

Using Animation to Facilitate Second Language Learning

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A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of Bachelor of Arts
with Honors in Psychology from the University of Michigan 2020

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I would like to thank Dr. Twila Tardif for believing in me and offering me the chance to work on this project. I would also like to thank all the members of the Language and Culture Lab for their continuous help and support throughout the process.

Abstract

This research aims to investigate the impact of short-term educational media exposure on children's morphosyntax knowledge. Seventy-two Chinese-speaking English language learners (ELLs) aged four to six were categorized into two experimental groups before given initial assessments on their first language (L1) and second language (L2) vocabulary and grammar, then were instructed to watch three animated clips over the span of one week before being assessed again. The results showed that short-term exposure to educational videos has a significant effect on ELLs' overall morphosyntax knowledge, while L2 vocabulary size is a predictor of higher verb scores.

Keywords: second language acquisition, morphosyntax, past tense, animation, English Language Learners

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English proficiency in second language speakers has been found to be correlated with academic success, specifically better academic achievements in school and higher mean Grade Point Average (GPA) in college (Prevo et al., 2016; Martirosyan et al., 2015). Hence, learning English as a second language (ESL) is a common feat for children raised in a non-English speaking household, whether in an English-speaking country or abroad. About one out of every 10 public school students in the United States is an English language learner, and this number keeps growing year by year. Outside of the U.S., English is the world's most popular second language choice and The British Council estimates that more than one billion people are learning English as a second language at any given time (Sanchez, 2017). As this demand for English proficiency grows worldwide, the demand for accessible yet reliable English teaching tools and programs to supplement or replace in-class instructions increases. The usage of technology, specifically animation, has been looked into as a convenient and credible method of language teaching. However, it is important for researchers, parents, and teachers to understand the trajectory of second language development as well as the challenges faced by second language learners before implementing a language learning plan.

Literature Review

Research in Language Acquisition

Contemporary research on first language acquisition began with Roger Brown's longitudinal study of three American children acquiring English as their first language (L1), which discovered that the children had acquired 14 grammatical morphemes in a strikingly similar order (Brown, 1973). A morpheme is the basic unit of meaning; words that have meanings by themselves are called lexical morphemes while words that function to specify the

relationship between one lexical morpheme and another are called grammatical morphemes. Brown (1973) found that the order of acquisition for the grammatical morphemes could be divided into five stages. Stage I takes place between the age of one year to 2.17 years, where children are expected to have the MLUm (mean length of utterance measured in morphemes) range of 1.0 to 2.0 morphemes. Here, children exhibit communicative intent, but no emergence of grammatical morphemes is recorded. In Stage II, which occurs typically between 2.25 to 2.5 years of age, present progressive (-ing) emerged the earliest followed by in, on, and -s plurals. Next, 2.5 to 2.8 years old children entered Stage III, where irregular past tense emerged followed by 's possessive and uncontractible copula. Children then acquired articles, followed by regular past tense and third person regular present tense in Stage IV, which occurs at the age of 3 to 3.3 years. Finally, children aged 3.4 years old onwards begin to acquire third-person irregular, uncontractible auxiliary, contractible copula, and contractible auxiliary in Stage V. Brown also argued that the similar orders were particularly interesting due to the emergence of a clear pattern of development, despite having drawn the data from spontaneous speech (Brown, 1973). His ideas, that some factor or some set of factors had caused these grammatical morphemes to evolve in an approximately consistent order in these children, have shaped much of the later research. A partial replication of Brown's study was then conducted by Jill de Villiers and Peter de Villiers (1973) through a cross-sectional study of 21 English-speaking children. Their results echoed Brown's, and since then the idea of a natural order of acquisition has been a dominant belief within the field.

In contrast, the learning of grammar in second language acquisition (SLA) research began by primarily adopting a behaviorist perspective on language learning, which views learning a second language (L2) as acquiring a second set of speech habits through practice and

ongoing exposure to stimulus-response patterns (Goldschneider & DeKeyser, 2008). In the 1960s, the study of language acquisition then moved away from these concepts towards the generative ideas of syntactic rules and grammar construction on the basis of the input children received (Cook, 1993). This led to numerous L2 morpheme acquisition studies, which borrowed the methodology used by Brown to study the acquisition of first language grammar to study second language development.

