An Examination of the Use of Subtitles in Learning L2 Collocations[*]

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Abstract—**Exposure to audiovisual input has been recognised as an engaging approach for implicit vocabulary learning. Recent studies have compared the effectiveness of different types of subtitling in enhancing viewers' learning gains in single word vocabulary, but research on multiword vocabulary acquisition, especially collocations, remains limited. The present study aims to examine which type of subtitling (i.e., English–Chinese subtitles or English-only subtitles) is more effective in L2 implicit collocation learning, and it attempts to identify Chinese L2 learners' learning difficulties when acquiring collocations. Experiments and interviews were conducted with 66 Chinese undergraduates to investigate their acquisition, in terms of both form recognition and meaning recall. Results indicate that compared with English-only subtitles, the effectiveness of English–Chinese subtitles in enhancing the acquisition of L2 collocation meaning is more significant, although English-only subtitles can be more helpful in reinforcing collocation forms. The results of the interviews also suggest that participants are more likely to encounter difficulties with contextually marked phrasal verbs and idioms, and affective filters should be considered when analysing individual differences. The findings support the use of L1 in subtitles to improve the learning efficiency of vocabulary meaning, as well as to help teachers identify the sources of students' learning difficulties.**

Index Terms—**incidental vocabulary learning, subtitles, audio-visual input, L2 collocations**

I. BACKGROUND AND RATIONALE

Recent advances in digital technologies have reshaped the English pedagogical landscape. Emerging teaching approaches that highlight the effective use of multimodal L2 materials, such as Computer Assisted Language Learning (CALL), are being intensively incorporated into teaching practice by universities in China. Combining both sound and image, L2 audiovisual input creates an engaging learning environment where learners can access authentic language resources via mobile devices without time and space limits. The advantage of methods using audiovisual input has been particularly identifiable during the COVID-19 pandemic, since students struggle to concentrate on online instruction and their learning motivation in such a situation tends to be weak.

L2 audiovisual input can benefit not only intentional learning inside the classroom but also provide desirable conditions for incidental learning. Incidental learning refers to the "learning which accrues as a by-product of language usage, without the intended purpose of learning a particular feature" (Schmitt, 2010, p. 29). Incidental learning gains are potentially significant, as, thanks to globalisation, college students in China today have frequent exposure to English TV series in daily life. Furthermore, as the dominant way in which native speakers acquire their first language during childhood, incidental learning is considered necessary in L2 vocabulary development as well. Empirical studies have confirmed the decisive role of multimodal input in L2 learners' acquisition of words (Webb, 2010; Webb, 2011; Peters & Webb, 2018) and formulaic sequences (Lin, 2014). Recent research also includes inquiry on how to optimise the implicit learning outcomes under such conditions, with a particular focus on enhancement techniques (Duy & Peters, 2021; Majuddin et al., 2021).

Subtitling is one of the most frequently employed enhancement techniques, but its effectiveness remains at issue. According to the "redundancy principle" (Sweller, 2005) and "limited working memory assumption" (Winke et al., 2013), the presence of audio, imagery and onscreen text will in fact interfere with each other rather than contribute to learning. However, premised on the "noticing hypothesis" (Schmidt, 2001) that input can only develop into the intake when it is consciously noticed, subtitles have the potential to increase L2 learning gains as they draw viewers' attention to the language itself. Meanwhile, as "dual coding theory" (Paivio, 2008) suggests, subtitled videos realise the co-occurrence of the vocabulary's visual and audio presentation, which can activate both the verbal and nonverbal parts of the brain's processing system. This improved working efficiency has also been further evidenced by a series of empirical studies (Montero Perez et al., 2018; Peters et al., 2016), highlighting subtitles' significant role in reinforcing form recognition and meaning recall.

Following this, which type of subtitles can lead to optimal incidental learning efficiency is worth investigation. With regard to the information load given in the subtitles, researchers have demonstrated that fully subtitled videos are more

helpful overall for learners' vocabulary acquisition than keyword-subtitled and non-subtitled materials (Montero Perez et al., 2014; Winke et al., 2013). Another aspect that causes heated discussion is the language choice for subtitles. The presence of L1 in subtitles is potentially effective in helping viewers construct correct form–meaning links, as the access to meaning L1 subtitles provide is relatively explicit compared with L2 subtitles (Laufer, 2005). Although this assumption has been confirmed by empirical data (Mardani et al., 2016), there are nevertheless empirical results suggesting that L2 subtitles help to increase L2 lexical learning gains. However, further research is required, as the research subjects involved in these empirical studies varied, either demographically or in terms of language proficiency levels.

