

# Bachelor's Thesis

The effect of iconic gestures and beat gestures on second language acquisition.



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## Introduction

As the world is globalizing at rapid pace, more and more people decide to learn a second language. When it comes to learning second languages there are several important factors determining its success. Numerous studies have investigated how a second language is acquired and what factors have an effect on this process. Age has shown to be an important predictor of successful language learning (Birdsong, 2018). Other variables include IQ (Genessee, 1976), personality (Robinson, Gabriel & Katchan, 1994) and the presence of verbal and visual annotations (e.g. translation of a word or picture representing it) (Plass, Chun, Mayer & Leutner, 1998). However, there has not been a lot of research into the effect of gestures on second language acquisition yet, even though Gullberg (2006) stressed the importance on why to study gestures and their influence on second language acquisition. Some studies focused on the effect of gestures on language onset and subsequent language development (Özçalışkan & Dimitrova, 2013). Apart from that, gestures appear to have an influence on second language learning as well. This is not surprising, given the fact that gestures are a natural component of language and thus need to be acquired too when learning a second language. It has to be taken into account though, that there are different kinds of gestures and they relate to speech and second language acquisition in different ways. These different types of gestures (gesticulation, pantomime, emblems and sign language), and their specific purposes were formulated by McNeill (1992). Hence, most studies focused on effects of certain types of gestures -mostly sub-types of the gesticulation category- on language development/acquisition. Gluhareva and Prieto (2017), for instance, looked at beat gestures and pronunciation specifically, whereas Tellier (2008) concentrated on iconic gestures. However, little research compared different types of gestures and the effect they may have on a single aspect of second language learning. Therefore, this study is set out to analyze different types of gesture conditions with regards to their influence on second language word learning.

## Gestures

All people produce gestures, either consciously or unconsciously. Most people see this form of non-verbal communication as something that is separate from verbal communication. Even though gestures and speech occur in close synchrony and their meanings do have overlap, gestures are able to convey information that cannot be communicated with words alone (McNeill, 1992). Consequently, both gestures and verbal communication are required to convey someone's meaning. Rather than being separate entities in communication, gestures and speech are

interconnected (McNeill, 1992). Some gestures carry meaning on their own, whereas other gestures only convey meaning if they co-occur with speech. This is further explained by McNeill (1992), who coined Kendon's (1983) continuum, which divides gestures into four main categories: gesticulation → pantomimes → emblems → sign language. The necessity of speech to co-occur with the gesture in order to add meaning declines towards the right end of the spectrum.

The majority of the gestures (99%) produced in everyday life belong to the gesticulation category (McNeill, 2006). In his book, McNeill (1992) further divides these into four sub-categories, the first one being "iconics". Iconics are pictorial gestures representing concrete things. An example of an iconic gesture is the movement a speaker makes with his/her index and middle finger when he or she wants to illustrate that someone is walking. Due to the gesture's tight semantic relation with speech, both the speech and gesture entity are needed to fully understand the speaker's meaning and thought. The second sub-type are metaphorics. These gestures are similar to iconics to the extent that both are pictorial, meaning that the shape of these gestures depend on the spoken content. However, metaphorics are different from iconics in that they depict abstract words. An example of a metaphoric gesture is when a speaker bends her/his fingers in the shape of a heart in order to provide a visual representation of love. The gestures belonging to the third sub-type are not pictorial; rather they always look like up/down or in/out movements that occur on the rhythm of speech. This type of gesture is called a beat gesture. McNeill (1992) articulates that beat gestures are important to fully understand a speaker's conception of the narrative as a whole due to their pragmatic content. Additionally, McNeill (1992) provides examples of things they can do: "marking the introduction of new characters, summarizing the action, introducing new themes" (p. 15). The final type of gestures are deictics (pointing gestures), which can be either referring to concrete or abstract entities. These gestures can refer to concrete objects by pointing at them, although most of the time in a narrative, they will refer to an abstract entity (McNeill, 1992). An example of the latter function is when a speaker points somewhere when they are talking about, for example, a country they have visited.