Early L2 cross-linguistic morpheme studies discovered that a unique, yet very similar accuracy order emerged among L2 learners, regardless of age group or first language. Dulay and Burt (1973) conducted a study to observe any common sequences emerging in children acquiring English as a second language. They predicted that if a common sequence were found for L2 learners, it would be different from Brown's (1973) stages since L2 learners do not have to struggle with the semantic notions they have acquired earlier in their L1 acquisition. Dulay and Burt elicited data from 145 Spanish-speaking children aged five to eight using an instrument called the Bilingual Syntax Measure (BSM), a test of L2 proficiency designed for young children. The test consists of seven cartoon pictures and 33 questions designed to elicit children's responses, and the structure the child produced allows a degree of syntactic proficiency to be calculated (Dulay & Burt, 1973). The speech corpus from the BSM for three groups of children from different school districts—two in California and one in New York City—included eight of the 14 morphemes from Brown (1973), including present progressive, plural, past irregular, possessive, articles, third person singular regular, contractible copula, and contractible auxiliary. Although there were differences in how accurately the grammatical morphemes were used by each group of children, the overall rank order of the morphemes was similar across the three groups and this order differed from the L1 order found in Brown (1973). Dulay and Burt then

expanded this study by looking at groups of children with two different L1s, and found very similar orders for the acquisition of English morphemes by Spanish-speaking and Chinese-speaking children aged six to eight (Dulay & Burt, 1974). Consequently, Bailey, Madden, and Krashen (1974) also carried out a similar study on adults and reported that the order they found correlated significantly with that in Dulay & Burt (1973). On the assumption that accuracy order reflects the acquisition order, it was proposed that there was a thus a natural order of acquisition of English morphemes which all learners followed.

English Language Learners and Challenges in the Classroom

English language learners (ELLs) is a term coined to refer to students in the U.S. who are unable to communicate fluently or learn effectively in English, who often come from non-English-speaking homes and backgrounds, and who typically require specialized or modified instruction in both the English language and their academic courses (The Glossary of Education Reform, 2013). The percentage of public school students who are ELLs was nearing five million in Fall 2017, which was a massive increase from the 3.8 million recorded in Fall 2000. Spanish is the primary language for most ELLs, followed by Chinese (Cantonese and Mandarin), Vietnamese, and Arabic (Sanchez, 2017).

In China, the emphasis on learning English has continued unabated since the 1970s and as of 2012, about 300 million Chinese are English language learners (Tan, 2015). Students learning English as a second language are getting younger by the year, which has inspired many companies such as Disney English to design programs catered to young Chinese children. Public schools have also switched from starting English education at age twelve to age nine, and some schools in the larger cities even start teaching English to children as young as six years old (Tan, 2015). Disney English also has discovered that classes aimed at toddlers and preschoolers are

one of the biggest areas of economic growth in China, illustrating the ever-increasing demands from parents to provide their children with English language lessons as young as possible (Gamlam, 2016).

However, certain considerations must be made to ensure that the children are receiving not only a high-quality language education, but an appropriately-designed one as well. Since ESL follows a different trajectory than learning English as a native speaker, ELLs face unique challenges in their learning process, which might or might not be noticed by their teachers and caregivers. Hence, it is important for program developers, parents, and teachers to ensure that appropriate accommodations could be made to allow both students learning English as a second language (also referred to as ESLs) and ELLs to learn effectively, instead of simply implementing standardized teaching methods that are expected to cater to both native and non-native speakers. Not only would a standardized method make it harder for ESL/ELLs to catch up with their native speaker classmates, it could possibly be disruptive and detrimental to their language learning as a whole.

Within an educational setting, ESL/ELLs often receive instruction in a more formal manner compared to their native-speaking peers (Hayes, 2009). In the majority of language education settings, ESL instruction is given primarily by a non-native speaker, and in the second language classroom, significant differences can be found in the teaching behavior of native versus non-native speaking teachers in terms of communicative competence and balance of content (Arva & Medgyes, 2000; Choi, 2008). Different teachers might favor and give more focus to different areas of learning, as well as how much L1 usage is permissible within a classroom. While most educators allow the usage of L1 alongside the L2, some use it as the primary means of teaching the L2, whereas others forbid the usage of L1 in their classroom (Park

& Abelmann, 2004, as cited in Ellis, 2015). This variation seen within the educational context of L2 learning can affect the level and quality of engagement with the language, which will ultimately impact learner's overall proficiency (Butler, 2012). Additionally, research on learning styles should make us skeptical of claims that a particular teaching method will suit the needs of all learners. Second language learners are not always conscious of their individual learning styles, but once they develop it, learners' preference for learning will influence the kind of strategies they choose in order to learn new material (VanPatten & Williams, 2007). This being said, in-class instruction might be a sufficient method of learning for some students, but definitely not for all students.

