

# Handy or harmful? The effect of gesture use on second language learning of concrete versus abstract words

---

*Bachelor's Thesis*  
*Hilde Ruitenber*

21-06-2020

Supervisor: Marieke Hoetjes

Second Reader: Ellen Ormel



**Radboud Universiteit**

## Introduction

In our globalised world, many people learn languages other than their native language (L1) for a broad variety of reasons. Whether it be an obligatory part of education, a work-related necessity, or just out of interest in a certain language, it is always desirable that the learning process of a second language (L2) is as effective and efficient as possible. When thinking about the idea of learning a second language, one may be quick to consider just verbal communication. However, non-verbal communication is also an important factor that is often culture-specific: Societies teach the people that live in it “not only how to speak, but also how to gesture, touch, even smell, posture themselves and assume spatial relationships with others.” (Soudek, 1984, p. 113). Within non-verbal communication, one can distinguish between different categories, such as proxemics (interpersonal distance), paralanguage (non-speech sounds like gasps etc.) and kinesics (can be summarized into body language) (Hall, 1966; Trager, 1958; Birdwhistell, 1952). The latter includes the use of gesture, which is also one of the aspects of non-verbal communication that can be used in second language acquisition.

It has been shown that one can teach and learn verbal communication aspects like vocabulary of a second language by using gestures that are paired with certain words, expressions or phrases (e.g. Tellier, 2005; Macedonia & Knösche, 2011). The research that has been done up until now on the influence of gesture on second language acquisition (SLA) has frequently resulted in contradictory results (for example, not all studies agree on what kind of gestures should be used) and is predominantly focused on the acquisition of concrete words. However, a lot of the words in a language’s vocabulary are abstract. There are reasons to assume that the acquisition of abstract words occurs differently than the acquisition of concrete words. This is why the present study aims to explore the possibly different effect of gesture use on learning concrete words on the one hand, and abstract words on the other hand. The results of the study can help improve the quality of language learning in both an educational and a professional context. Also, it can provide insight in the way people process gestural input.

## Literature Review

### **Gesture types**

In order to grasp the concept of gesture use in SLA, it is important to start by distinguishing the different types of gestures that exist. McNeill (1992) divides gestures into five categories: iconics, metaphorics, beats, cohesives and deictics. Iconic gestures are closely semantically tied to the concrete words they accompany, for example, forming a round shape with your hands when describing a ball. Metaphoric gestures are, like iconics, pictorial gestures, though they depict abstract concepts. For example, when describing a research field, one could perform a gesture that depicts a field, even though a research field is not an actual concrete field. Beat gestures accompany speech in a rhythmic way. They are often used to emphasise certain parts of a sentence. Cohesive gestures are used to “tie together thematically related but temporally separated parts of the discourse” (McNeill, 1992, p. 16). Finally, deictic gestures, often referred to as pointing gestures, are mostly used to indicate objects in the space that the speaker is in. However, they are also used often in an abstract manner. The experiment that was conducted in the present study makes use of iconic and metaphoric gestures that are closely semantically related to their corresponding words.

### **Gesture use**

How often a person uses gestures and what type of gesture they use, differs not only among cultures, but also on a personal level. That being said, one’s L1 does have a significant influence on the gestural expression of concepts. Cultures vary in several influential factors, being cognition, language, pragmatics and conventions for form-meaning associations (Kita, 2009), and gesture use depends on these factors. Of course, people use gestures naturally, thus also in foreign language acquisition. As was mentioned above, non-verbal communication and therefore also gesture use is culture specific. For example, a study by Kida (2005) showed that Japanese learners of French as an L2 started using a bigger gesture space and less depictive gestures when speaking French. It seems that with learning another language, one also learns another way of gesturing, often without being aware of this new development.

Besides being used subconsciously, gestures can also be purposefully used, for example as a method for learning vocabulary in a second language. Previous research has investigated the use of gesture in the language learning classroom (Tellier, 2005; for an extensive review see also McCafferty & Stam, 2008), and this is not without reason. Gestures can aid memorisation of words (Macedonia & Knösche, 2011) and it is thus worthwhile to further investigate the use of gestures in SLA. Several empirical studies (e.g. Engelkamp &

Krumnacker, 1980; García-Gámez & Macizo, 2018; Kelly & Lee, 2012; Macedonia & Knösche, 2011) have explored this topic, they will be discussed below.

