lead to improved English performance. Dizon (2018) also conducted a study on video streaming but in the context of a paid streaming service, specifically Netflix. According to the interview data, participants in the study thought the streaming service was motivating and useful for L2 English learning. On the other hand, one issue that hampered the convenience of the service was that watching TV shows and movies through Netflix took up a lot of data; therefore, some of the participants only streamed whenever they had access to Wi-fi. In a pilot study of Netflix, Alm (2019) examined how the interdependent nature of formal and informal learning—a term she refers to as intra-formal learning—impacted the learning of L2 German. Based on data she collected from reflective reports, Alm concluded that the video streaming service supported the participants' engagement in out-of-class listening activities and promoted their metacognitive awareness. Although these studies were narrow in scope and involved small sample sizes ($N \leq 20$), they point to the usefulness of video streaming services for foreign language learning.

The aforementioned literature demonstrates that on-screen textual aids can be beneficial for vocabulary learning and listening comprehension when watching L2 videos. Nonetheless, research on video streaming for L2 learning has not kept pace with the explosive growth and popularity of these services. Moreover, as Peters and Webb (2018) note, there is a need to investigate how authentic videos, particularly TV shows, affect L2 learning "It is important to study the potential of audio-visual input because TV provides learners with authentic, spoken input and creates opportunities for incidental vocabulary learning. Previous research has mainly used short video clips to investigate the potential of TV. Yet, it is important to investigate whether learning occurs in longer TV programs as well, because such viewing conditions would better reflect authentic viewing behavior" (p. 557). In addition, although reading and listening activities are often used in formal learning contexts, authentic video is less frequently used, ostensibly because it is often perceived to be more difficult for L2 learners (Feng & Webb, 2020). However, a recent study by Feng and Webb (2020) disputes this. The researchers found that there were no significant differences in incidental vocabulary learning among the three modes studied (reading, listening, and viewing) when participants either read, listened, or viewed a TV documentary. This finding demonstrates that watching L2 TV shows may afford similar benefits as L2 reading or listening in terms of incidental vocabulary learning. Lastly, while some L2 research exists on the use of dual subtitles, more studies are needed to better understand if they can help support language learning.

Research Questions

- (1) When EFL students watch L2 videos, do dual subtitles promote incidental vocabulary learning more significantly than L1 subtitles or L2 captions?
- (2) Do dual subtitles promote comprehension of L2 video more significantly than L1 subtitles or L2 captions?

Methodology

Research design

The current study employed a quasi-experimental design to examine the impact that dual subtitles had on Japanese EFL students while viewing a TV episode from an American sitcom. Pre- and post-tests were administered at two different levels (form recognition and meaning recall) to assess the effects that the differing textual aids had on vocabulary learning. An assessment was also administered post-viewing to determine if there were significant differences between the three groups (L1 subtitles, L2 captions, dual subtitles) in terms of listening comprehension.

Participants

A total of 124 male and female EFL students from two private universities in Japan participated at the outset of the study. All the participants were first- or second-year students enrolled in an English listening and speaking class at the time of the study. According to the participants' EIKEN or TOEFL scores, the approximate English language ability of the students was between A1-A2 on the Common European Framework of Reference for Languages (CEFR) proficiency scale. In other words, they were beginner L2 English learners. Five of the classes involved were taught by the researchers while the remaining four classes were taught by other native English instructors. The participants were divided into three groups, each consisting of students from both universities, and viewed the target TV episode under a different subtitling condition (L1 subtitles, L2 captions, dual subtitles). Classes were chosen at quasi-random for which intervention they would receive (English captions, Japanese subtitles, or dual subtitles) during the treatment phase, specifically, participants from both universities were evenly distributed between the three groups (two classes in each group from University A and one class in each group from University B). After removing outliers from the data and any participants who did not complete the post-viewing vocabulary and listening tests, the final number of participants was 32 in each group (N=96).

Research instruments

Two research instruments were developed by the researchers to measure participants' vocabulary knowledge pre- and post-viewing and listening comprehension of the target video. Each test was created by the researchers in English and then translated into the students' L1 by a native Japanese-speaking colleague.