Providing Early Exposure at Home

To complement exposure from in-class instructions, ELLs are also encouraged to be provided with English language exposure from home. A study by Davidson and Hammer (2012) has shown that children exposed to English-language communication at home mastered more morphemes earlier than children who started getting their English language exposure at the onset of a Head Start program. Although children from both groups arrive at the same level of mastery by the end of their second year in Head Start, this finding supports not only the importance of English exposure at home, but the importance of giving children an early exposure to the second language. In regard to early exposure, multiple studies have provided support for the idea that when it comes to language, "the earlier, the better." In fact, one of the most influential ideas in Linguistics and Psychology is the Critical Period Hypothesis by Lenneberg (1967), who claimed that there are maturational constraints on the time a first language can be acquired. He argued that since first language acquisition relies on neuroplasticity, some aspects of language will not be fully mastered unless they are mastered before a particular time around puberty, a period he

called the critical period (Lenneberg, 1967, as cited in Ellis, 2015). While some researchers have shown full support to this hypothesis to the point of extending it for second language acquisition, other researchers are not as convinced that full-on language learning can only happen within such a small window of time.

Despite the debate surrounding the Critical Period Hypothesis, it can still be argued that earlier exposure is better because it minimizes possible disruptions caused by L1 transfer to L2 development. Ellis (2015) suggested that learners who start their L2 learning at a younger age are more likely to achieve a more native-like accent. Additionally, younger learners rely less on their first language and exhibit less transfer than older learners. This is because the more established the L1 is at the time of L2 acquisition, the greater the influence it will have on the L2 (Guion, Flege, Lieu, and Yeni-Komshian, 2000, as cited in Ellis, 2015). They also argued that second language learners have two primary sources of information, which are their first language knowledge and second language input. Since L1 is less established in younger learners, it will be less available, and they would have to rely more on the second language input. Furthermore, a study on German learners illustrated that younger learners acquire grammatical rules faster because they do not form hypotheses about a particular grammar rule on the basis of their L1 (Czinger, 2012, as cited in Ellis, 2015).

Ultimately, these findings provide evidence to support the notion that parents should allow their children to gain as much exposure to a second language as early as possible. Access and exposure to engaging, authentic, and comprehensible yet demanding materials in the target language is essential for successful language learning (Zhao, 2003). However, this might not be possible if the parents are not proficient in English, or not proficient enough to provide adequate English exposure at home. Hence, the need arises for an external tool to assist parents in

providing their children with adequate and appropriate English exposure. One way this could be achieved is by supplementing the children with video materials in the target language, which can bring natural and context-rich linguistic and cultural materials to the learners (Zhao, 2003).

Animation as a Teaching Tool

As we progress and make new technological advancements, audiovisual media have been highlighted as one of the most feasible teaching methods. Kuppens (2010) reported that Dutch-speaking L2 students who had watched subtitled English TV programs and movies performed significantly better on oral translation tests compared to their peers with less media exposure. The participants were asked to fill out a survey on media usage as well as their active use of English in daily life. Then, they were given an oral test that consisted of four parts to evaluate four skills: vocabulary, translating from English to Dutch, translating to Dutch to English, and grammar. While the study focused only on the results of the two translation tests, this finding suggests that language learners are indeed able to gain language knowledge implicitly through mere exposure to English stimuli.

Within a classroom setting, the usage of animation has gained traction as a reliable teaching tool. In a study with older ELLs, Abdo and Al-Awabdeh (2017) reported that Arabic-speaking L2 high school students scored better grades after learning grammar through animated videos. Additionally, the superiority of animation over a static image in facilitating children's verb recognition has been reported in Schlosser (2012), where animated verbs were more accurately named than static verbs. In this study, 52 children aged three to five were exposed to static and animated images of verbs and prepositions and were asked to guess the meaning of symbols and identify target symbols. Following this, Schlosser (2012) suggested that the usage of animation will reduce the teaching burden. Hence, while some people might be skeptical

about the feasibility of using animation as a teaching medium, these outcomes suggest that animation could be used as a supplemental language teaching tool.