### **Gestures and learning**

In the domain of gesture studies there is general consensus that gestures do not solely serve as a transmitter of (semantic) information. The enactment (acting something out with for instance gestures) of action phrases (e.g. "grab the cup"), also improves recall, recognition performance

and reaction time (Zimmer et al., 2000; Masumonto et al., 2006). The effects of gestures are investigated in many other fields, amongst other things education. Singer and Goldin-Meadow (2005) conducted a study looking at the effects of different learning strategies and gestures co-occurring with speech on the learning abilities of young children. They found that using gestures in teaching leads to better learning results than if no gestures are used. Moreover, using gestures that deliver information in addition to the verbally transmitted information leads to even better results than using gestures that deliver information that is exactly the same as the spoken information.

Valenzo, Alibali and Klatzky (2003) looked at teachers' use of pointing and tracing gestures. They had young children participate in a pre-test in which they had to answer questions about the symmetry of images. After the pre-test, half of the children watched a verbal-plus-gesture lesson and the other half a verbal-only lesson. In the post-test, the children who were exposed to the verbal-plus-gesture lesson gave more correct judgments than the children who were exposed to the verbal-only condition, proving that adopting pointing and tracing gestures enhances the general learning process of young children. Similar results were found by Church, Ayman-Nolley and Mahootian (2004). In their study, young native-Spanish and native-English children were asked to watch a pre-test video posing questions about water, number of quarters and the length of rulers. Subjects were provided with an answer sheet to answer the questions that were posed in the pre-test video. After the pre-test video, half of the children watched an instruction video (that further explained the three topics presented in the testing video) with gestures, whereas the other half of the children watched the instructional video without gestures. After the instruction video, the subjects took part in a post-test that was similar to the pre-test and enabled Church et al. (2004) to analyze improvement in the subjects' answers. The experiment found that learning for the group of children who watched the video accompanied by gestures improved two-fold, which shows that gestures have a positive effect on the learning process of children.

### **Gestures and first language acquisition**

Thus far, gestures and their influence on learning in general have been discussed, but the power of gestures goes beyond this field of research. Over the past few decades, more and more researchers found evidence for effects of gestures on language development. The adoption of gestures by parents, for example, can increase comprehension for young children, by reducing the chance of misinterpretation. Accompanying speech with pointing gestures makes it easier for children to

understand the meaning of the spoken words (Özçalışkan & Dimitrova, 2013). In addition, parents' gesture use also affects their children's vocabulary development. More specifically, the amount of pointing gestures a parent uses determines the pace of the child's vocabulary growth (Özçalışkan & Dimitrova, 2013). The fact that gestures do not only precede lexical and syntactical development, but actually predict it, was also investigated in a study conducted by Iverson and Goldin-Meadow (2005). In their study, they observed the gestures and speech produced by young children over a longer period of time, and the effects these had on lexical development and the development of one- to two-word combinations. With regards to lexical development, the study found that the gestures young children produce initially, turn into their verbal counterparts after that. Additionally, the experiment showed that those children that use gesture-plus-word combinations first (point at a cup and say drink), were also the first children to acquire two-word combinations, proving that gestures are of paramount importance to language development.

## **Gestures and second language acquisition**

### **Iconic gestures**

As discussed above, gestures play a major role in first language development of young children. More and more research, though, is looking at the effects of gestures on second language learning. Research has shown that gestures can play a compensatory role with regards to linguistic weakness (Gullberg, 1991) and that types of gestures are related to speech in different ways (Sherman & Nicoladis, 2004). However, gestures can fulfill a far more active role in second language acquisition.

Several studies have shown that people can infer meaning from new words when gestures co-occur with speech (Goodrich & Hudson Kam, 2009; Gullberg, Roberts & Dimroth, 2012). Goodrich and Hudson Kam (2009) conducted two experiments, presenting subjects with one and subsequently two verbs that were made up by the researchers. Subjects were either placed in the iconic-gesture condition, the other-gesture condition or the no-gesture condition. Subjects were first taught the meaning of the novel verb by mentioning the novel verb together with a gesture and toy it represented. After, the experimenter would say a sentence with one of the novel verbs in it and subjects were required to point at the toy that matched with the verb. It appeared that subjects in the iconic gesture condition were better at inferring meaning from the fake verbs than the subjects in the no-gesture condition, showing a positive effect of iconic gesture use on second

language acquisition. In another experiment, where participants had to watch a Chinese weather report either once or twice, Gullberg, Roberts and Dimroth (2012) found that participants were better at inferring meaning from Mandarin words if the item occurred more frequently and if it was accompanied with a gesture. This also shows that gestures can aid in the comprehension and subsequent acquisition of a language.