### **Producing gestures while learning**

One example that shows a positive effect of gesture use on word recall is the enactment effect or self-performed task effect that was introduced by Engelkamp and Krumnacker (1980). This entails that performing an action while learning the words for it — for example ‘rip the paper’ and mimicking the movement one makes when doing that — improves memorisation. A study by Tellier (2005) confirmed this effect. In her experiment, young children were taught words using different methods. One group watched the teacher use gestures while explaining, one group did this as well but also re-enacted the gestures, and one group learned without viewing or repeating gestures. The study showed that, in a free recall test, the group that re-enacted the gestures performed the best out of the three groups. One can deduce from this that in order for gestures to aid memorisation, they need to be performed and not just watched. This was therefore also implemented into the experiment of the present study.

### **Do semantics matter?**

Whereas the focus of Tellier (2009) and Engelkamp and Krumnacker (1980) was on the effect of participants producing gestures while learning, other researchers have studied the characteristics of the gesture itself. To be specific, several studies focused on the importance of the semantic relationship between gesture and word. García-Gámez and Macizo (2018) conducted a language learning experiment with four gesture conditions: congruent, incongruent, meaningless and no gesture. Their results showed that congruent gestures, meaning gestures that match their corresponding word, positively influence word recall. However, both incongruent and meaningless gestures resulted in a word recall that was lower than the word recall after learning without gestures. In other words, they found that using gestures for SLA is only effective when a semantic relationship between gesture and word is established. Due to the negative effect on word recall for the incongruent and meaningless gesture condition, however, the authors suggest a possible negative overall effect of gesture use on word learning.

Research by Kelly and Lee (2012) points out an interesting nuance to this statement. Their experiment measured the effect of gesture on learning phonetically easy Japanese word pairs versus learning phonetically difficult Japanese word pairs (the participants were native English speakers). It appears that gesture use had a significant positive effect on word recall

for the easy condition, however, using gestures affected word recall negatively for the hard condition. Combined with the results of García-Gámez and Macizo (2018), one can conclude that using congruent gestures can have a positive effect on the acquisition of relatively simple tasks.

Some other studies in the research field have resulted into contradictory conclusions. Kelly, McDevitt and Esch (2009), like Kelly and Lee (2012), researched the effect of the use of gestures for learners of Japanese. However, contrarily to Kelly and Lee, (2012) they looked at incongruent as well as congruent gestures. Congruent gestures with a high iconicity affected learning positively, and incongruent gestures affected learning negatively when compared to learning without gestures., which is in line with the results of García-Gámez and Macizo (2018). For the incongruent gesture condition, Kelly et al. (2009) also used gestures with a high iconicity – for example, a gesture that clearly represents the word ‘wash’ accompanied the word ‘drink’. In their 2018 study, Huang, Kim and Christianson criticised this approach, arguing that it is logical that the participants in Kelly et al.’s study got confused by these gestures, because they so clearly represented a different word. They conducted a similar experiment, but now using three conditions: no gesture, low idiosyncratic gesture and high idiosyncratic gesture. The low idiosyncratic gesture condition contained gestures that did not mean anything independently, whereas the high idiosyncratic gesture condition contained gestures that were clearly semantically related to the word. Both of the gesture conditions led to better word recall than the no gesture condition, which contradicts the findings of Kelly et al. (2009) and García-Gámez and Macizo (2018), where only congruent gestures affected word recall positively.

All in all, it can be concluded that using gestures in SLA is helpful for improving learning, whether these gestures are closely semantically tied to the word or not. However, congruent gestures do seem to be more effective, which is why they will also be used in the present study.

### **Concrete versus abstract**

In all of the studies discussed above, the words that the participants were taught were mostly concrete — think of words like ‘drink’, ‘throw’, or ‘apple’. In none of these studies, a distinction between abstract words and concrete words was made. Iconic gestures that accompany concrete words are, by their nature, easier to relate to their corresponding word, as the things these words describe are often tangible and visual, like gestures. One can wonder if the results of these studies will therefore hold for abstract words as well, as for abstract words

it might require more effort to relate the gesture to the word. This has scarcely been researched, though one study did focus on this topic. In their 2011 research, Macedonia and Knösche taught participants concrete nouns and abstract verbs, adverbs and nouns in a fictive language called Vimmi. They used two gesture conditions: audio-visual (no gesture) and enactment (gesture that had to be reproduced by the participant). They tested word recall in four different ways; free recall, cued recall, sentence reproduction and sentence creation. The tests were repeated over time. It was found that gesture use had a positive influence on the three types of abstract words as well as on the concrete nouns.