Subsequently, the past decade alone has witnessed the rise of language-teaching programs and applications such as Duolingo, Memrise, and Babbel. It is apparent that people are opting for technology-based learning due to its low cost, flexibility, and convenience. However, we also have to evaluate the necessary components that make an animated program a feasible teaching tool. Bolgun and McCaw (2019) argued that current language technology caters predominantly to the declarative memory system, which could be effective in forming explicit metalinguistic knowledge but does not lead to procedural ability. They asserted that language learning applications should instead cater to learners' procedural memory in order to promote procedural activity. However, one meta-analysis review on 156 empirical studies had found that technology-supported language learning is at least as effective as human teachers, if not more so (Zhao, 2003). The use of technology in the reviewed studies has supported the teaching of various aspects of language learnings including vocabulary, grammar, reading, speaking, listening, writing, and culture. Zhao (2003) asserted that modern technology can help enhance the quality of input, authenticity of communication, and provide more relevant and useful feedback. Despite the studies being limited to college level language learners and the target language under consideration in these studies were also limited to French, Spanish, Arabic, German, and ESL, a consistent positive effect is found across the studies. Similar results emerged for a meta-analysis on 37 studies spanning from 1970 to 2006, which favored technology-supported language learning with a small yet positive and statistically significant effect size (Grgurovic et al., 2013). This study echoed previous results, showing that across the various conditions of technology use, second/foreign language instruction supported by

computer technology was at least as effective as instruction without technology. This meta-analysis provides yet another empirically-based answer to the question of whether pedagogy supported by computer technology can be effective in promoting second language development relative to pedagogy without technology.

The present study

The present study aims to investigate the feasibility of using animation to facilitate young ELLs' second language acquisition. I set out to assess the influence of naturalistic, and child-friendly learning videos on young English Language Learners (ELLs)'s morphosyntax knowledge, focusing on past tense. To do so, I analyzed the data from a completed experimental study on 72 Mandarin-speaking participants from Nanjing, China conducted by UM graduate student, Lexie Huang. This experiment is the Mandarin-English version of the still-ongoing primary study run in the Language and Culture Lab at the University of Michigan, Ann Arbor, which is now also recruiting Spanish-speaking children in Michigan. While I am directly involved with the Ann Arbor project, data analysis on this sample was not able to be conducted due to time constraints and an inadequate number of participants (data collection ended abruptly on March 13, 2020).

In the experiment, participants were tested on their native language and English proficiency during the first session, before being assigned to either the Verb Exposure or the Possessive Exposure group. For the purpose of this paper, participants in the Verb Exposure group are treated as the Experimental group. They were assigned three short animated clips focusing on verb marking to be watched at home over the period of one week. Meanwhile, participants in the Possessive Exposure group were assigned three similar-length videos focusing on possessives, which contain no past tense markers at all. The video types assigned were

predetermined in the primary experimental design. Participants then returned for a second session, where they were reassessed for their English proficiency and was given exposure to the alternative set of videos. Their performance on the initial test and the retest sessions were compared to evaluate any improvements in past tense in particular, or English morphosyntax in general.

The first independent variable in this study is the participant groups, which are Verb Exposure and Possessive Exposure. Participants in the Verb Exposure group were assigned three short animated clips featuring lessons in English verb marking while participants in the Possessive Exposure group were assigned clips featuring lessons in English possessives. Other independent variables include participants' score in the Mandarin morphosyntax test, participants' score in the English vocabulary test, and the amount of exposure to target stimuli. As for dependent variables, this paper looks into participants' English morphosyntax post-test score and English past tense post-test score. However, the most important dependent variable is participants' improvements in morphosyntax and past tense tests, which refer to the difference between pre-test and post-test scores in both English morphosyntax tests and past tense questions respectively.

I hypothesized that the participants assigned to the Verb Exposure group will show more improvement in test scores compared to those in the Possessive Exposure group, in both the past tense section and the overall test of English morphosyntax. This will show that the short-term exposure to past tense target words as well as other components relevant to the morphosyntax test will benefit their L2 acquisition process. Thus, this provides support to the argument that technology-based language learning, particularly using animated videos, is beneficial for ELLs' learning process.