The 30-item vocabulary assessment measured vocabulary knowledge at two levels—form recognition and meaning recall—and was developed according to studies that also assessed incidental vocabulary learning through L2 video (Montero Perez et al.,

2014; Peters et al., 2016). Form recognition was tested by asking students to tick *yes* or *no* to whether or not they had heard or read each word before, whereas meaning recall refers to the participants' ability to correctly translate the target vocabulary items to L1 Japanese or write an English synonym. The 20 target word items were identified by analyzing the script of the TV episode for any words over the 2k frequency level according to the British National Corpus (BNC) and Corpus of Contemporary American English (COCA). This resulted in a list of 26 unique vocabulary items. A pilot study was then conducted with a separate group of Japanese EFL students from both universities who did not take part in the main study (N=43). Words that were not known by at least 70% of these participants in terms of form recognition were then designated as the target vocabulary items for the main study (see Appendix for a breakdown of target words). The remaining 10 words on the vocabulary test consisted of five relatively easy items which appeared in the episode (*lottery, hope, comfortable, weird, borrow*) to aid in test motivation and five non-words retrieved from https://lex tutor.ca/freq/lists_download/pnwords.html to control for guessing. These 10 items (easy words and non-words) were not included in the analyses of the participants' mean vocabulary gains.

The 15-item listening comprehension test was made up of 10 true-false questions and five open-ended short-answer items and related to global and detailed content. The true-false questions were presented in L2 English but retained the same words and sentence structures that were used in the target TV episode so that the difficulty of these items directly matched the difficulty level of the target video (Markham & Peter, 2003). On the other hand, the open-ended questions were presented and also answered in the participants' native language; thus, the students' reading and writing proficiency in the target language did not interfere with their ability to answer these questions.

Language Learning with Netflix

The Language Learning with Netflix Chrome Extension was used to display dual subtitles. According to the website of the extension, "It makes studying languages with films/series more effective and enjoyable" (n.d.). However, the developers of the application provide no evidence to support these claims. Nonetheless, the extension does provide features that may be useful for learning a foreign language. Besides the aforementioned dual subtitles capability, it allows users to control playback speed, which may promote comprehensible input as research indicates that playback speed is often perceived as a major difficulty for L2 students during listening tasks (East & King, 2012; Hasan, 2000). Although the combined use of these features may support vocabulary learning or comprehension in the L2, only the dual subtitles function was used and examined in this study.

Data collection and analysis

Data collection for this study was done during normal classes. Pre-intervention data was taken from the participants in early December 2019 and the video was shown to them in mid-January 2020. A four-week gap was included between the pre- and post-test phases to minimize any effects from students remembering their answers on the pre-test as the items on both tests were the same. During the pre-test phase of the study, students were asked at the end of a class period in December to answer to the best of their

knowledge what words they could recognize and produce L1 or L2 definitions for. No indication was given as to the nature of the test or that they would see a similar test in a month. During a class near the end of the semester in January, students were given a short introduction into the world of American sitcoms, and then another short explanation about what the show, *Friends* was about. Students then watched an episode from the show (specifically season nine episode 18: “The one with the lottery tickets”) and were then immediately given the vocabulary and listening comprehension post-tests in that order. To be clear, the listening test was administered only after the completion of the vocabulary assessment so that the inclusion of the target vocabulary items on the listening assessment would not influence the vocabulary results.

The main foci of statistical analysis for this study are the mean gains in form recognition and meaning recall of the target vocabulary words and the listening comprehension test scores. Descriptive statistics (mean and standard deviation) of the vocabulary scores taken a month before the intervention and immediately after the students watched the video were also included. This data was included to provide a more comprehensive picture of student achievement. Three different statistical analysis methods were used for the data in this study: an ANCOVA test, a one-way ANOVA test, and a Tukey’s pairwise test. Due to considerable differences in pre-test scores in form recognition ($F(2,93) = 4.22, p < .05$), an ANCOVA was used to assess if there were significant differences among the three groups between the mean gains in form recognition and meaning recall vocabulary test scores, controlling for mean pre-test vocabulary scores as a covariate. A one-way ANOVA test was chosen to compare the three groups in terms of their listening comprehension test scores. Finally, a Tukey’s pairwise test was used to ascertain which pairs specifically within the three compared groups exhibited statistically different mean gain scores in vocabulary learning and listening comprehension test scores.