Another factor ignored by the above studies is how subtitles can benefit the incidental learning of collocations rather than single-word items. Knowledge of collocations is significant in developing L2 learners' communicative capacities (Schmidt, 2010), especially in reducing speakers' cognitive load to improve the fluency of their L2 production (Wray, 2017). However, Chinese L2 learners tend to dedicate more time to single-word items than to collocations, and they are often reluctant to focus on collocations due to their low meaning transparency. Therefore, the need arises to explore how Chinese L2 learners can effectively acquire collocations outside the classroom and to identify the most challenging groups of collocations for Chinese L2 learners.

II. LITERATURE REVIEW

A. L2 Collocation Learning Difficulties

According to previous research, L2 learners' collocational competency lags far behind their single-word vocabulary proficiency (Bahns & Eldaw, 1993). The challenges in learning collocations can be explained from three perspectives: the learner-related, the cognitive, and the linguistic.

1. Learner-related Perspective

L2 learners' inappropriate learning strategies can exert a negative influence on their development of collocational competence. Chinese L2 learners' reliance on the rote memorisation of L1 literal translation, for example, is argued to be responsible for the "odd word combination" mistakes in the L2 collocation production process (Liu, 2010). This learning strategy fails to take the different levels of L1–L2 congruence into account, as it assumes that the meaning of L2 collocations is equivalent to their L1 word-for-word translation. Another obstacle in collocation learning lies in Chinese L2 learners' blind pursuit of "uncommon words" rather than "accurate words". As identified in Ying and O'Neil's (2009) research on the "aware approach", instead of noticing how common words are paired to produce a new meaning, Chinese L2 learners tend to pay excessive attention to the unfamiliar words appearing in the input.

2. Cognitive Perspective

L2 adult learners develop collocations differently from their native counterparts, and this constitutes another learning barrier. Compared with native children, L2 adult learners tend to behave more analytically during the acquisition, as they have developed much higher cognitive abilities through their L1 learning experience (Schmidt, 2001). Instead of processing collocations based on chunks, these highly analytical learners start L2 learning from their previous knowledge about individual words, that is, they break collocations down word by word and attach the available concepts in their mind to each constituent part. Consequently, these L2 learners presume any word combinations with a similar connotation are equally possible (Wray, 2002), which explains why they find it difficult to distinguish between collocations that are similar in form.

Such an analytical processing pattern requires time and places demands on an L2 learner's working memory, thus leading to their difficulties in collocation storage. According to Miller (1956), the amount of information that a person's short-term memory can process depends on the number of chunks rather than on the amount of information stored within each chunk. On this basis, it could be inferred that a person's memory capacity will expand if they tackle collocations based on large units (e.g., multiword chunks) rather than on small units (e.g., single words). Thus, native children who handle collocations on a chunk basis have an advantage over their non-native counterparts in terms of efficiency of cognitive processing, and L2 learners' collocational learning efficiency will therefore suffer due to their constraints in cognition.

3. Linguistic Perspective

From a linguistic standpoint, it is assumed that there are three main L2 learning barriers: 1) the low semantic transparency of L2 collocations, 2) the arbitrary nature of collocations, and 3) the low degree of L1 and L2 congruence. According to Macis and Schmitt (2016), as opposed to literal collocations, whose meanings are the simple sum of literal meanings of the component words, there exists a wealth of figurative collocations (i.e., the collocations whose meanings cannot be derived from the constituent words) and duplex collocations (i.e., the collocations which present both literal meanings and figurative meanings) that appear to be challenging to learn. The authors show that these word combinations seem to exhibit a low level of semantic transparency and are particularly problematic in L2 learning (ibid.). Furthermore, the semantic arbitrariness in the selection of word combinations is also argued to present a particular difficulty for L2 learners' collocation development (Nesselhauf, 2003). In terms of the language learning issue,

