

Bachelor Thesis

**The Effect of Gestures on Memorisation of Concrete and
Abstract Words in Second Language Acquisition**



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Introduction

In a globalising world, people are more easily connected and international communication plays a bigger part each day. However, to communicate effectively, a basic knowledge of a common language is necessary. Learning a second language is challenging and besides grammar or pronunciation, vocabulary is one of the most important factors in its acquisition. There are many studies ascribing a percentage to the importance of verbal and nonverbal parts of communication, but no consensus has been reached with regard to this debate. What has been generally established is the fact that nonverbal communication, or gestures, is a very important part of our day to day communication. An interesting aspect is how gestures can be practically used and how they can facilitate certain parts of life, like second language learning.

Gesture

Gesture can be defined as symbolic movement accompanying the meaning of the verbal sentences, excluding functional actions, symptomatic movements, posture or proxemics, etc. (Gullberg, 2006). David McNeill (1992) established several categories of gestures in Kendon's continuum:

Gesticulation → Language-like gestures → Pantomimes → Emblems → Sign language

These categories consist of several different types of gestures that can range from being strongly dependent on speech, as is the case for gesticulation, or gestures, to being completely independent from speech, like sign language or emblems. Those are gestures with a fixed form and meaning, like a 'thumbs-up'. In everyday communication, gesticulation is by far the most used category (99%) (McNeill, 1992). We will focus on gesticulation, later referred to as gestures, in this research, because of its close relation with spoken language and therefore its connection with second language acquisition.

There are four main groups of gestures: Deictics, beat gestures, iconics and metaphoric (McNeill, 1992). Deictics are pointing gestures and beat gestures are rhythmic gestures produced to emphasize which part of an utterance is important. These two types of

gestures are both non-imagistic, meaning that they are not representational of, or semantically related to, speech. Iconics and metaphors are both considered to be imagistic gestures and because of their close semantic relation to speech, they are chosen as the focus for this research. Iconics are gestures being used for concrete words or phrases. They “bear a close formal relationship to the semantic content of speech” (McNeill, 1992, p. 12). The other type of gesture that we use in this study are metaphors. Metaphors are gestures used for abstract words or phrases. They are similar to iconics in the way that they both are pictorial and are strongly connected with speech, but the difference is that they illustrate an abstract idea instead of a concrete object.

There is a close relation between gesture and speech. Gesture accompanies speech. This sometimes happens involuntarily, but often gesture is used as an additional tool for communication. Gesture develops simultaneously with speech in young children and this happens for almost everyone (Gullberg, De Bot & Volterra, 2018). Even blind people, who have never seen someone gesture, produce gestures when they speak (Iverson & Golden-Meadow, 1998). There are various hypotheses about what the exact relationship between speech and gesture looks like. Roughly speaking, previous research has provided two opposing hypotheses. The first stating that “gesture facilitates speech, meaning that they consider gesture to be secondary to speech” (Hoetjes, 2015, p. 14), and the second stating that speech and gesture are more equal so that they support each other (see Wagner, Malisz & Kopp, 2014, for more details). Despite these different hypotheses, there is general agreement that speech and gesture are closely related.

Gesture has many functions in social interaction and there are many potential benefits in its use if one would know where and how to implement it. One of these areas of possible implementation is second language acquisition.

Learning abstract and concrete words in a second language

Many different factors influence second language learning, for example, age (Nikolov & Djigunović, 2006), your native language (Carson, 1992) or the preference for visual or verbal learning (Plass et al., 1998) play an important part in learning a new language. These factors are all personal factors, different for everyone. Furthermore, it has been proven that word length can influence memorability of a word. Baddeley (2003) demonstrated that short words, with one or two syllables, are better retained in memory than long words, words with more than three syllables. However, the way of teaching a new language is also key in Second Language Acquisition (SLA). All students have their learning strategies. Chamot and Kupper

(1989) established three general learning strategies, of which the first category is metacognitive learning, which can be described as a self-awareness within the student about the learning process. The second category is cognitive learning, in which students use materials given to study by themselves and the third category is learning by using social and affective strategies in which a teacher or another student assists in learning. The majority of students use cognitive learning most often when learning a foreign language.