Results and Discussion

Table 2 below illustrates the descriptive statistics of how each group performed on the vocabulary assessments before and after being shown the video. The English captions group did not exhibit very significant form recognition or meaning recall gains with mean (M) scores staying at .25 and .22 respectively. However, a high standard deviation (SD) in form recognition (FR) suggests a high amount of variability in scores in this group. Mean scores for both FR and meaning recall (MR) are higher in the Japanese subtitles group than the English captions group (1.91 FR gain and 0.91 MR gain), which suggests that native language subtitles are more effective for vocabulary learning than L2 captions. However, standard deviation scores for both variables are also higher than the English captions group. The dual subtitle group’s FR mean scores are on average lower than the Japanese subtitles group (1.44) and MR gains are only marginally higher (0.94). Scores show a slightly less variance with a lower SD for FR gain, however, MR gain SD is higher. Overall, the results of the vocabulary tests indicate that the use of Japanese subtitles and dual subtitles produce higher gains in vocabulary learning than English captions.

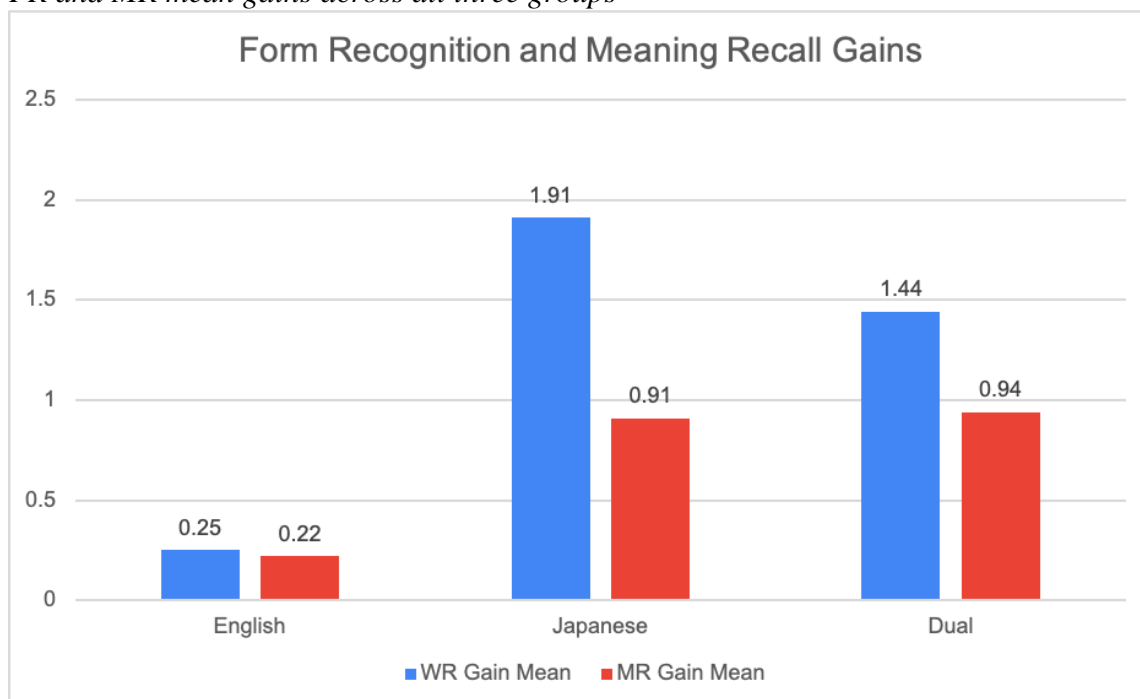
Table 2
Vocabulary pre- and post-test scores

Group	Form recognition (FR)						Meaning recall (MR)					
	Pre-test		Post-test		Gain		Pre-test		Post-test		Gain	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
English captions	4.78	2.80	5.03	2.95	0.25	2.59	0.91	1.03	1.13	0.91	0.22	0.94
Japanese subtitles	4.22	2.89	6.13	3.33	1.91	2.93	1.16	1.53	2.06	2.24	0.91	0.96
Dual subtitles	6.31	3.24	7.75	3.79	1.44	2.06	1.59	1.64	2.53	1.76	0.94	1.39

As stated above, ANCOVA was chosen to test the three on-screen textual aid conditions while taking into consideration pre-test vocabulary scores due to there being a noticeable difference in them. When controlling for pre-test scores, significant differences in FR mean gains were found between all three groups ($F(2, 92) = 4.06, p < .05$). Tukey post hoc pairwise tests show FR mean gains were only significant between English and Japanese groups at $p < .05$. English captions vs. dual subtitles and Japanese subtitles vs. dual subtitles did not show a significant difference in FR gains.