A secondary hypothesis is that the participants who have had more exposure to the target stimuli will be more likely to achieve more score improvement in the English morphosyntax test compared to participants with less exposure. This is because frequency of exposure is one of the main factors that facilitate the acquisition of grammatical morphemes by L2 learners (Goldschneider & DeKeyser, 2008).

Third, I also hypothesized that participants' improvement in the English morphosyntax test will be positively correlated to their scores in the Mandarin morphosyntax test, highlighting the role of L1 transfer as well as aptitude on L2 learning. As argued by Ellis (2015), according to the Linguistic Coding Difference Hypothesis, learners with lower levels of L1 skills might possess lower levels of L2 aptitude and correspondingly greater difficulty in learning a second language.

Finally, I hypothesized that participants' improvement in the English morphosyntax test is mediated by their achievement in the English vocabulary test. This is because research has shown that within a single language, vocabulary size is a more powerful predictor of grammatical development than age or gender (Dale et al., 2000). Hence, a high score in the vocabulary test should be a reliable predictor of a high score on the morphosyntax test.

Method

Participants

Participants were 72 native Mandarin speakers (35 female and 37 male) from the city of Nanjing, which is the capital of China's eastern Jiangsu province. Their age was between four to six years old ($M = 5.32$, $SD = 0.60$), and all participants were English Language Learners (ELLs) with some exposure to English through school and media. Recruitment took place in

kindergartens and learning centers across Nanjing. Participants' demographic information is summarized in Table 1 (see Appendix).

Materials

Testing Materials

English vocabulary was tested using the Peabody Picture Vocabulary Test (PPVT), an untimed test of receptive vocabulary for Standard American English intended to provide a quick estimate of the examinee's receptive vocabulary ability. There is a total of 139 items on the PPVT scoresheet, spread into 10 categories based on children's age. When this test is administered to native speakers of English, test takers are expected to begin from the category pertaining to their age range. However, for this study, all participants were tested from item 1, up until the stopping point. For each prompt, participants were shown four pictures on a PowerPoint slide while hearing a target word and were asked to either verbally or gesturally point out the picture corresponding to the target word. Failure to obtain six correct responses within eight consecutive prompts marks the stopping point. Accordingly, the Mandarin version of the PPVT was also used in this study to measure participants' receptive vocabulary in their native language.

To measure the participants' grasp of English morphosyntax, a morphosyntax test consisting of 18 questions within eight categories were produced. The categories are possessive -'s, simple present, copula, auxiliary and negation, auxiliary and present progressive -ing, auxiliary and past progressive -ing, past tense, and passive verbs. The grammatical morphemes included in this test align with some of Brown's 14 grammatical morphemes, namely the present progressive -ing, possessive-'s, copula, past tense, and auxiliary. For each item of the test, participants were expected to produce the target grammatical markers in order to complete the

prompted sentences. Failure to repeat the demo items for each category warrants a move to the next section. Meanwhile, the Mandarin morphosyntax test is made up of four categories totaling to 16 test items, which cover articles, possessives, and aspect.

Viewing Materials

The viewing materials consist of short animated clips produced by ABCmouse.com, an online-based early learning academy designed for children ages two to eight. All of the clips revolve around the day-to-day activities of a teacher, Miss Jones, with her students in a preschool classroom setting. The students are Sarah, Raj, Carmen, Lina, Ken, and Niko. At the beginning of the first session, an introduction video, “Hello,” introducing all the characters is shown and at the beginning of the second session, a second introduction video, “Robot,” is shown as a part of the warm-up procedure. Both videos are around two minutes each.

The intervention videos consist of five 3-minute episodes. Two of the episodes (Episodes 12 and 15) emphasize English possessives, two others (Episodes 17 and 41) emphasize English verb marking, and one episode (Episode 52) functions as a filler video without any direct emphasis on any particular target grammatical functions. Episodes 17 and 41, which were assigned to the Experimental group, contain 6 instances of verb marking in each video. The filler clip, Episode 52, contains three instances of verb marking, while Episodes 12 and 15, which were assigned to the control group, contained zero instances of verb marking. This means that by the time they finished their first session, which includes watching each of their assigned videos once (excluding Episode 52), participants in the Experimental condition would have been exposed to 12 instances of verb marking, as opposed to those in the Control condition with zero exposure.