Although Macedonia and Knösche's work provides interesting insights into the effect of gesture use on abstract and concrete word learning in a second language, there are some potential issues with the study which make it hard to determine whether the effect of gesture differs between abstract and concrete words. The words that were used in the study were divided into four categories, only one of which was concrete. Also, the study was focused on the effect of gesture on learning abstract words rather than on the comparison between concrete and abstract words. There are no studies yet that have researched the effect of gesture use in SLA on concrete versus abstract words. A study in which abstract and concrete words are used to an equal extent and, consequently, compared to each other could bring new insights. In addition, it cannot be confirmed that learning words in a fictive language such as Vimmi is generalisable to learning words in existing languages. The words were created so that their spelling was 'logical' to the participants (with regard to grammar and syntax rules of their native language), which could have made it easier for them to remember the correct spelling. All in all, more research should be done into the possibly different effect of gesture on abstract versus concrete word learning in second language acquisition, which is why the present research was conducted. The following research question was formulated: *'What is the effect of using gestures on learning concrete vs. abstract vocabulary in a second language?'*

It is expected that, for both types of words, gesture use will have a positive effect on word recall. This would be in line with the results of Tellier (2005), García-Gámez and Macizo (2018), Kelly et al. (2009), and Macedonia and Knösche (2011). Because gesture use may be more effective for learning easy tasks than for learning difficult tasks (Kelly & Lee, 2012), it is expected that the gesture condition will result in better word recall for concrete words than for abstract words. Learning concrete words using gestures is expected to be an easier task than learning abstract words with gestures, because concrete words may be easier to relate to their corresponding gesture.

## Methodology

### Materials

In order to answer the research question, a language learning experiment was conducted among native Dutch speakers. The participants took part in a language learning session by watching a video, through which they studied eight Vietnamese words, of which four were concrete and four were abstract. Vietnamese is a language that is rarely heard in the Netherlands, so chances that the participants had picked up some of the words before partaking in the experiment were very low. In addition, it is a language that very few Dutch people speak, which eased the process of selecting participants.

Two different videos were made, one for every gesture condition – no gesture or gesture. The video for the gesture condition was largely based on the teaching procedure used by Kelly et al. (2009). This means the video showed a native speaker of Vietnamese making the semantically related gesture whilst pronouncing the words in Vietnamese and Dutch (“Vietnamese word X means Dutch word Y”). In addition to the method Kelly et al. (2009) used, participants were also provided with a text bar on the bottom of the screen containing subtitles, as the sound of the Vietnamese words often differed from their spelling (from a Dutch-speaking point of view). Each word was shown twice in a row, followed by a 5 second break in which participants were asked to revise the word and reproduce its gesture (for participants in the gesture condition). Reproducing the gesture was specifically instructed upon the participants as it has been shown to improve the memorisation of words (Engelkamp & Krumnacker (1980); Tellier (2005)).

The video for the no gesture condition was very similar to the gesture video, except the instructor kept her arms to the side of her body instead of performing gestures. This was also based on Kelly et al. (2009).

As was said above, participants were taught four concrete and four abstract words (see Table 1 for an overview). The abstract words were selected from the word list of Macedonia and Knösche (2011). The concrete words *bowl*, *moustache* and *glasses* were chosen from the word list of Kelly et al. (2009). The concrete word *airplane* was selected from the words used in a study by Macedonia, Müller and Friederici (2011) about the impact of iconic gestures on second language vocabulary acquisition. Several criteria were taken into account for the selection of the words, namely the concreteness level, the frequency, and the complexity of its Vietnamese translation. For the latter, this meant that all the words that were chosen have two syllables in Vietnamese (see Table 1 for the Vietnamese translation of the words). The words were checked for level of concreteness using the corpus that was created by Brysbaert,

Stevens, De Deyne, Voorspoels, Storms (2014). Their corpus consists of 30000 Dutch words that have a score ranging from 1 to 5 where 1 stands for very abstract, and 3 stands for equally abstract as concrete, and 5 stands for very concrete. Table 1 displays the 8 words that were selected and the score they have on this scale. The frequency of the words was also assessed using a database created by Keuleers, Brysbaert and New (2010), in order to ensure that the words were equally frequent. This database shows how many times words are used, based on film subtitles. In Table 1, it is demonstrated that all of the words' frequencies are below 100 per million. As every word that was used in this study had a frequency of under 100 per million words, they can all be regarded as low frequency words. For the noun 'bowl', no data were available.