Out of grammar, speaking, listening, reading and vocabulary, vocabulary has been proven to be the first and most important part of learning a new language (Alqahtani, 2015). After all, without vocabulary one would lack the ability to express themselves and form sentences or phrases. However, when learning vocabulary, one should pay attention to the different types of words. The difference in learning abstract and concrete words has been explored by several researchers. De Groot and Keijzer (2000) found that concrete words are easier retained in memory than abstract words, and Walker and Hulme (1999) demonstrated a similar argument about how the meaning of concrete words is easier to remember than the meaning of abstract words in short-term serial recall. Klaver et al. (2005) presented subjects with words that either had a high or a low level of imageability (i.e. concrete or abstract words) and found similar results stating that concrete words are easier remembered than abstract words. The concreteness of a word influences the memorability of the word, because the imageability of a concrete word is higher and therefore can be placed in context easier (Zhao & Macaro, 2016). This results in that when learning concrete words, someone can construct a specific mental image and in addition to the verbal systems, the nonverbal system in the brain is activated. This area in the brain that processes nonverbal aspects supports processing concrete words, but not abstract words (Zhao & Macaro, 2016) and making remembering new abstract words harder, because these are only processed in the verbal systems of the brain.

Gesture and second language vocabulary acquisition

Learning vocabulary is an important part of learning a second language and the previous paragraphs demonstrate that the type of word (i.e. concrete or abstract) is a factor that influences the way in which a word is remembered. Gesture could play a role in learning abstract and concrete words. The effects of gesture have been proven for verbal memory if learners produce a gesture illustrating an action that the word describes instead of only hearing or reading the word (Engelkamp & Krumnacker, 1980). This phenomenon has been called the 'enactment effect' (Engelkamp & Krumnacker, 1980) or the 'subject-performed

task-effect' (Cohen, 1981). Moreover, in free recall tests, it was shown that gestures also help participants when trying to find words in their memory (Zimmer et al., 2000).

The effects of gesture have also been found to be helpful in learning a foreign language. A study by Quinn-Allen (1995), in which she taught French expressions to a group of English-speaking students, showed a significant effect of gesture on short- and long-term memory of the expressions. Kelly et al. (2009) demonstrated in their research teaching Japanese words to native English-speaking adults, that words that were learned accompanied by congruent gestures were better remembered when they were taught in combination with a gesture that was representational of the word. Additionally, a study with French children, performed by Tellier (2008), confirmed a similar hypothesis on second language memorisation taught with gesture. Her results showed that teaching common words in combination with seeing a gesture, but especially in combination with the reproduction of the gesture assists in memorising the vocabulary.

These previous studies usually did not account for the type of word or they used only concrete words in their research. However, Macedonia and Knösche (2011) researched the effect of enactment on memory in concrete and abstract words, making this research interesting because it is one of the few studies researching the difference in the role that gesture may play in the acquisition of concrete and abstract words. Twenty subjects learned new concrete and abstract words either audio-visually or audio-visually while reproducing a gesture. They did free recall and cued recall tests at six different points in time assessing the level of remembrance of the words. The overall result was that enactment helps with remembering vocabulary not only in concrete but also in abstract words. Furthermore, the newly learned words were more regularly adopted in the active vocabulary as they used them more frequently when the participants were asked to form new sentences.

Interestingly, the aforementioned results that gesture facilitates vocabulary acquisition of a second language do not prove true in all situations. Kelly and Lee (2012, p. 793) found that "hand gestures disrupt word learning when phonetic demands are high". They did phonetic and vocabulary tests for easy and hard word pairs. Easy pairs are two words that are not phonetically similar and hard pairs are two phonetically highly similar words. In their research, they gave examples of two phonetically similar words in Japanese: /ite/ which means go and /itte/, in which the "t" is held, which means stay. They found that in easy word pairs gesture did help, but in hard word pairs gesture actually hurts.

In conclusion, the results of these studies suggest that learning words combined with the re-enactment of a gesture helps with remembering and delays forgetting said words

(Engelkamp & Krumnacker, 1980; Tellier, 2008; Kelly et al., 2009; Macedonia and Knösche 2011). Furthermore, gestures with a meaning linked to the meaning of the word help better in remembrance than using meaningless gestures or gestures with an unrelated meaning (Kelly et al., 2009). However, this only seems to be the case for relatively easy word learning tasks (Kelly & Lee, 2012).

The interesting question now is, why do gestures help in remembering vocabulary when learning a foreign language. Macedonia and Kriegstein (2012) gathered four main views on the subject. The ‘enactment-effect’, introduction of a cognitive activity, imagery and increased perceptual and attentional processes. The first one by Engelkamp and Krumnacker (1980) and Zimmer (1985) stresses the importance of “the overt action performed by the learner” (Macedonia and Kriegstein, 2012, p. 397) and ascribes this phenomenon to the fact that the physical enactment of the gesture “creates a motor trace in the memory representation of the verbal item” (Macedonia and Kriegstein, 2012, p. 397). A second view is that performing a cognitive activity, like spelling or gesturing, while learning a word, can induce a better verbal memory (Cohen, 1981, 1985). Imagery can be a third factor. Using descriptive language to portray an in-depth image can lead to better vocabulary memory because it appeals to the human senses (Saltz & Donnenwerthnolan, 1981). Finally, Bäckman, Nilsson and Chalom (1986) argue that the impact on improved performance can be ascribed to “increased perceptual and attentional processes occurring during proprioception and/or when using objects to perform the action” (Macedonia & Kriegstein, 2012, p. 397).