Similar to the FR scores, ANCOVA also revealed a significant difference between the three groups for MR scores ($F(2, 92) = 4.535, p < .05$). According to Tukey post hoc pairwise tests, both Japanese and dual subtitle groups were found to be statistically significant when compared to the English group (both groups $p < .05$). Japanese and dual subtitle groups were not found to be statistically significant when compared with each other. The results of these statistical analyses support the descriptive statistics and highlight the superiority of L1 subtitles and dual subtitles over L2 captions for vocabulary learning among the participants in this study. These findings are in contrast with previous research involving dual subtitles as the Lwo and Lin (2012) and Wang (2019) studies resulted in mixed findings when comparing the effects of different captioning/subtitling conditions on vocabulary learning. Based on the results of these prior studies, other factors such as L2 proficiency or grade level may have had a greater impact on vocabulary learning than the specific textual aid used, whereas the findings from the present study indicate that L1 subtitles, either alone or in conjunction with L2 captions, positively influence vocabulary learning. Furthermore, the results are partially aligned with Mayer's (1997, 2001) theory of multimedia learning, as only two out of the three on-screen textual aid conditions (Japanese subtitles and dual subtitles) led to statistically significant vocabulary learning gains. This suggests that the use of dual subtitles may not overburden L2 learners, but rather supports the acquisition of unfamiliar vocabulary, although this may be primarily due to the presence of L1 subtitles rather than the combination of L1 subtitles and L2 captions.

Figure 1
FR and MR mean gains across all three groups



Listening comprehension scores test scores are depicted in Table 3. On average, the Japanese subtitles group scored two points higher than the English captions group. However, the dual subtitles group outperformed both of these groups (10.75), but SD was also the highest at 2.79, indicating a higher level of variability among the participants in that group. These descriptive statistics suggest that dual subtitles allow language learners to better understand L2 input when compared to either L1 captions or L2 subtitles alone.

Table 3
Listening comprehension test scores

Group	M	SD
English captions	7.00	2.21
Japanese subtitles	9.06	2.20
Dual subtitles	10.75	2.79

According to a one-way ANOVA test, there was a statistically significant difference in listening comprehension scores, $F(2,29) = 19.30, p < .01$. A Tukey post hoc pairwise test also confirmed the statistical significance across all three groups with differences at $p < .01$ for all except for Japanese and dual subtitles only significant at $p < .05$. Although prior dual subtitles studies have reported mixed findings concerning the comprehension of L2 input (Lwo & Lin, 2012; Wang, 2019), the results from this study suggest that the subtitling method may be more effective in supporting listening comprehension, at least in terms of Japanese EFL learners.

Table 4
Summary of vocabulary results

Form recognition	Meaning recall
L1 subtitles > L2 captions	L1 subtitles > L2 captions
L1 subtitles = dual subtitles	L1 subtitles = dual subtitles
Dual subtitles = L2 captions	Dual subtitles > L2 captions

In summary, Japanese subtitles and dual subtitles best supported vocabulary learning and listening comprehension. Students who used these textual aids outperformed the English captions group on vocabulary form recognition and meaning recall. With that said, only the Japanese subtitles group showed significant differences in both form recognition and meaning recall gains when compared to English captions, while a significant difference was found between the English captions and dual subtitles groups in meaning recall gains only (see Table 4 for a summary of vocabulary results). A significant difference was not found in the vocabulary gains between the Japanese subtitles and dual subtitles groups, which indicates that there is no difference between the overall effect of these two on-screen textual aids on vocabulary learning. These mixed results largely align with the findings from previous studies examining dual subtitles (Lwo & Lin, 2012; Raine 2013, Wang, 2019).

One potential explanation for the results found in the present study is that some L2 learners may find it difficult to hear and understand new L2 vocabulary when L1 aids are not present. This is of particular importance as students may struggle to learn unfamiliar words in real-time given that playback speed is a common challenge mentioned by L2 learners (East & King, 2012; Hasan, 2000). Another possible reason for the difference in vocabulary learning between Japanese/dual subtitles versus English captions is the L2 proficiency of the participants as they were beginner learners and might have needed L1 subtitles to adequately understand any new words that were introduced in the target video. In terms of listening comprehension, participants who viewed the video with Japanese subtitles performed better than those who used English captions, while the dual subtitles group did significantly better than either of these groups on the listening test. Again, the fact that novice learners took part in the study likely impacted the participants' listening test scores, i.e., beginners are less likely to understand L2 input without any L1 support, and this is highlighted by the low mean score seen in the English captions group on the listening assessment.