Table 1. Words used in the experiment and their Vietnamese and Dutch translations, level of concreteness, and frequency

Word	Vietnamese translation	Dutch translation	Level of concreteness	Frequency (per 1 million words)
Airplane	Máy bay	Vliegtuig	4.80	89
Bowl	Cái bát	Kom	4.60	NA
Moustache	Râu mép	Snor	4.80	9
Glasses	Kính mắt	Bril	4.87	24
Procedure	Quy trình	Procedure	2.20	12
Warning	Cảnh báo	Waarschuwing	2.47	21
Donation	Ủng hộ	Donatie	2.47	3
Understanding	Kiến thức	Begrip	1.53	14

In the experiment, iconic gestures accompanied the concrete words and metaphoric gestures accompanied the abstract words. 5 researchers worked together on the design of the experiment. In order to design the gestures for the words, the researchers had a meeting where they simultaneously made the gestures for each word that seemed most congruent to them. After coming to an agreement about what gestures should be performed, the 8 words and their gestures were tested for congruence. In a pre-test, 10 participants were shown the gestures and they were told their corresponding word. They then voted 'yes' if they thought the gesture matched the word and 'no' if they did not. All 10 participants rated the gestures for the four concrete words as congruent. For the abstract words, 1 gesture was rated as congruent by all 10 participants, 1 gesture was rated as congruent by 8 participants, and 2 gestures were rated



as congruent by 6 participants. The lower scores for congruence of the abstract words were expected, as it is not possible to make gestures for these words that are visually representative, given the intangibility of abstract words. The gestures that were rated as congruent by 6 participants were those for the words *warning* and *procedure*. The gestures for these words are displayed in Figure 1 (note that the gesture for *procedure* is a rotating motion of the arms). The arms of the teacher in the gesture for *warning* form a cross, which indicates that something should not be done. The rotating motions in the gesture for *procedure* represent the different steps of a procedure. Appendix A includes stills of the videos for each gesture.