More specifically related to the level of concreteness of the foreign words, Macedonia and Knösche (2011) suggested that, for a concrete word, the gesture strengthens the connections to the word due to internal characteristics the word possesses. A concrete word has a fixed image in our collective minds and a gesture illustrates this mental image when using the word in speech. In abstract words, the gesture helps to create a more concrete image of the abstract word and therefore facilitates recording it in memory (Macedonia & Knösche, 2011). In conclusion, Macedonia and Knösche (2011), demonstrated that not only concrete words, but also abstract words benefit by the use of gesture. However, they did not yet compare these different types of words. In this research, the goal was to demonstrate such a distinction.

Practical relevance

The aforementioned studies demonstrate the theoretical significance of the potential benefits of using gestures when learning a language. However, using gesture in SLA can also

be very interesting for practical purposes. In current education of second languages, the way of teaching is very different from how a first language is acquired. When learning a native language, children heavily engage with their parents/caregivers by use of gesture (Tomasello, 2005). In second language teaching, teachers already make use of many learning devices, trying to facilitate learning. Research has for example been done on the use of multimodal learning or multisensory input and it has been proven to aid in memorisation (von Kriegstein et al., 2008; Shimojo & Shams, 2001). Benefits of this type of learning have been shown in research on the use of flashcards (Barcroft, 2009), mobile phones (Başoğlu & Akdemir 2010) and songs (Keskin, 2011) when teaching a second language has proven their use and although the previously stated benefits of using gesture have been acknowledged and implemented in some types of education, there is still potential in adopting findings of these researches more widely.

Based on the aforementioned research there are some potentially interesting areas to be explored. Vocabulary learning is an important part of second language acquisition (Alqahtani, 2015) and as written before, the type of word matters when learning abstract and concrete words. This was established in research by Zhao and Macaro (2016), discussing the difference in difficulty remembering concrete and abstract words. Furthermore, the benefit of gesture in SLA has been proven by several researchers. The enactment effect states that reproducing a gesture aids in recollection of a word (Engelkamp & Krumnacker, 1980). Furthermore, when a word is accompanied by a congruent gesture, the learned word is better retained in memory (Kelly et al., 2009). Macedonia and Knösche (2012) confirmed that this effect is true for concrete as well as for abstract words. However, this research is aiming to fill a gap that previous research has not yet explicitly touched upon. Specifically, the comparison between learning concrete and abstract words when they are being taught using iconic and metaphoric gestures and the difference in the effects of gesture for different kind of words that not yet has been confirmed. Therefore, the following research question was introduced.

RQ: What is the effect of gestures on learning concrete versus abstract words when learning a second language?

Based on previous research that concluded that there is a significant effect of gesture on vocabulary acquisition of a second language (Engelkamp & Krumnacker, 1980; Quinn-Allen, 1995; Kelly et al., 2009; Macedonia and Knösche, 2011) the following hypothesis was proposed.

H1: Memorisation of both concrete and abstract words of a foreign language benefits from the use of gestures.

Furthermore, research about the differences in memorisation of concrete and abstract words (de Groot & Keijzer, 2000; Walker & Hulme, 1999) shows that concrete words are easier to remember than abstract words, as it has been shown that concrete words enable the semantic system more strongly than abstract words do (Kaushanskaya & Rechtzigel, 2012). Furthermore, research by Macedonia and Knösche (2011) describes the internal meaning and collective image of concrete words. Meaning that abstract words correlate with an arbitrary gesture that therefore has a symbolic value which makes it more difficult to remember. Based on the findings by these researches the following second hypothesis was developed.

H2: The use of gesture has a bigger effect on the memorisation of concrete words of a foreign language than on the memorisation of abstract words.

Method

Materials

In this study an experiment was carried out. This experiment contained two independent variables. The first independent variable was ‘Gesture’ and had two levels: present and not present. A different video was made for each level consisting of a native speaker of Vietnamese saying sentences of 8 Vietnamese words followed by the Dutch translation, for example ‘Máy bay betekent Vliegtuig’ (‘Máy bay, means plane’). This sentence was also shown at the bottom of the screen. After viewing each sentence containing the eight words with their translations twice, a screen counting down five seconds was shown during which the participant had time to repeat the word, and gesture, if the participant was in the gesture condition. In the gesture condition, the person accompanied the spoken Vietnamese and the Dutch word with the same gesture and in the no gesture condition the input was transmitted only by saying the phrase with the written form shown on screen. The gestures were established by the researchers by simultaneously producing the first gesture that comes to mind when hearing the word. If the researchers were not unanimous, a discussion would follow in which the most congruent gesture was chosen. All gestures were moderate to large gestures produced with two hands moved in front or next to the body. Some gestures were a static pose and others were a movement. In image 1 and 2 examples of the gesture for warning and airplane are displayed from a still from the video that the participants saw. To