the term "arbitrariness" is typically interpreted in an intralinguistic sense, that is, "a collocation is arbitrary because it [its word combination] cannot be predicted by syntactic or semantic rules" (Smadja & McKeown, 1991, p. 230). The given example is that although "strong" and "powerful" are synonymous in meaning, "tea" can only be modified by "strong" rather than "powerful", and "car" should be modified with "powerful" rather than "strong" and there are no rules that can be referred to in order to explain this convention(ibid.). Such an intralinguistic view emphasises the unpredictability or unconventionality of the word pairing, which could be argued to echo the figurative feature of collocations mentioned above. Although collocations are believed to be highly arbitrary, some researchers (e.g., Liu, 2010) indicate that collocations are probably not as "unmotivated" or "arbitrary" as people initially suppose. They suggest that collocations are in fact motivated and their meanings analysable, because, as some studies show, particles used in phrasal verbs typically present a great deal of coherence in meaning (Condon, 2008).

In addition to the two aforementioned linguistic aspects, L2 collocation learning difficulties can also be attributed to the inefficient interlingual transfer between the first language and English. According to Nesselhauf (2003), there are varying degrees of congruence between the first language and English, and such congruence can be identified as the degree to which the collocations are natural in both languages. The previous study on congruence has demonstrated that L2 learners tend to make collocational errors when the interlingual congruence is not so evident, as they tend to heavily depend on word-for-word L1 translation when producing collocations (Sun & Wang, 2003). Therefore, the role of L1 influence cannot be overlooked when analysing L2 learners' production of questionable word combinations.

B. Previous Studies on Incidental L2 Collocation Learning

In response to the sources of L2 learners' difficulty, as discussed in the preceding part, many researchers have started to identify possible practical approaches to collocation learning. While the role of explicit instructions in L2 collocation learning has been extensively discussed (e.g., Sun & Wang, 2003; Webb & Kagimoto, 2010), the positive role of implicit collocation learning has also been confirmed by multiple empirical studies (e.g., Webb et al., 2013; Pellicer-Sanchez, 2017). These studies focus on how collocations are acquired through the reading process, and other input types have been insufficiently investigated. In terms of incidental collocation learning occurring during the reading process, Webb et al.'s (2013) research, for instance, further confirms previous research that L2 learners can acquire collocational knowledge through repeated encounters. On this basis, the results also indicate that implicit learning gains would be reinforced if learners read the text while listening to its audio version. As identified by the above research, the effectiveness of reading while listening suggests the potential benefit of using audio and visual inputs together to improve implicit collocation learning outcomes. Thus, another form of input that also incorporates audio and visual inputs, TV episode viewing, is examined in the present study.

In response to the problem and research gap outlined above, this study aims to address the following research questions:

[1] Are English-only subtitles more effective than English–Chinese subtitles in helping Chinese L2 learners to acquire the form of collocations incidentally?

[2] Are English-only subtitles more effective than English–Chinese subtitles in helping Chinese L2 learners to acquire the meaning of collocations incidentally?

[3] What are the sources of learning difficulties for Chinese L2 learners in acquiring collocations?

III. METHODOLOGY

A. Participants

Sixty-six Chinese EFL students who had studied in a Sino-U.S. accounting undergraduate program for three months participated in the research. All the participants were first-year students from a Tier-2 university in China, and they presented an intermediate level of English, namely, B1 level according to the Common European Framework of Reference (CEFR). Intact sampling was applied to recruit the participants in this quasi-experimental study. There were 32 participants in the English–Chinese subtitles group and 34 in the English-only subtitles group.

B. Data Collection Instruments

1. Collocation Tests

An online test involving two tasks assessed participants' knowledge of target collocations. The first task aimed to measure participants' ability to recognise the form of target collocations, while the second focused on their ability to recall the meaning. In the form recognition task, participants were given target collocations in which one constituent word was missing, and they had to choose the correct word from a list of three or tick the "I don't know" option. The meaning recall task required participants to provide the correct definition, synonym or Chinese translation for each given collocation, and the "I don't know" choice was also available in this task.

2. Interviews

Semi-structured interviews were conducted with six participants from each group due to time limit, and ten questions were used as a guide in case the discussion strayed from the focus of the research questions. The issues explored in the interview included but were not limited to participants' reflections on the collocation tests, their perceptions about

collocation learning, their perceptions about implicit learning through viewing, and the role of subtitles in such learning conditions.