Apart from providing a helping hand to infer meaning from unknown words, several studies have looked into the effects iconic gestures might have on second language word learning (Tellier, 2008; Kelly, McDevitt & Esch, 2009; Macedonia, Müller & Friederici, 2011).

Tellier (2008) conducted an experiment to determine whether gestures enhance word memorization more so than pictures do. After having presented all of her young French subjects with an English word, both accompanied by a gesture and a picture, she split the group up in two between-subject groups. Half of the subjects were in a gesture condition, whereas the other half were in the picture condition. She found that subjects in the gesture condition performed better in the active word knowledge assessment, that is connecting English words to pictures that were presented to them. Moreover, subjects in the gesture condition memorized the English words better over a longer period of time than the subjects in the picture condition. These results show that gestures are a crucial predictor to active word knowledge and long-term word memorization.

Where the latter study found an effect of gestures on word learning for children, a study by Kelly et al. (2009) found that gestures also enhance word memorization for adults. In their experiment, they trained young English-speaking adults into learning 12 Japanese verbs. The subjects were split into four groups: one group was trained with speech only (S), the second group was trained with speech and a congruent iconic gesture (S+CG), the third group was trained with speech and an incongruent iconic gesture (S+IG) and the last group was trained twice with speech only (RS). After three training sessions, the researchers had the subjects participate in a free recall test and a word recognition task. They found that if iconic gestures are semantically congruent to their verbal referent, word memorization is increased.

In addition to that, Kelly et al. (2009) also found evidence for the fact that gestures enhance word memorization because of their semantic content and not due to their attention-grabbing abilities. Subjects in the congruent gesture condition performed better than the subjects in the speech condition, whereas subjects in the speech condition performed better than subjects in the incongruent gesture condition. Kelly et al. (2009) stated that the effect might have happened

“because the meaning of congruent gestures is conceptually integrated with the meaning of speech, and this integration creates stronger and more multimodal memory representations” (pp. 319-320). Moreover, beneficial effects of congruent gestures did not occur due to increased exposure to meaning than in the speech condition. The subjects in the repeated speech condition, who saw the meaning of the Japanese words twice as often, still performed worse than subjects in the congruent gesture condition (Kelly et al., 2009).

Similar results were found in a study by Macedonia et al. (2011). In their within-subject experiment, they asked their German subjects to learn 92 artificial words from the Vimmi language in different conditions (Iconic gesture + facial expression, Iconic gesture + no facial expression, meaningless gesture + facial expression, meaningless gesture + no facial expression). The subjects were split up into two within-subject groups and both groups were exposed to every condition with different words. The subjects were trained for four days and were exposed to the vocabulary 13 times every day. Two written translation tasks that already started on the second day, showed that in both tasks, Vimmi to German and German to Vimmi, subjects in the iconic gesture condition performed better than subjects in the meaningless gesture condition. A free recall test, that was conducted 60 days after the experiment, showed that subjects in the iconic gesture condition were better at recalling both the Vimmi word when they were presented with the German word and the German word when they were presented with the Vimmi word. This experiment supports previous research that show a positive effect of iconic gestures on second language word learning.

### **Beat gestures**

Most studies thus far have showed an effect of iconic gestures on second language learning, but these gestures are not the only type that have been shown to be able to influence this process. Even despite their lack of a semantic relation to their spoken referents (McNeill, 1992), beat gestures have been shown to enhance second language learning as well (Gluhareva & Prieto, 2017; Kusch, Igualada & Prieto, 2018)

In their study, Gluhareva and Prieto (2017) looked into the effect that beat gestures might have on the improvement of second language pronunciation. Their Spanish subjects took part in a pre-test, in which they had to vocally respond to 6 “easy” and 6 “difficult” prompts. After the pre-test, the subjects had to participate in a training session that required them to watch a video that showed a native speaker of English respond to the same 12 prompts that the subjects were exposed

to in the pre-test. Half of the subjects saw prompts 1-6 with beat gesture and 7-12 without gesture and the reverse happened for the other half of subjects. The post-test was similar to the pre-test and found that subjects who saw difficult prompts accompanied with beat gestures in the training session showed the biggest improvement with regards to their second language pronunciation.