verify the congruence of the gestures, a pre-test was done with ten participants to assure the congruence of the gesture with the word. In this pre-test the gesture was shown to a participant and they were asked if they thought the gesture matched the meaning of the word. If they disagreed, they were asked why and to provide a more congruent gesture. This pre-test showed that 100% of the participant agreed on the gesture for all concrete words and one of the abstract words (airplane, glasses, moustache, bowl and donation), 80% with one of the abstract words (understanding) and 60% with two of the abstract words. The abstractness of these words could have caused the uncertainty about the gestures. However, because more than half of the participants decided that the gesture was congruent for all of the words, the gestures were not changed after the pre-test.

The second independent variable was ‘Type of word’ and also consisted of two levels: concrete and abstract. The way in which each word was presented (i.e. with what kind of gesture) was dependent on this. An iconic gesture always accompanied a concrete word and a metaphoric gesture was used while uttering an abstract word (McNeill, 1992). A concrete word could be characterised as a word that has an explicit meaning that one could visualise, and an abstract word would be defined as words that do not evoke a fixed image in one’s mind and usually are symbolic of nature. They “differ from concrete words in terms of embodied experiential information” (Macedonia & Kriegstein, 2012, p. 405) and contain more emotional information (Kousta et al., 2011). In the videos the concrete and abstract words were alternated and accompanied by either the iconic or metaphoric gesture. The testing material consisted of 8 words in Vietnamese, 4 concrete and 4 abstract words (the words are displayed in appendix 1). The words were chosen based on the length of the Vietnamese word (i.e. two syllables) to confirm that the length of the word could not influence the differences in memorability of the words. Furthermore, the words were based on research on concreteness of words by Brysbaert et al. (2014) which concluded that the concrete and abstract distinguished significantly. The words used in this research were previously used in research on the effects of gesture by Macedonia, Müller and Friederici (2011), Kelly et al. (2009) and Macedonia and Knösche (2011).

The Vietnamese language was chosen, because the likelihood that our sample (native Dutch speakers) is familiar with this language was relatively small and to hereby rule out any previous knowledge. It should be noted that, because Vietnamese is not an easily associable language to native Dutch speakers, the unfamiliar sounds could have caused a bizarreness effect (Engelkamp, Zimmer & Biegelman, 1993) and this may have influenced memory performance (Macedonia & Knösche, 2011). The bizarreness effect entails that items that are

not easily recognisable cause a longer time to process the item but could increase the memorability of that item (Worthen et al., 2000). To ease learnability of the words, the words and gestures were presented twice, and the video was accompanied by written subtitles.



Image 1: Two stills from video 1: The gesture condition



Image 2: Two stills from video 2: The no-gesture condition

Subjects

In this experiment, 116 Dutch speaking participants took part. Of these 116 participants none had prior knowledge of Vietnamese. 36 participants were male (31%) and 80 participants were female (69%). A Chi-square test showed no significant relation between gender and gesture condition ($\chi^2(1) = .249, p = .617$). The mean age of the participants was 25.82 years old with the youngest participant being 16 and the oldest participant being 64 years old. An independent samples T-test was conducted and showed no significant effect of gesture condition on age ($t(111) = .056, p = .956$). The largest part of the participants was currently enrolled in or finished a higher education (49.1% University Bachelor, 13.8% University of Applied Sciences Bachelor and 14.7% University Master). A Chi-square test showed no significant relation between educational level and gesture condition ($\chi^2(4) = 3.433, p = .488$). This means that the participants in the two gesture conditions were comparable with regard to gender distribution, age, and level of education.

Design

This experiment had a 2x2 design with 'Gesture' as a between-subjects factor. Subjects were exposed to only one of the two conditions of this variable and were exposed to both conditions of the second independent variable 'Type of word' making this a within-subjects variable.

Instruments

This study had one dependent variable: ‘Number of correctly remembered words’ which was operationalised with a memorisation task. Participants were asked to take a test assessing the level of remembrance of the words of the new vocabulary shown in the video. The Vietnamese words were displayed in a random order with a blank box behind it, and the participant was asked to fill in the Dutch translation of each word. These translations were asked solely in a passive manner of memorisation (i.e. from Vietnamese to Dutch).