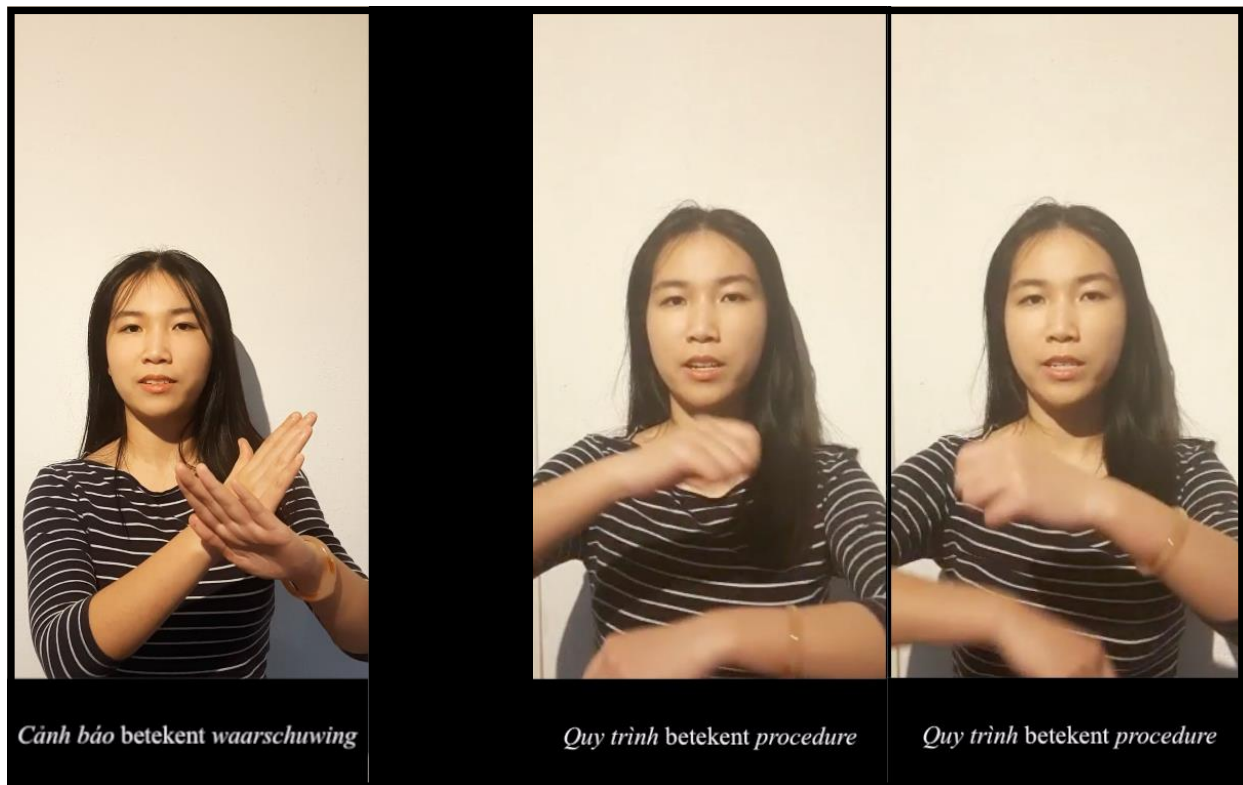


Figure 1. Screenshots of the gesture videos for *warning* (left) and *procedure* (middle and right)

The abstract and concrete words were presented to the participant in a random order, in order to decrease the chance that the participants were aware of the purpose of the experiment. This also avoids selective memorization of the words due to participants remembering either concrete or abstract words better because they were presented last.

### Subjects

161 subjects took part in the online experiment. Due to technical issues, some participants had no access to the video and, as a consequence, could not learn the words. The data of these 45

participants were not taken into account in the analyses. Ultimately, the data of 116 native Dutch speakers with no prior knowledge of Vietnamese were analysed. The participants were also asked which foreign languages they spoke. Almost all participants ( $N = 115$ ) spoke English. On average, participants spoke 2.07 languages ( $SD = 1.09$ ). An independent samples T-test showed that there was no mean difference in number of foreign languages spoken between the two gesture conditions ( $t(111.10) = 1.42, p = .157$ ). 31% of the participants was male and 69% was female. The participants' age ranged from 16 to 64. The mean age was 25.82, with a standard deviation of 12.50. The educational level ranged from secondary school to a Master's degree, but the most frequent educational level was a Bachelor's degree ( $N = 57$ ). 62 participants were exposed to the gesture condition and 54 participants were exposed to the no gesture condition. Within the gesture condition, there were 18 men and 44 women. In the no gesture condition, there were 18 male participants and 36 female participants. A Chi-square test showed that the gender distribution did not differ significantly between the two groups ( $\chi^2(1) = .25, p = .617$ ). An additional Chi-square test pointed out that there was no significant difference between the experimental conditions in educational level ( $\chi^2(4) = 3.43, p = .488$ ). Finally, an independent samples T-test showed ( $t(111.02) = .06, p = .956$ ) that the mean age for the gesture condition ( $M = 25.76, SD = 12.41$ ) did not differ significantly from the mean age for the no gesture condition ( $M = 25.89, SD = 12.72$ ).

## Design

The study used a 2 (gesture or no gesture) x 2 (abstract or concrete word) mixed design, with gesture as a between-subjects factor and word type as a within-subjects factor. This design was chosen as to reliably measure the difference in concrete and abstract word learning without the participants knowing about the effect of the presence or absence of gesture being measured. Each participant thus learned 4 concrete and 4 abstract Vietnamese words via either a video containing a speaker using gestures, or a video containing a speaker that did not use gestures.

## Instruments

An online questionnaire was used to measure the dependent variable word recall. Participants performed the task of filling in this questionnaire directly after watching the video. The questionnaire contained 8 questions, each asking for the Dutch translation of one of the Vietnamese words that were taught. The word recall was thus tested only passively. This choice was made because of the difficulty of the task and the little time that participants had

to revise the words. It was expected that active knowledge testing, in other words, asking for the Vietnamese translation of Dutch words, would result in very low scores.

Participants could score up to 8 points in the questionnaire, receiving 1 point for each correct answer. Spelling mistakes were not taken into account in assessing the scores. Unanswered questions resulted in a 0-point score, as it was assumed that participants did not remember the translation if they did not fill in an answer. The answers were graded by two coders. The intercoder reliability of the variable ‘number of correct answers’ was good:  $\kappa = .979, p < .001$ ).