C. Procedure

1. Pretests, Immediate Posttests, and Delayed Posttests

Pretests, immediate posttests, and delayed posttests were used in the study. Participants completed the meaning recall task from the online collocation test in the pretest stage. The form recognition task was excluded from the pretest session because of concerns about the test learning effect. After completing the meaning recall task in the pretest session as a comprehension check, the participants were assigned to watch a video with English-only or English–Chinese subtitles. The immediate posttests were then administered to the participants, in which they had to complete both the form recognition task and meaning recall task. Next, a ten-minute interview was conducted and audio recorded. One week later, these participants were invited to take the delayed posttests, in which their knowledge of the target collocations was tested again, using the same test instruments.

2. Audiovisual Input

The material selected as the audiovisual input was Episode 3 from Season 1 of *Young Sheldon*, produced by Columbia Broadcasting System (CBS). The episode lasts approximately 20 minutes and includes 2,324 words in total. To test its validity, a lexical profile analysis of the transcript was conducted using RANGE and BNC/COCA (Nation, 2012). As the results suggest, 85.2% of the vocabulary could be found in the most frequent 2,000-word families, and 9.93% of the vocabulary fell within the range of the 3,000- to 5,000-word families. According to Van Zeeland and Schmitt (2012), adequate comprehension of oral discourse requires 90–95% lexical coverage. As all the participants demonstrated an intermediate proficiency level of English, their vocabulary size and the onscreen visual support (i.e., subtitles and visual information) arguably provided sufficient conditions for them to interpret meaning from context during TV viewing and thus access comprehensible input.

D. Data Analysis

The results of collocation tests were scored, with 5 points for a correct response and 0 points for an incorrect response. Test scores were entered into SPSS 26.0 and analysed through ANOVA with repeated measures. To address the third research question, thematic analysis was applied to analyse the content of interview transcripts from 12 participants, and the correct rate of each target collocation was also calculated as a reference.

IV. RESULTS

A. Findings from Collocation Tests

The results of the pretest showed that the two groups' prior collocational knowledge was not statistically different ($F = 0.001$, $p = .979$). As the data were normally distributed, an ANOVA with repeated measures was conducted to compare the effectiveness of English-only subtitles and English–Chinese subtitles.

TABLE 1
DESCRIPTIVE STATISTICS OF MEANING RECALL TEST SCORES

	English-only Subtitles N = 34	English–Chinese Subtitles N = 32	F	Sig.
Pretest (Mean ± SD)	23.68 ± 12.33	23.59 ± 12.52	.001	.979
Immediate Posttest (Mean ± SD)	43.24 ± 18.04	68.13 ± 12.16	42.630	<.001
Delayed Posttest (Mean ± SD)	25.59 ± 9.27	42.19 ± 13.91	32.903	<.001

The results indicate that subtitle type can significantly affect participants' acquisition of collocation meanings ($F = 23.660$, $p < .001$; Table 3). According to the descriptive statistics of meaning recall tests, shown in Table 1, participants from the English-Chinese subtitles group ($M = 68.13$, $SD = 12.16$) scored significantly higher in the immediate posttest than those from the English-only subtitles group ($M = 43.24$, $SD = 18.04$). Given that members of the English-Chinese subtitles group gained approximately five more collocations on average than their counterparts, English–Chinese subtitles were arguably more advantageous in facilitating the initial acquisition of meanings. However, the gap between the two groups was narrowed in delayed posttests, with the English–Chinese subtitles group ($M = 42.19$, $SD = 13.91$) and English-only subtitles group ($M = 25.59$, $SD = 9.27$) acquiring 8.43 and 5.12 collocations respectively. The striking fact of the English-only subtitles group was that participants' knowledge about target collocations almost returned to the previous level in the delayed posttest, even though there had been noticeable learning gains of, on average, 8.90 collocations immediately after the viewing activity.