The answers were coded as either correct or incorrect and spelling was not accounted for. Also, if the subject would respond with an answer that is not exactly the same as the way it was taught but represented the same concept (e.g. *Donatie/Doneren (Donation/To donate)*), the answer was coded as correct. If an item was left blank, it was coded as incorrect, assuming that if a participant would leave a blank, they did not know the correct answer. All answers were coded for being correct or not by two coders with an intercoder reliability that was considered good: $\kappa = .979, p < .001$.

Procedure

Subjects were approached via network sampling. They received a link referring to the online experiment. Participants were given an introduction explaining the aim of the research and were asked to give their consent. They answered a few demographic questions about age, gender, educational level and languages spoken. Then, they were directed to one of the two videos according to the gesture condition they were randomly assigned to. They were asked to watch the video and repeat the word out loud with any gesture presented. Subsequently, the participant was directed to a page where the Vietnamese words were displayed, and the participant was asked to fill in the Dutch translation of the words. By going to the next page, they concluded the experiment and were thanked for their participation.

Statistical treatment

To test both hypotheses, a Repeated Measures ANOVA was performed with ‘Gesture’ as a between subject factor and ‘Type of word’ as the within subject/repeated factor and Number of correctly remembered words as the dependent variable.

Results

This study was set up to find out what the effect is of gestures on learning concrete versus abstract words from a foreign language. It was hypothesized that memorising words is easier when the word is accompanied by a gesture and that the effect of gesture is bigger for concrete words than for abstract words.

In order to test these hypotheses and to answer the research question a Repeated Measures ANOVA was conducted. This Repeated Measures ANOVA for ‘Number of correctly remembered words’ with between-subjects variable ‘Gesture’ (Gesture versus No gesture) and within subjects variable ‘Type of word’ (Concrete versus Abstract) showed no main effect of ‘Gesture’ ($F(1, 114) = .794, p = .375$). There was a significant main effect of ‘Type of word’ ($F(1, 114) = 22.900, p < .01$). Which means that concrete words ($M = 1.79, SD = 1.017$) were better remembered than abstract words ($M = 1.24, SD = 1.076$). This main effect was qualified by a significant interaction effect between ‘Type of word’ and ‘Gesture’ ($F(1, 114) = 7.732, p = .006$). After separating the gesture conditions, the ANOVA for the ‘With gesture’ condition did show a significant effect of ‘Type of word’ ($F(1, 61) = 32.291, p < .001$), but not for the ‘No gesture’ condition ($F(1, 53) = 1.782, p = .188$). This implies that when a gesture is presented, concrete words ($M = 1.87, SD = .897$) are better memorised than abstract words ($M = 1.03, SD = 1.055$).

In figure 1, a graphic representation is presented for a more in-depth understanding of these data and to illustrate the interaction effect that was found. In the graph, a clear interaction effect is visible demonstrating that only a significant result was found in the with-gesture condition which showed that concrete words are significantly better remembered with a gesture than abstract words with a gesture.

Table 1: Mean number of correctly remembered words per condition (with standard deviation between brackets).

	Gesture	No gesture	Total
	M (SD)	M (SD)	M (SD)
Concrete	1.87 (.896)	1.70 (1.143)	1.79 (1.017)
Abstract	1.03 (1.055)	1.48 (1.059)	1.24 (1.076)
Total	2.90 (1.58)	3.19 (1.83)	