### **Procedure**

The experiment was executed by 5 researchers. The participants in the experiment were recruited through convenience sampling via the social network of the researchers. Subjects were not rewarded for their participation. The experiment was designed using the survey tool Qualtrics and the videos were created using video-editing software. Participants received a web link that directed them to the experiment, where they first read an explanation of the experiment and gave their consent. The experiment started with the demographical questions. In addition to the demographics discussed above, participants were also asked to enter what other languages they speak besides Dutch. After answering these questions, the participants watched either the gesture or the no gesture video (this was randomised by the software), followed by the word recall test, which was also the final part of the experiment. After finishing the test, participants saw a debriefing screen thanking them for their participation. In total, the experiment took approximately 10 minutes.

### **Statistical Treatment**

In order to answer the research question, a repeated measures analysis of variance was performed that compared the effect of gesture on word recall for concrete and abstract words.

## Results

A repeated measures analysis of variance was performed with gesture condition as between subjects factor and word type as within subjects factor and number of correctly remembered words as dependent variable. The results from the analysis were used to investigate whether the suspected effect of gesture was indeed present and whether this differed among the two word types. Table 2 shows the mean score for each word type in each condition.

Table 2. Means and standard deviations (between brackets) of word recall (score ranging from 0 for no correct answers to 4 for all correct answers) per type of word in each condition

Word type	Gesture condition <i>n</i> = 62 <i>M</i> ( <i>SD</i> )	No gesture condition <i>n</i> = 54 <i>M</i> ( <i>SD</i> )	Total <i>n</i> = 116 <i>M</i> ( <i>SD</i> )
Concrete	1.87 (.90)	1.70 (1.14)	1.79 (1.02)
Abstract	1.03 (1.06)	1.48 (1.06)	1.24 (1.08)
Total	2.90 (1.58)	3.19 (1.83)	3.03 (1.70)

A significant main effect of type of word was found ( $F(1, 114) = 22.90, p < .001$ ). In general, word recall was lower for abstract words ( $M = 1.24, SD = 1.08$ ) than it was for concrete words ( $M = 1.79, SD = 1.02$ ). There was no significant main effect of gesture condition ( $F(1, 114) < 1, p = .375$ ). This is not in line with the hypothesis that a positive main effect of gesture would be found, which would be expected considering results from previous research.

However, a significant interaction effect between gesture condition and type of word nuanced the main effects ( $F(1, 114) = 7.73, p = .006$ ). The significant difference in word recall between abstract and concrete words was only found among participants in the gesture condition ( $F(1, 61) = 32.92, p < .001$ ). For these participants, word recall of concrete words was higher ( $M = 1.87, SD = .90$ ) than word recall of abstract words ( $M = 1.03, SD = 1.06$ ). There was no significant difference in word recall between abstract and concrete words among participants in the no gesture condition ( $F(1, 53) = 1.78, p = .188$ ). The interaction effect confirms the hypothesis that word recall would be better for concrete words than for abstract words in the gesture condition.

### Conclusion and Discussion

The results of the study showed that it is generally more difficult to memorise abstract words than it is to memorise concrete words, which confirms the hypothesis. In addition, the results indicated that the use of gestures did not affect word recall in general. In other words, when not taking into account the type of word, using gestures does not necessarily aid second language acquisition. This is a surprising finding considering the existing literature, and the hypothesis was rejected. The most important finding of this study, however, was that the difference in concrete and abstract word memorisation only occurred in the gesture condition. Concrete word recall was significantly higher than abstract word recall in this condition. One could thus conclude that gesture use only has a positive effect on the memorization of concrete words. Though the following difference was not significant, it should be noted that abstract word recall was actually lower in the gesture condition than it was in the no gesture condition. This suggests that (metaphoric) gesture use might actually hinder abstract word recall, though further research would be needed to investigate this.

Some of the results that were found are in accordance with previous findings. A so-called concreteness effect has been found by De Groot and Keijzer (2000). This concreteness effect refers to the phenomenon that, in native as well as foreign language learning, concrete words are easier to learn and are less likely to be forgotten than abstract words. The results of the present study confirm said effect. With this in mind, it could be stated that in the present study, the abstract words are the 'hard condition' and the concrete words are the 'easy condition'. If then, the finding of the present study that abstract word acquisition was significantly lower than concrete word acquisition when using gestures is compared to the results of Kelly and Lee (2012), it can be concluded that the results from the present study are similar to Kelly and Lee's results. In their study, there was a positive effect of gesture use on word recall for easy word pairs and a negative effect of gesture use on word recall for hard word pairs.