Conclusion

The shift from traditional video consumption to video streaming has given language learners easy access to authentic L2 video content. As a result, more learners are using video streaming as an informal method to learn more about the target language and culture. These changes have given rise to tools such as Language Learning with Netflix which allow for more intentional language learning through the use of dual

subtitles and control of playback speed. However, CALL research in this area is still limited; thus, the present study sought to fill this gap in the literature to investigate how the combination of Netflix and dual subtitles could enhance L2 English vocabulary learning and listening comprehension. Based on the results of the study, it was found that dual subtitles significantly promoted vocabulary learning, albeit to a slightly lesser degree than Japanese subtitles. On the other hand, dual subtitles better-supported listening comprehension when compared to the other two on-screen textual aid conditions. Yet, caution is needed when interpreting these results as it is not known if the presence of L1 subtitles was the primary reason for the significant differences between the dual subtitles and English caption groups. Even so, the results are promising and at the very minimum indicate that the inclusion of L2 captions alongside L1 subtitles does not interfere with vocabulary learning or comprehension.

Some pedagogical implications can be made according to the findings of this study. To begin, the Language Learning with Netflix application could be recommended to L2 learners who already use Netflix in their daily lives as a way to independently study the target language and expand their L2 vocabulary. The results of the study suggest that dual subtitles may be beneficial for vocabulary learning and comprehension, so using the application could help L2 students utilize their informal language learning practices for intentional foreign language learning. Furthermore, as recommended by Peters and Webb (2018), language teachers could show TV episodes or even a full season of a TV program in-class while utilizing the Language Learning with Netflix extension to enable dual subtitles. Beginner learners especially might benefit from the use of dual subtitles when compared to the sole use of target language captions as they may need native language support to sufficiently understand a full-length TV episode in an L2.

Although the findings from this study point to the potential of video streaming and dual subtitles for vocabulary learning and improved L2 comprehension, several limitations must be addressed. First, the participants came from two private universities in Japan and as a result, broad generalizations from the findings cannot be made. In addition, the higher pre-test vocabulary scores in the dual subtitles group might indicate a higher L2 listening/reading ability, as research suggests that vocabulary knowledge and listening/reading ability are linked (Cheng & Matthews, 2016). In other words, the participants in this group could have had an advantage in L2 proficiency over the other students in the study, which might have skewed their performance on the listening comprehension test. Furthermore, similar to other L2 video studies (e.g., Birulés-Muntané & Soto-Faraco, 2016; Markham & Peter, 2003; Peters, et al., 2016), the results of this study were based on a single intervention. Thus, a longitudinal design such as in Frumuselu et al. (2015) and Pujadas and Munoz (2020) would allow researchers to better understand if dual subtitles can have a long-term effect on L2 vocabulary learning and listening development. Moreover, as there was no statistical significance in vocabulary gains between the dual subtitle and L1 subtitle groups, there is a chance that the dual subtitles group mainly focused on L1 subtitles instead of L2 captions. At this stage it is not known what happened in this respect, however, further study with eye-tracking software could lend considerable insight into this issue. Lastly, only the dual subtitle feature of the Language Learning with Netflix application was explored. Therefore, a future study could examine the combined and/or separate use of reduced playback speed and dual subtitles to see how these aids impact different aspects of L2 learning.

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Appendix. Target vocabulary items

Target word	Part of speech	Word frequency level	Frequency of occurrence
agency	noun	3k	1
fleshy	adjective	3k	1
maturity	noun	3k	1
principle	noun	3k	1
surgery	noun	3k	1
yield	noun	3k	1
betray	verb	4k	1
vanish	verb	4k	1
butt	noun	5k	2
fungus	noun	5k	1
stink	noun	5k	1
tow	verb	5k	2
psychic	noun	6k	5
sophistication	noun	6k	1
carcass	noun	7k	1
dude	noun	8k	1
spank	verb	9k	1
genie	noun	11k	1
skittish	adjective	12k	1
squish	verb	14k	1