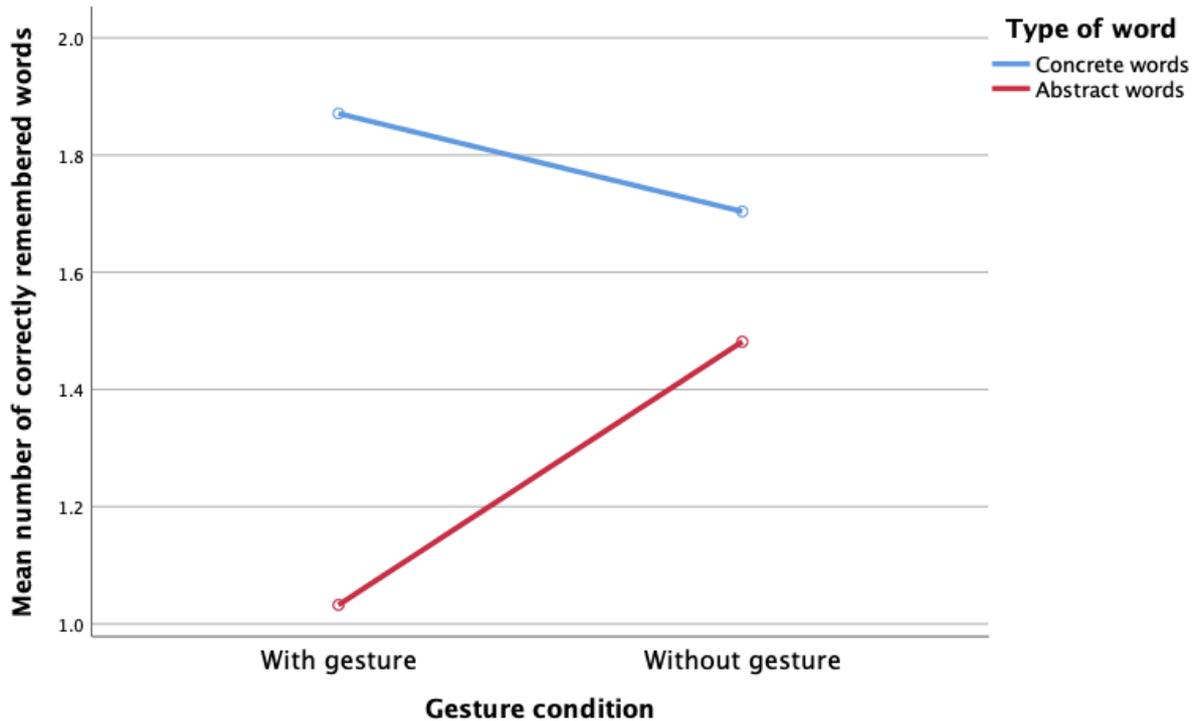


Figure 1: The mean number of correctly remembered words per gesture condition for each type of word

Conclusion & Discussion

The aim of this study was to expand on current research on the effect of gesture use in second language acquisition, and, more specifically, to explore the differences of the effects of gesture in concrete and abstract words. As written before, the effects of gesture and its benefits on second language vocabulary acquisition have been proven in previous research. However, the difference in the effects of gesture for different kind of words has not been confirmed yet.

The findings of this research did not show significant evidence in support of the first hypothesis. In contrast with previous findings by Macedonia and Kriegstein (2012), Engelkamp and Krumnacker (1980), Macedonia and Knösche (2011) and Zimmer (1985), there was no significant overall effect of the use of gestures when learning words of a second language. This might be due to the fact that the participant's environment during the experiment was unknown and there could have been differences between the environments of different participants. Previous research stated the importance of repeating a gesture when learning a word in order to remember it. However, due to the fact that this entire experiment was done online, it was impossible to see whether participants actually produced the gestures as they were learning, and therefore it may be that participants did not reproduce the gesture. If they in fact did not reproduce the gesture, there would be no enactment effect (Engelkamp & Krumnacker, 1980) which is necessary for words to be better retained in memory. This

could mean that, because participants did not repeat the gesture, the effect of gesture was not proven to be significant.

However, there was a significant difference in the effectiveness of gestures between concrete and abstract words. The main effect of type of word showed that in general, the concrete words were easier to remember than the abstract words (which confirms research done by Zhao and Macaro (2016)) and the significant interaction effect showed that if there was a gesture present, concrete words were better remembered than abstract words. If a gesture accompanied an abstract word, it seemed that the memorisation of abstract words was actually negatively affected by the use of gestures. An explanation for this finding might be found in research done by Kelly and Lee (2012). In their research they showed that if a task is difficult, in their case high phonetic demands, the use of a gesture actually hurts. This can be related to this research in which remembering abstract words, might be a more difficult task than remembering concrete words. A possible reason being that concrete words have a higher level of imageability (Klaver, et al., 2005) and can be placed in context easier (Zhao & Macaro, 2016). If such a task is more difficult, it could be that using a gesture hurts, because it distracts or confuses the person learning a new word.

These findings confirm the second hypothesis, proving that gestures help more when learning concrete words than when learning abstract words. The interaction effect of gesture on type of word showed that there is a significant difference between the remembrance of the two types of words when there was a gesture presented and that this difference was absent when there was no gesture accompanying the word.

This study looked at the impact of the type of word on vocabulary acquisition in a second language. While some of our findings contradicted previous research, the study did provide answers in the memorability of concrete versus abstract words if they are accompanied by a gesture.

Due to circumstances surrounding the COVID-19 crisis, the entire experiment was conducted online. This may have caused various limitations. For example, there is no knowledge about the differences in environments that participants were in while doing the experiment. Furthermore, for the same reasons it could not be verified whether participants repeated the given word out loud or reproduced the gesture as they were instructed. It would be interesting to do a similar experiment in which this can be controlled, for example by recording the participant or by doing the experiment face-to-face.

Another interesting aspect that could be researched is testing the active vocabulary. This entails that the participant is asked not only to translate the words from the foreign language into their first language, but also from their first language into the foreign language. Research has shown that demonstrating knowledge of vocabulary in an active way is significantly harder than merely testing this knowledge passively (Fan, 2000). Making the task harder may have a negative effect on the use of gesture as suggested by Kelly and Lee (2012).