On the one hand, the results from the present study as well as Kelly and Lee's study thus support the idea that gesture use is not always helpful and can sometimes make the learning process more difficult. It must be noted that this finding contradicts with findings by Macedonia and Knösche (2011), who concluded that gesture use positively affects concrete word learning as well as abstract word learning. On the other hand, Like Kelly and Lee, the present study showed a positive effect of gesture use on the acquisition of concrete words. This positive effect may have been caused by the close semantic relationship that concrete words have with iconic gestures. From the gesture alone, participants could probably already

deduce the meaning, without hearing the corresponding word. For abstract words, it is more difficult to create a gesture that clearly represents the word. It might be more difficult to link the meaning of an abstract word to the meaning of a metaphoric gesture. Further research could study whether different types of gestures could have a better effect on the acquisition of abstract words. Perhaps an abstract gesture like, for example, a pointing gesture, would be a better match with an abstract word.

In the present study, there was no main effect of gesture. In total, mean word recall did not differ significantly among the two gesture conditions. This conflicts with the widely researched statement that gesture use aids memorisation (Macedonia & Knösche, 2011; Tellier, 2005; Engelkamp & Krumnacker, 1980). The enactment effect that Engelkamp and Krumnacker (1980) introduced indicates that, in order for gesture use to be effective, subjects need to perform the gesture while revising the words and not just watch an instructor perform it. The study from Tellier (2005) showed similar results. Though participants of the present study were instructed to re-enact the gestures that they saw in the video, the researchers were unable to supervise this due to the online environment in which the experiment had to be conducted. This means that participants may not have produced the gestures, and this in turn might have been a possible cause for the incongruence between previous findings and the findings of this study.

The online environment of the experiment brings us to some possible limitations of the study. The fact that the experiment was not conducted face to face but had to be conducted online (due to Corona virus regulations) may have been disadvantageous. First of all, the participants could not be observed. Hence, it was not possible to examine whether participants in the gesture condition actually performed the gestures and also whether they possibly watched the video a multitude of times in order to be able to increase their score. Secondly, conducting the experiment in a classroom setting (which was how this study was originally planned) would have better resembled a real-life language learning experience, and could possibly have had a positive impact on the performance of the participants.

Another limitation of this study is the short time that was taken to study the words. Participants had only five seconds in between words to revise and they took the word recall test directly after watching the video. As the time for this research was limited and the participation of the subjects was not recompensed, it was not realistic to increase this time period. The short time frame may have influenced the performance of the participants, as a longer revision time would expectedly lead to better memorisation. The participants only took

the word recall test once, directly after learning the words. Long-term word recall could therefore not be measured, which would have been an interesting aspect to research.

Despite the limitations mentioned above, this study has contributed to the field of gesture studies, specifically gesture use in second language acquisition. It explored a topic, the role of the type of word, that had previously hardly been researched. However, this topic can still benefit from further research and there are some aspects that are yet to be examined. Executing an experiment similar to the one in this study, but over a longer period of time with multiple instruction moments might provide additional insights regarding long-term memorisation of concrete versus abstract words. An experimental design like the one Macedonia and Knösche (2011) used could then be implemented, with longer, recurring training sessions in a classroom setting. When participants can use more time to revise, it is also possible to teach a wider variety of words, or even phrases and sentences. It would then also be possible to test the active knowledge of participants, as they will have obtained deeper knowledge of the study material.

This study revealed some new findings that invite further exploration of the topic of gesture use in abstract word learning. The use of iconic gestures aided word recall of concrete words, but the use of metaphoric gestures resulted in a lower word recall of abstract words. As was mentioned above, it could be interesting to research whether other types of gestures, being deictics or beat gestures (see introduction), have different effects on abstract word acquisition in a second language.

Finally, the present study sampled quite a diverse group of participants of different age and education categories as to represent everyday society. That being said, businesses or educational institutes may be interested in the learning process of a more specific population, for example high school students or expats.

To conclude, the present study has contributed to the research topic of effect of gesture use on SLA of different types of words. This specific topic is still in development and the present study has taken some of the first steps in the expansion of knowledge about this topic, with the most important findings being that gesture use positively affects concrete word learning and negatively affects abstract word learning in a second language. In other words, when using gestures as a learning method, the type of word that is being learned should be taken into account. Besides their contribution to the research field, the results can also be used practically in an educational context as to improve language teaching. Teachers could use gestures when teaching their students concrete words, which often occurs in the starting phase

of the acquisition of a language. When teaching more abstract (and therefore more complex) vocabulary, teachers may not want to use gestures as a memorisation aid.