Parent Questionnaires and Video Watching Log

This study also collected additional data from the parents by having them fill up two types of forms. The first one is a pre-test questionnaire for demographic purposes, which elicited information regarding the parents' educational background and child's media usage, among others. The second form is a video watching log that they brought home with them to record the amount of times their child had watched the assigned videos over the span of a week. Both the questionnaire and the video watching log was produced in Mandarin.

Procedure

Testing Procedure

All participants were tested in a child-friendly lab space for two one-hour sessions, ideally one week apart. In the first session, participants were introduced with the first experimenter who is a Mandarin native speaker. Consent forms were handed out to the parents while the experimenter filled up an assent form on behalf of the participant. Next, participants were offered a juice box or a snack to keep them focused on the upcoming tasks. They were then tested with the Mandarin equivalent of the PPVT to assess their Mandarin vocabulary, before going through the Mandarin morphosyntax test right after.

The Mandarin-speaking experimenter then informed the participant that their short play session was over and that another experimenter, a native English speaker, would be taking over. Participants were then shown the "Hello" video, which allowed them to familiarize themselves with relevant characters in Miss Jones' classroom and prompted them to introduce themselves in English. After the video ended, participants were asked if they had enjoyed what they had just watched. This was repeated for each video shown during the session. Participants were then assessed on their English vocabulary using the PPVT. Afterwards, participants went through another round of testing, this time for English morphosyntax.

The two intervention videos were finally shown to the participants, and the episodes differed according to their assigned conditions. Participants in the Verb Exposure group watched Episodes 17 and 41, while those in the Possessive Exposure group watched Episodes 12 and 15. A post-viewing mini test on vocabulary and grammar, which was conducted afterward to detect any immediate learning effects, marked the end of the first session. Parents were given the links to the assigned videos as well as a copy of the video watching log. They were encouraged to watch the videos together with their children.

The second session, which ideally took place a week after the first one, began with the showing of the “Robot” video as a part of the warm-up procedure. This was followed by a second assessment on English vocabulary using the PPVT, as well as a second test on the English morphosyntax. Both of these tests were performed using a different version than the one used for the first session. Upon completing the two tests, participants were then shown the two episodes they were not initially assigned to. This means that participants in the Verb Exposure group, who were assigned with episodes on verb marking (Episodes 17 and 41), would be watching the episodes on possessives (Episodes 12 and 15), and vice versa. A different version of the post-viewing mini test was administered to once again detect for immediate effects of target video exposure. Similar to the first session, the post-viewing mini test marked the end of the second session. Participants were given a certificate and a toy of their choice upon completion.

Scoring Procedure

The scoring procedure took place upon the completion of the testing session. Scoring was done by trained undergraduate research assistants under the supervision of the primary researcher (Lexie Huang for the Nanjing data, Dr. Twila Tardif for the Ann Arbor data). A document with

scoring guidelines was used as a reference to ensure standardization across scorers. This document outlines the basic rules for the morphosyntax tests and mini-tests, since the PPVT and Mandarin vocabulary tests were scored based on the total number of consecutive correct responses. For the morphosyntax tests and mini-tests, a raw score of 0, 0.5, or 1 was given for each response. A score of 1 was given for a complete and accurate answer, while a score of 0 was given for an inaccurate or intelligible answer. Meanwhile, a response was scored 0.5 if it was partially accurate. For instance, the response “*he throwed*” instead of the correct answer “*he threw*” would be scored 0.5 because while the participant did not succeed at producing the accurate past tense term for “*throw,*” they managed to produce a past tense form of the word.

Results

The descriptive statistics as well as the correlation for all variables are summarized in Tables 2 and Table 3 respectively (see Appendix). It was hypothesized that the Verb Exposure group will show more improvement in test scores compared to those in the Possessive Exposure group. Additionally, it was also hypothesized that the difference in test scores will appear both in the past tense section as well as the overall English morphosyntax test. For the overall score, a repeated measures ANCOVA was conducted to compare the means of between the pre- and post-test scores between the two groups. While the analysis did not show a statistically significant difference in regard to pre- and post-test scores, $F(1, 70) = 1.86, p = 0.18$, it did show that the interaction between test time (post-test versus pre-test) and group is statistically significant, $F(1, 70) = 4.35, p = 0.41$. Another repeated measures ANCOVA was conducted to assess the differences between pre- and post-test past tense scores between the two groups. It was found that there was neither a statistically significant effect of test time, $F(1, 70) = 0.55, p = 0.46$, nor a significant effect of interaction between test time and group, $F(1, 70) = 0.55, p = 0.46$.