Furthermore, repeating the experiment with words with another length (i.e. not only words with two syllables) could be interesting to test the effect of the length of the words on the memorability. It could be possible that words that are longer might be more difficult to remember (Baddeley, 2003) and consequently, if the task gets harder, the influence of gesture might change (Kelly & Lee, 2012).

In conclusion, this study showed that memorising concrete words is in general easier than memorising abstract words. Furthermore, it revealed an effect of gesture on memorability stating that in concrete words a gesture does help to remember a word better, but for abstract words memorisation of the words was better when there was no gesture present.

On the basis of these findings, some implications could be formulated. Teachers should be aware of gesture when teaching vocabulary of a new language, because when using gestures, the type of word has an influence on memorability. Using a gesture with a concrete word has a positive influence on the recollection of a word's meaning, but when a teacher uses gestures when teaching an abstract word, the use of the gesture actually hurts the recall.

References

- Alqahtani, M. (2015). The importance of vocabulary in language learning and how to be taught. *International Journal of Teaching and Education*, 3(3), 21-34.
- Bäckman, L., Nilsson, L. G. & Chalom, D. (1986). New evidence on the nature of the encoding of action events. *Memory and Cognition*, 14, 339–346.
- Baddeley, A. (2003). Working memory and language: an overview. *Journal of Communication Disorders*, 36, 189–208.
- Barcroft, J. 2009. Strategies and performance in intentional L2 vocabulary learning. *Language Awareness*, 18, 74–89.

- Başoğlu, E. B. & Akdemir, O. (2010). A comparison of undergraduate students' English vocabulary learning: Using mobile phones and flash cards. *Turkish Online Journal of Educational Technology*, 9, 1–7.
- Brysbaert, M., Stevens, M., De Deyne, S., Voorspoels, W., & Storms, G. (2014). Norms of age of acquisition and concreteness for 30,000 Dutch words. *Acta Psychologica*, 150, 80-84.
- Carson, J. G. (1992). Becoming biliterate: First language influences. *Journal of Second Language Writing*, 1(1), 37-60.
- Chamot, A. U., & Kupper, L. (1989). Learning strategies in foreign language instruction. *Foreign Language Annals*, 22(1), 13-22.
- Cohen, R. L. (1981). On the generality of some memory laws. *Scandinavian Journal of Psychology*, 22(1), 267-281.
- Engelkamp, J., & Krumnacker, H. (1980). Image-and motor-processes in the retention of verbal materials. *Zeitschrift für experimentelle und angewandte Psychologie*. 27(4), 511–533
- Engelkamp, J., Zimmer, H. D., & Biegelmann, U. E. (1993). Bizarre- ness effects in verbal tasks and subject-performed tasks. *European Journal of Cognitive Psychology*, 5, 393–415.
- Fan, M. (2000). How big is the gap and how to narrow it? An investigation into the active and passive vocabulary knowledge of L2 learners. *RELC Journal*, 31(2), 105-119.
- Groot, A. M. B. de, & Keijzer, R. (2000). What is hard to learn is easy to forget: The roles of word concreteness, cognate status, and the word frequency in foreign language vocabulary learning and forgetting. *Language Learning*, 50(1), 1-56.
- Gullberg, M. (2006). Some reasons for studying gesture and second language acquisition (Hommage à Adam Kendon). *IRAL-International Review of Applied Linguistics in Language Teaching*, 44(2), 103-124.
- Gullberg, M., De Bot, K., & Volterra, V. (2008). Gestures and some key issues in the study of language development. *Gesture*, 8(2), 149-179.
- Hoetjes, M. (2015). *Talking hands: Reference in speech, gesture, and sign*. PhD Dissertation, Tilburg University.
- Kaushanskaya, M., & Rechtzigel, K. (2012). Concreteness effects in bilingual and monolingual word learning. *Psychonomic Bulletin & Review*, 19(5), 935-941.
- Kelly, S. D., & Lee, A. L. (2012). When actions speak too much louder than words: Hand gestures disrupt word learning when phonetic demands are high. *Language and Cognitive Processes*, 27(6), 793-807.
- Kelly, S. D., McDevitt, T. & Esch, M. (2009). Brief training with co- speech gesture lends a hand to word learning in a foreign language. *Language and Cognitive Processes* 24, 313–334.
- Keskin, F. (2011). Using songs as audio materials in teaching Turkish as a foreign language. *Turkish Online Journal of Educational Technology*, 10, 378–383.