TABLE 2
DESCRIPTIVE STATISTICS OF FORM RECOGNITION TEST SCORES

	English-only Subtitles N = 34	English–Chinese Subtitles N = 32	F	Sig.
Immediate Posttest (Mean ± SD)	84.71 ± 6.15	73.91 ± 5.92	52.726	<.001
Delayed Posttest (Mean ± SD)	57.35 ± 14.10	55.94 ± 14.17	.165	.686

In terms of the results from form recognition tests (Table 2), participants exposed to English-only subtitles ($M =$ 84.71, $SD = 6.15$) scored significantly higher than their counterparts ($M = 73.91$, $SD = 5.92$) in the immediate posttest, $F = 52.726$, $p < .001$. This finding indicates that English–only subtitles can generate approximately two more collocations for incidental learning gains than English-Chinese subtitles. However, this advantage became less evident after some time had elapsed, as the delayed posttest scores were not significantly different ($F = .165$, $p = .686$).

TABLE 3
RESULTS OF ANOVA WITH REPEATED MEASURES

		Sum Squares	of df	Mean Square	F	Sig.
Meaning Recall	Subtitles	9420.967	1	9420.967	23.660	<.001
	Time	35319.488	1.19	29681.803	264.046	<.001
	Subtitles*Time	5333.629	1.19	4482.277	39.874	<.001
Form Recognition	Subtitles	1229.836	1	1229.836	10.007	.002
	Time	16930.398	1	16930.398	149.406	<.001
	Subtitles*Time	725.853	1	725.853	6.405	.014

As shown in Table 3, there also existed a significant main effect of time on the average number of collocations participants acquired in both meaning recall ($F = 264.046$, $p < .001$) and form recognition tasks ($F = 149.406$, $p < .001$). As the results of collocation tests indicated, the subtitled audiovisual input can contribute to sizable learning gains in the immediate posttests, while participants suffered different degrees of learning loss during the one-week interval. As the interaction effect of subtitles and time was significant, with both p values less than .05, line-plots were generated to clarify the exact nature of the interaction (Figure 1 and 2):
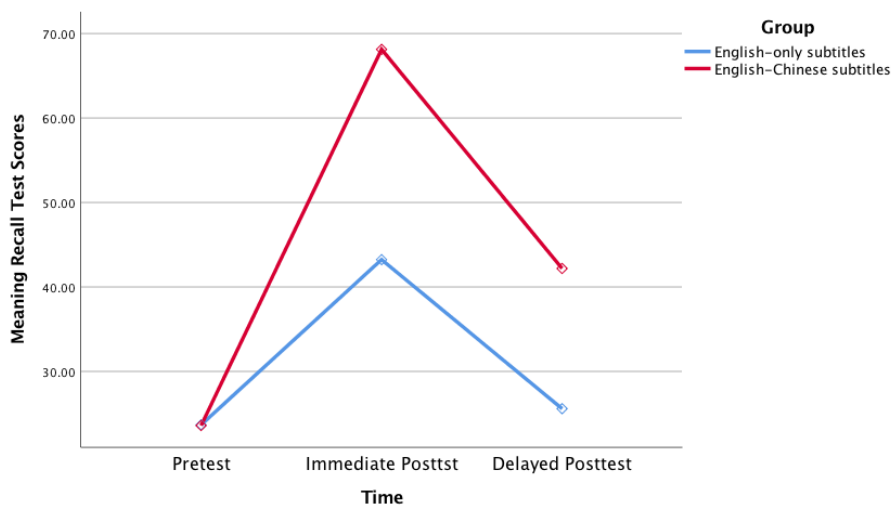

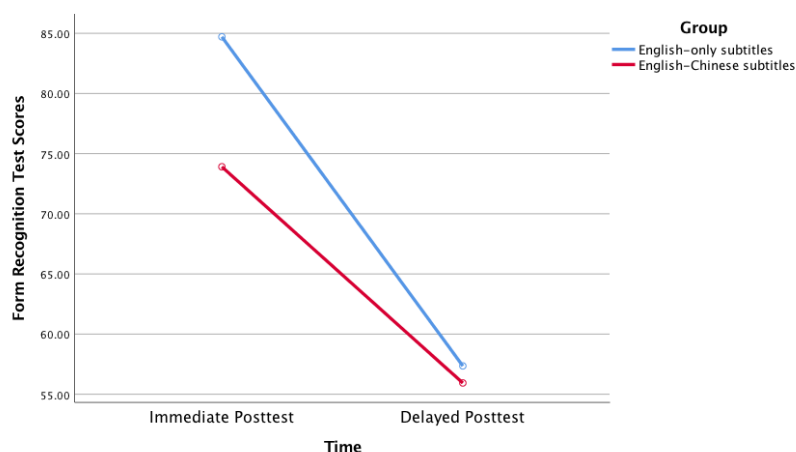Figure 1: Test Performance of Meaning Recall Tests

Figure 2: Test Performance of Form Recognition Tests

B. Findings from Interviews

Six themes emerged from 12 participants' reflections on the viewing activity and collocation tests. Below, the analysis of themes and codes is discussed in connection with the findings from the quantitative data.