Additionally, a secondary hypothesis is that the participants who have had more exposure to the target stimuli will be more likely to achieve higher overall scores in the English morphosyntax test compared to participants with less exposure. A repeated measures ANCOVA was conducted to determine a statistically significant effect of number of total exposure on overall English morphosyntax test scores, and found that there is only a marginally significant effect, $F(1, 69) = 3.89, p = 0.053$. The analysis was repeated to on the past tense scores, yielding no significant effects of number of total exposure on past tense scores, $F(1, 69) = 1.86, p = 0.18$.

I also expected that participants' overall scores in the English morphosyntax test would be positively correlated to their scores in the Mandarin morphosyntax test. From the same repeated measures ANCOVA, there appears to be no significant effect of Mandarin morphosyntax scores on the overall English morphosyntax scores, $F(1, 67) = 2.631, p = 0.109$. There is also no significant effect of Mandarin morphosyntax scores on the English morphosyntax past tense scores, $F(1, 69) = 0.849, p = 0.36$.

Finally, I hypothesized that participants' performance in the English morphosyntax test would be mediated by their English vocabulary test scores. A repeated measures ANCOVA with English vocabulary scores as a covariate was conducted to test this. When English vocabulary is considered, there is no statistically significant effect of test time, $F(1, 69) = 0.51, p = 0.48$, nor a significant effect of the interaction between test time and English vocabulary on overall English morphosyntax test scores, $F(1, 69) = 0.01, p = 0.91$. However, for the past tense scores, there is a statistically significant effect test time, $F(1, 69) = 5.43, p = 0.02$, as well as a significant effect of interaction between test time and English vocabulary, $F(1, 69) = 9.09, p = 0.004$.

Discussion

The present study set out to test if short-term exposure to educational animated clips could influence young English Language Learners (ELLs)'s performance in morphosyntax tests in general, and past tense in particular. The results showed that the interaction between test time and group is statistically significant on the overall English morphosyntax post-test scores. This means that participants in the Verb Exposure group received significantly higher scores in the post-test compared to their pre-test, while the participants in the Possessive Exposure group did not show similar improvements. However, the effects were not as strong in regard to the past tense scores. There was no significant difference in past tense scores between the two groups. Hence, the results only support the first part of the first hypothesis, which is the Verb Exposure group will improve more on the overall English morphosyntax test compared to the Possessive Exposure group, and does not provide support for the second part, which predicts differences in past tense scores as well. Overall, this finding shows that while animation might not be a feasible teaching tool for past tense, it shows to be a reliable tool for general grammar learning.

This study also highlights the role of English vocabulary test scores in mediating the improvement in past tense test scores, despite not having an effect on the overall English Morphosyntax test scores. One explanation behind this effect is the possible role of vocabulary size as a predictor to successful verb learning. Lee (2011), in a study on 1071 American children aged three to 11, found that total vocabulary size at age two can significantly predict subsequent language and literacy achievement up to fifth grade. Another way to look at this is by assuming that children with a bigger vocabulary size would have been receiving more linguistic exposure, hence making it easier for them to already be familiar with naturalistic language learning. This allows them to acquire new grammar rules faster. Apart from the effect of group on overall English Morphosyntax scores and the role of English vocabulary on past tense scores, other

covariates did not show any statistically significant effects. The other variables such as age, amount of exposure to target stimuli, as well as Mandarin morphosyntax scores did not yield relevant results.

Although the present study had gathered an adequate number of participants in order to have a credible sample size and external validity, it should be noted that the present study comes with several limitations. First, the small quantity of test items does not thoroughly and accurately reflect the participants' mastery in target grammatical functions. There was only a total of 18 questions in the morphosyntax tests, and only three of them directly measured past tense, both regular and irregular. One way to improve this is by having a more comprehensive assessment, which will have more test items for past tense since it is the area of interest.