- Klaver, Peter, Jürgen Fell, Thomas Dietl, Simone Schür, Carlo Schaller, Christian E. Elger & Guillén Fernández. (2005). Word imageability affects the hippocampus in recognition memory. *Hippocampus*, 15, 704–712.
- Kousta, S. T., G. Vigliocco, D. P. Vinson, M. Andrews & E. Del Campo. (2011). The representation of abstract words: Why emotion matters. *Journal of Experimental Psychology: General*, 140, 14–34.
- Kriegstein, von K., Dogan Ö., Grüter, M., Giraud, A. L., Kell, C. A., Grüter, T., Kleinschmidt, A. & Kiebel, S. J. (2008). Simulation of talking faces in the human brain improves auditory speech recognition. *Proceedings of the National Academy of Sciences of the United States of America*, 105, 6747–6752.
- Macedonia, M., & Knösche, T. R. (2011). Body in mind: How gestures empower foreign language learning. *Mind, Brain, and Education*, 5(4), 196-211.
- Macedonia, M., & Kriegstein, von K. (2012). Gestures enhance foreign language learning. *Biolinguistics*, 6(3-4), 393-416.
- Macedonia, M., Müller, K., & Friederici, A. D. (2011). The impact of iconic gestures on foreign language word learning and its neural substrate. *Human Brain Mapping*, 32(6), 982-998.
- McNeill, D. (1992). *Hand and mind: What gestures reveal about thought*. University of Chicago press.
- Nikolov, M., & Djigunović, J. M. (2006). Recent research on age, second language acquisition, and early foreign language learning. *Annual Review of Applied Linguistics*, 26, 234-260.
- Plass, J. L., Chun, D. M., Mayer, R. E., & Leutner, D. (1998). Supporting visual and verbal learning preferences in a second-language multimedia learning environment. *Journal of Educational Psychology*, 90(1), 25.
- Quinn-Allen, L. (1995). The effects of emblematic gestures on the development and access of mental representations of French expressions. *The Modern Language Journal*, 79, 521–529.
- Saltz, E. & Donnenwerthnolan, S. (1981). Does motoric imagery facilitate memory for sentences — a selective interference test. *Journal of Verbal Learning and Verbal Behavior*, 20, 322–332.
- Shimojo, S. & Shams, L. (2001). Sensory modalities are not separate modalities: Plasticity and interactions. *Current Opinion in Neurobiology*, 11, 505–509.
- Straube, B., Green, A., Bromberger, B., & Kircher, T. (2011). The differentiation of iconic and metaphoric gestures: Common and unique integration processes. *Human Brain Mapping*, 32(4), 520-533.
- Tellier, M. (2008). The effect of gestures on second language memorisation by young children. *Gesture*, 8, 219–235.
- Tomasello, Michael. (2005). *Constructing a Language: A Usage-based Theory of Language Acquisition*. Cambridge, MA & London: Harvard University Press.

- Wagner, P., Malisz, Z., & Kopp, S. (2014). Gesture and speech in interaction: An overview. *Speech Communication, 57*, 209-232.
- Walker, I., & Hulme, C. (1999). Concrete words are easier to recall than abstract words: Evidence for a semantic contribution to short-term serial recall. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 25*(5), 1256.
- Worthen, J. B., Garcia-Rivas, G., Green, C. R., & Vidos, R. A. (2000). Tests of a cognitive-resource-allocation account of the bizarreness effect. *The Journal of General Psychology, 127*(2), 117-144.
- Zhao, T., & Macaro, E. (2016). What works better for the learning of concrete and abstract words: teachers' L 1 use or L 2-only explanations? *International Journal of Applied Linguistics, 26*(1), 75-98.
- Zimmer, H. D., Helstrup, T., & Engelkamp, J. (2000). Pop-out into memory: A retrieval mechanism that is enhanced with the recall of subject-performed tasks. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 26*(3), 658.

Appendix 1

Words used in the experiment

Dutch (English)	Vietnamese	Concrete/Abstract	Concreteness*
Vliegtuig (Airplane)	Máy bay	Concrete	4.80
Bril (Glasses)	Kính mắt	Concrete	4.87
Snor (Moustache)	Râu mép	Concrete	4.80
Kom (Bowl)	Cái bát	Concrete	4.60
Begrip (Understanding)	Kiến thức	Abstract	1.53
Donatie (Donation)	Ủng hộ	Abstract	2.47
Procedure (Procedure)	Quy trình	Abstract	2.20
Waarschuwing (Warning)	Cảnh báo	Abstract	2.47

*According to Brysbaert et al. (2014) : Scale of 1-5 with 1 being very abstract and 5 being very concrete. We took 2.50 as the division that the words had to be above for concrete words and below for abstract words.

The following word was used in research by Macedonia, Müller and Friederici (2011):
Airplane (Vliegtuig – Máy bay)

The following words were used in research by Kelly, McDevitt and Esch et al. (2009):
Glasses (Bril – Kính mắt), moustache (Snor – Râu mép), and bowl (Kom – Cái bát)

All the abstract words from the current study were used also in research by Macedonia and Knösche (2011).