## References

- Birdwhistell, R. L. (1952). *Introduction to Kinesics*. Louisville, KY: University of Louisville.
- 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. doi: 10.1016/j.actpsy.2014.04.010
- Engelkamp, J., & Krumnacker, H. (1980). Imaginale und motorische Prozesse beim Behalten verbalen Materials. *Zeitschrift Für Experimentelle Und Angewandte Psychologie*, 511–533.
- García-Gámez, A. B., & Macizo, P. (2018). Learning nouns and verbs in a foreign language: The role of gestures. *Applied Psycholinguistics*, 40(2), 473–507. doi: 10.1017/s0142716418000656
- de Groot, A. M. B., & Keijzer, R. (2000). What is hard to learn is easy to forget: The roles of word concreteness, cognate status, and word frequency in foreign-language vocabulary learning and forgetting. *Language Learning*, 50(1), 1–56. doi: 10.1111/0023-8333.00110
- Hall, E. T. (1966). *The hidden dimension*. Garden City, N.Y.: Doubleday.
- Huang, X., Kim, N., & Christianson, K. (2018). Gesture and Vocabulary Learning in a Second Language. *Language Learning*, 69(1), 177–197. doi: 10.1111/lang.12326
- 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. doi: 10.1080/01690965.2011.581125
- 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(2), 313–334. doi: 10.1080/01690960802365567
- Keuleers, E. Brysbaert, M. & New, B. (2010). SUBTLEX-NL: A new frequency measure for Dutch words based on film subtitles. *Behavior Research Methods*, 42(3), 643–650.

- Kida, T. (2005). *Appropriation du geste par les étrangers : le cas d'étudiants japonais apprenant le français*. Aix en Provence : Laboratoire Parole et Langage.
- Kita, S. (2009). Cross-cultural variation of speech-accompanying gesture: A review. *Language and Cognitive Processes*, 24(2), 145–167. doi: 10.1080/01690960802586188
- Macedonia, M., & Knösche, T. R. (2011). Body in mind: How gestures empower foreign language learning. *Mind, Brain, and Education*, 5(4), 196–211. doi: 10.1111/j.1751-228x.2011.01129.x
- 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. doi: 10.1002/hbm.21084
- McCafferty, S. G., & Stam, G. (2008). *Gesture: second language acquisition and classroom research*. New York, NY: Routledge.
- McNeill, D. (1992). *Hand and mind: what gestures reveal about thought*. Chicago, IL: University of Chicago Press.
- Soudek, M. (1985). Non-verbal channels in language learning. *ELT Journal*, 39(2), 109–114. doi: 10.1093/elt/39.2.109
- Tellier, M. (2005). How do teacher's gestures help young children in second language acquisition? *International Society of Gesture Studies, ISGS*.
- Trager, G. L. (1958). Paralanguage: A first approximation. *Studies in Linguistics*, 1–12.

## Appendix A. Video stills for each gesture and video still of no gesture video

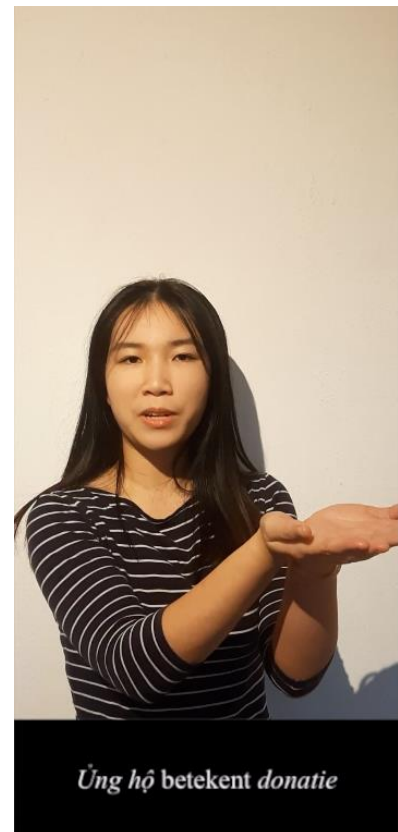
1. Gesture for *warning*2. Gesture for *procedure*3. Gesture for *glasses*4. Gesture for *understanding*



5. Gesture for *moustache*



6. Gesture for *bowl*



7. Gesture for *donation*



8. Gesture for *airplane*



9. Video still of no gesture-video