1. Acquiring Phrasal Verbs and Idioms Is More Challenging than Acquiring Other Collocations

Participant 10: *I think these collocations are the most difficult (pointing at the phrasal verbs). On top of that, I think "dollars to doughnuts" and "powder one's nose" are also tricky. They are slang expressions, right? I think only native speakers can understand them.*

The above excerpt potentially suggests a self-perceived difficulty ranking for the target collocations, as many participants (participants 2, 3, 4, 5, 6, 9, 11) highlighted similar words in the interview. Participants' comments on their collocation tests were also found to be considerably consistent with their test performance, in which they scored relatively low in tasks for phrasal verbs (66% correct rate) and idioms (59% correct rate) compared to tasks for other collocations (73% correct rate).

2. Perceived Source of Difficulties in Acquiring Phrasal Verbs

Participant 3: *This type of collocation [phrasal verbs] always has more than one meaning, and I think it's difficult to memorise them all and accurately understand them in different situations.*

Participant 6: *I think verb plus preposition collocations are quite difficult, because they are very abstract, and you cannot guess the meaning. I mean, even though I can relate to my previous knowledge about individual words, I still cannot figure out the meaning of the whole collocation.*

The above responses indicate that the participants were in fact highly conscious of the polysemous and figurative nature of phrasal verbs. Almost all participants identified these two aspects as the primary source of difficulties in acquiring collocations.

Another difficulty of learning phrasal verbs lies in participants' confusion about collocation pairs with similar forms. For example, some participants (1, 4, 5, 12) indicated that they would be very likely to confuse the meaning of the collocations "pull over" and "pull up" several days later, although they could identify one from the other at that moment.

3. Perceived Source of Difficulties in Acquiring Idioms

Participant 6: *I can understand the general idea of the conversations without knowing the meaning of this idiom. So I did not pay much attention to it.*

In addition to phrasal verbs, some participants (1, 2, 6, 7, 11) attributed their inability to recall the meaning of idioms to the weak relationship between idioms and the whole context. As participant 6 reports above, she failed to notice idioms while viewing, as these new idioms did not interfere with her ability to understand the "gist" of the conversation.

4. Overall Positive Response to the Use of Subtitles in Audiovisual Input

In terms of the use of subtitles in audiovisual input, almost all the participants were conscious of the progress they had made in the immediate posttest, and they recognised the effectiveness of subtitles in reinforcing incidental vocabulary learning. As some of them explained, subtitles can help eliminate the barriers in listening comprehension and draw viewers' attention to language itself:

Participant 3: *I think I'm poor at English listening; subtitles can help me to understand the content better, and at the same time, help me to recognise the collocations.*

Participant 10: *I think subtitles can help me to concentrate on the language itself. From the perspective of language learning, I think subtitles are helpful.*

5. Positive and Negative Responses to the Use of English-only Subtitles

English-only subtitles, to be specific, were regarded as an effective enhancement that can allow viewers to focus more on the forms of the collocations:

Participant 5: *I think English subtitles can allow me to become more familiar with them, I mean, I could pay more attention to what these collocations look like. Therefore, when I encountered them afterwards on other occasions, I could recognise them quickly.*

This finding can be further confirmed by the results of the collocation tests, as the participants from the English-only subtitles group outperformed those exposed to English-Chinese subtitles in form recognition tasks.

However, participants' attitudes towards the role of English-only subtitles might be different when it comes to learner-related factors. Participant 10 expressed her preference for English-only subtitles, suggesting that she would be more motivated with no Chinese subtitles.