Second, the data analyzed for this study comes from only one group of English Language Learners, which are four to seven years old children in Nanjing, China. While the initial plan for this study is to compare the data from Mandarin-speaking participants in Nanjing with Spanish-speaking participants in Ann Arbor, data analysis on the Ann Arbor sample was not able to be conducted. This was due to time constraints as well as having an inadequate number of participants. Hence, this limitation does not allow us to make comparisons across different native languages to see if the impact of using animation for grammar learning differs according to learners' first languages. Since L1 transfer could play a big role in inhibiting as well as facilitating second language learning (Ellis, 2015), future research should look into how the usage of these supplemental English teaching tools could cater to children with different native languages.

Third, another limitation of this study is the lack of instructions toward parents. Participants and their parents were instructed to watch the allocated episodes, but they were not

told which grammatical components should be focused on and will be tested on. One way to change the direction of this study in the future is by informing the parents about the particular grammatical markers in the assigned videos beforehand. This would allow parents to guide their children's focus and be actively involved in the learning process as well. As a result, children might be able to pay attention and remember the grammar rules better when they are explicitly pointed out by their parents, hence increasing their performance. Our focus should not be limited to deciding which teaching methods to implement and standardized tests to use, but also to develop active parental engagement and allow children to develop their own motivation and goals to achieve in second language learning.

Conclusion

In conclusion, the findings show that Mandarin-speaking ELLs with more exposure to target markers (verbs) outperformed their peers with less verb exposure on the English morphosyntax test, providing support for animation as a grammar teaching tool. Thus, the usage of animation as a supplementary teaching tool should be considered by teachers and parents while planning for language learning lessons for young English language learners. While no significant impact of age and first language grammar were detected, the results also show that English vocabulary scores is a predictor of English past tense scores. Based on this finding, it should be noted that providing young ELLs with adequate exposure to the English vocabulary will also facilitate their learning of grammar. Hence, the link between vocabulary size and grammar knowledge is worth paying attention to while keeping track of ELLs' language development. This, as well as utilizing animation as a teaching medium, can be the key factors to facilitate the language learning process.

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Appendix

Table 1*Participants' demographic information*

	N	%
Gender		
<i>Male</i>	37	51
<i>Female</i>	35	49
Total	72	100
Father's education level		
<i>Technical high school</i>	1	1
<i>Technical college</i>	6	8
<i>College</i>	45	3
<i>Master's Degree</i>	17	25
<i>PhD</i>	2	3
Total	71	100
Mother's education level		
<i>Technical high school</i>	1	1
<i>High school</i>	1	1
<i>Technical college</i>	9	13
<i>College</i>	47	66
<i>Master's Degree</i>	12	18
<i>PhD</i>	1	1
Total	71	100

Table 2*Descriptive statistics for all variables*

VARIABLES	GROUP	Mean	Std. Deviation	N
Age (Years)	P	5.77	0.53	37
	V	5.75	0.66	35
	Total	5.76	0.60	72
Mandarin	P	20.69	1.47	37
	V	20.30	1.34	35
	Total	20.50	1.41	72
English Vocabulary	P	17.86	9.22	37
	V	19.80	10.24	35
	Total	18.81	9.71	72
Number of views	P	9.32	22.61	37
	V	31.20	39.23	35
	Total	19.96	33.43	72
Morphosyntax Pre-Test	P	1.62	2.46	37
	V	1.06	2.10	35
	Total	1.35	2.30	72
Morphosyntax Post-Test	P	1.47	2.05	37
	V	1.76	2.40	35
	Total	1.61	2.21	72
Past Tense Pre-Test	P	0.03	0.16	37
	V	0.01	0.09	35
	Total	0.02	0.13	72
Past Tense Post-Test	P	0.03	0.16	37
	V	0.06	0.24	35
	Total	0.04	0.20	72

Table 3*Correlation table for all variables*

	1	2	3	4	5	6	7	8
Age (Years)	1							
Mandarin								
Morphosyntax	0.12	1						
English Vocabulary	0.30	0.26	1					
Amount of Exposure	0.12	0.10	0.27	1				
Pre-test Overall Score	-0.17	-0.04	-0.15	0.02	1			
Post-test Overall Score	-0.32	0.06	-0.15	0.25	0.69	1		
Pre-Test Past Tense	0.12	0.04	-0.03	0.00	-0.09	-0.07	1	
Post-Test Past Tense	0.04	-2.20	0.40	0.22	-0.03	0.01	-0.03	1