Participant 10: *If there were no Chinese translation, I think I would focus more on the language. Because without the assistance of Chinese subtitles, I felt the drive to figure out the vocabulary and plot all by myself. I had to observe it.*

Some other participants, though, reported that they felt nervous when there were only English subtitles available:

Participant 2: *I always felt anxious while viewing without Chinese translation because I was unsure if I understood the words correctly or had missed something important. The more anxious I felt, the more likely I would lose confidence. Finally, I ended up missing more running texts.*

6. Positive and Negative Responses to the Use of English–Chinese Subtitles

Contrary to the mixed views expressed about English-only subtitles, English–Chinese subtitles were perceived by most participants to be effective in promoting the meaning acquisition, and participants highlighted the dual subtitles' potential to improve viewers' accuracy of comprehension:

Participant 11: *As for English–Chinese subtitles, I think Chinese subtitles can provide a comparison against the original English texts. When I'm not sure about my guess, Chinese subtitles can help me to check whether my guess is right or wrong.*

Participant 9: *Chinese subtitles can help me to check whether my guess is correct. For example, in the beginning, I thought "insurance purposes" meant the goal of a specific insurance plan, but when I checked the Chinese subtitles, it turned out to have a completely different meaning.*

This echoes the results of the meaning recall tests, in which the data show that participants exposed to English–Chinese subtitles could acquire five more collocations on average than those who viewed the TV episode with English subtitles only. Although the role of Chinese subtitles as a "meaning checker" was mentioned by most participants, there also existed the view that the presence of two languages on screen could be a distraction and a source of laziness. As participant 6 suggested, when exposed to English–Chinese subtitles, she would depend too much on L1 translation and this would potentially slow down her language development:

Participant 6: *With English–Chinese subtitles on, I was likely to focus on the Chinese translation only, which I think does nothing to help my collocational development and listening comprehension.*

V. DISCUSSION

A. Research Question 1: Are English Subtitles More Effective than English–Chinese Subtitles in Helping Chinese L2 Learners to Acquire the Form of Collocations Incidentally?

This study demonstrates that English-only subtitles are more effective than English–Chinese subtitles in improving viewers' acquisition of forms. The results of both collocation tests and interviews support this conclusion. English-only subtitles can create learning gains in the form of two more collocations acquired on average than were acquired by viewers of English–Chinese subtitles, according to the results of immediate posttests. The effectiveness of English-only subtitles is also verified by participants' beliefs that such subtitles can result in an increased focus on the form of collocations. This conclusion is consistent with the findings of eye-tracking research (Winke et al., 2013).

However, although the immediate posttest results showed that English-only subtitles made a noticeable contribution to short-term learning outcomes, the analysis of participants' test performance did not reveal a significant difference between the English-Chinese subtitles group and the English-only subtitles group in long-term retention. Because viewers' prior vocabulary knowledge can have a significant impact on their vocabulary learning outcomes (Peters & Webb, 2018), and because participants' prior collocational knowledge was not considered in the form recognition tasks for this study, the quantitative findings of this part of the study should be interpreted with caution.

B. Research Question 2: Are English Subtitles more Effective than English–Chinese Subtitles in Helping Chinese L2 Learners to Acquire the Meaning of Collocations Incidentally?

English–Chinese subtitles were found to be more effective than English-only subtitles in contributing to viewers' meaning recall success. This result is supported by the findings from both collocation tests and interviews. As

participants' test performance in meaning recall tasks indicates, on average, the learning gains that occurred in the English–Chinese subtitles group were almost twice as many as in the English-only subtitles group. Participants' perceptions as expressed in the interviews also reinforced this finding, suggesting that they felt reassured if there were L1 translations available for meaning-checking purposes, and because of this, they gave more accurate responses.

Participants' superior performance in the English–Chinese subtitles group can be explained in two ways. Firstly, in line with Paivio's (2008) dual coding theory, which holds that the more paths that co-occur for processing, the more cognitive involvement will be required, English–Chinese subtitling allows participants to process three sources of information (i.e., audiovisual input, L1 input and L2 input) simultaneously. Therefore, the parallel processing of such a bilingual input could arguably lead to better performance in target language encoding and meaning retrieval. The other explanation relates to Lambert et al.'s (1981) concept of optimal reading strategy. Subtitled viewing can be regarded as involving both reading and listening. Based on Van Dijk and Kintsch's (1983) interpretation of reversed subtitles, the processing sequence in the English–Chinese subtitles group could also potentially follow a productive interaction between top-down and bottom-up approaches. As native language processing is more automatic (Danan, 2004), Chinese subtitles enabled participants to approach contextual information before they had time to focus on the English subtitles to learn or review the specific aural text in English. In contrast, videos with English-only subtitles cannot provide such conditions to deal with high online processing demands.

Overall, the results from both instruments disclose a significant effect of English–Chinese subtitles on participants' performance in the meaning recall. This is, in fact, contrary to Frumuselu et al.'s (2015) research which found that intralingual mode (i.e., English-only subtitles) is more effective for the recall and retention of colloquial expressions (e.g., idioms and phrasal verbs) during viewing, but it supports several studies that evidenced L1 subtitles' positive implications for lexical learning (Danan, 2004; 1992).

In addition, affective filters should also be considered when evaluating the effectiveness of subtitles. Following Krashen's "affective filter hypothesis" (1985), there arise four factors that could prevent comprehensible input from being processed: motivation, attitude, anxiety, and self-confidence. The findings from interviews suggest an individual variation in terms of affective filters under different subtitling conditions. To be specific, English-only subtitles could be less effective for some participants, as they reported that the absence of Chinese subtitles could make them feel "anxious", "nervous", and "uncertain". This high affective filter may result in a lower intake for these students. By contrast, English–Chinese subtitles seemed to provide a positive learning environment, giving rise to a low affective filter, as some participants indicated that L1 translation on the screen could lower their anxiety level and boost their confidence. However, some participants presumed that English–Chinese subtitles would not be as useful as English-only subtitles in collocation learning, as they feared the availability of native-language subtitles might lower their learning motivation. More than half of participants, for instance, considered that the bilingual written input on the screen provided opportunities for laziness, as they tended to focus only on L1 subtitles while viewing.

C. Research Question 3: What Are the Sources of Learning Difficulties for Chinese L2 Learners in Acquiring Collocations?

The findings of the collocation tests reveal that the participants were the most likely to encounter learning difficulties with contextually marked collocations. This may suggest participants' lack of metacognitive strategies while viewing, and the responses from the interview also confirm this suggestion. Some participants indicated that they were, to some extent, conscious of paying insufficient attention to collocations with so-called "weak contextual constraints" (Lowell & Morris, 2017, p. 551). The results reinforce the noticing hypothesis that words relevant to comprehending a running speech are more likely to be noticed and learned, while inconsistent with the results of Peters and Webb (2018), who found little connection between word–context relevance and lexical learning outcomes. In addition to contextual factors, the semantic factors proposed by Macis and Schmitt (2016) did not appear to be as problematic as expected, although in interviews many participants expressed their concerns about phrasal verbs that are similar in form or connote figurative or multiple meanings.

VI. CONCLUSION AND IMPLICATIONS

The present study confirms the potential of audiovisual input as a resource of collocation learning, and highlights subtitles' effectiveness in promoting L2 learners' acquisition. Considering the easy access to English video materials in an everyday context, it is advisable to incorporate L2 TV series into teachers' lesson plans, textbook design and students' autonomous learning. In addition, although the current findings strongly recommend the use of English-Chinese subtitles to enhance learners' learning gains in collocation meaning acquisition, lesson planners still need to take individuals' affective factors into account when making decisions on instruction types. Such consideration derives from the fact that there are noticeable individual differences in students' motivation, anxiety, and confidence level under the two discussed subtitling conditions. Therefore, students' learning outcomes would vary from person to person due to the different affective filter levels they encounter. Individualised instructions based on students' emotional variables would be necessary to build a productive low-affective-filter viewing environment to address this concern. For example, teachers can tailor a developmental progression (Koskinen et al., 1996) for students who tend to feel nervous and unconfident under an English-only subtitling condition. Students can first be engaged with native language subtitles

before they feel prepared to view only English subtitles. On the other hand, to avoid students' laziness and demotivation in an English-Chinese subtitling condition, teachers are well-advised to refer to students' listening and reading proficiencies while choosing video's difficulty level for target students.

The present study's identified learning difficulties also suggest teachers focus more on idioms and phrasal verbs. In response to students' struggle with contextually marked collocations while viewing, explicit instructions and pre-learning activities might help students achieve better meaning retrieval. In addition, some attention-grabbing strategies can be used to bring these collocations to students' notice. Material designers, for example, can make contextually marked collocations stand out by highlighting or bolding them in subtitles.

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