Moreover, beat gestures also seem to affect other aspects of second language acquisition. Kusch et al. (2018) conducted an experiment to find out if beat gestures and prosodic prominence (emphasis by means of pitch) were important factors in second language word learning. In this between-subject study, 92 Spanish students were trained to learn Russian words. Subjects were split up into four groups and were exposed to all four of the categories (no prominence in both speech and gesture, prominence in both speech and gesture, prominence in speech but not gesture, prominence in gesture but not in speech). However, every group was exposed to a different sample of the stimuli words in their condition. After the training session, subjects took part in a free recall test and a word recognition task. It was found that prosodic prominence without gestural prominence led to better word learning than gestural prominence without speech prominence. However, the combination of gestural prominence and speech prominence showed optimal results. This suggests that beat gestures can play a supportive role in second language word learning. A possible explanation for this effect could be that beat gestures are an integral part of our language system and therefore are able to direct a listener's attention towards the speaker's speech rather than other highlighters (Hubbard, Wilson, Callan & Dapretto, 2009).

Thus far, it has been shown that gestures play a crucial role in both first language acquisition (Özçalışkan & Dimitrova, 2013; Iverson & Goldin-Meadow, 2005) and second language acquisition (Goodrich & Hudson Kam, 2009; Gullberg, et al., 2012; Tellier, 2008; Kelly, et al., 2009; Macedonia, et al., 2011; Gluhareva & Prieto, 2017; Kusch, et al., 2018). However, previously conducted studies have solely focused on the effect of one certain type of gesture on second language (word) learning, rather than combining them and comparing which type of gesture has the most substantial impact. Insights into the influence of different types of gestures on second language learning and what type is most suitable for which aspect of second language learning are paramount to effective second language acquisition in education, as it might accelerate and simplify the entire process. Therefore, this study is going to combine the use of iconic gesture, beat gesture and no gesture conditions into one experiment, and find out which type is most effective in second language acquisition, or, more specifically, second language word learning.

Based on the findings of previous studies that showed that gestures play a role in second language acquisition (Goodrich & Hudson Kam, 2009; Gullberg, et al., 2012; Tellier, 2008; Kelly, et al., 2009; Macedonia, et al., 2011; Gluhareva & Prieto, 2017; Kusch, et al., 2018), the following hypothesis has been formulated:

- Hypothesis 1: Iconic gestures and beat gestures enhance second language word learning more so than if no gestures are used in this process.

Based on previous literature that showed that iconic gestures share a close semantic relation to the speech they represent and beats only relate to speech in a rhythmic manner (McNeill, 1992), the following hypothesis has been formulated:

- Hypothesis 2: Iconic gestures enhance second language word learning more so than beat gestures do.

## **Method**

### **Materials**

This study had one independent variable: “Gesture Condition”. The variable had three levels, namely: iconic gesture, beat gesture, no gesture. For every level, a separate video was recorded containing 20 Dutch words followed by their Tamil translation (See appendix 1 one for an overview of all Tamil words with their English and Dutch translations). These 20 words were chosen as their iconic gesture representatives were easy to perform. The audio and Tamil words were the same in every video. An example of what subjects heard in the video was: “huis betekent Vīṭu, huis betekent Vīṭu” (In English: “House means Vīṭu, House means Vīṭu”). It was decided to say the sentence twice as this is also done in the experiment conducted by Kelly et al. (2009). In the iconic gesture condition video, a Dutch word was uttered, followed by its Tamil counterpart, which was accompanied by an iconic gesture, which visualized the semantic meaning of the word (see figure 1). In the beat gesture condition video, a Dutch word was uttered, followed by its Tamil counterpart which was accompanied by a beat gesture (see figure 2). In the no-gesture condition video, a Dutch word and the Tamil counterpart was be uttered, without any accompanying gestures (see figure 3). In order to reach consensus on what the iconic gestures were going to look like, one researcher uttered the Tamil word in question and the other researchers produced the iconic gesture they thought represented that word best. The gesture-form that was produced most often, was chosen. Apart from the gestural manipulation, and the fact that the no gesture training

video was zoomed in on the speaker, the videos were the same.



Figure 1. Iconic gesture condition video (bird)



Figure 2. Beat gesture condition video



Figure 3. No gesture condition video

## Subjects

In this experiment, 91 subjects took part, of which 50 were female and 41 male. All subjects were between the age of 18 and 27 ( $M = 20.71$ ,  $SD = 1.69$ ), as it was assumed that age might influence language acquisition. All of the subjects were native speakers of Dutch and had no prior knowledge of the Tamil language. In terms of educational level, most of the subjects were bachelor students: 81 bachelor students vs. 9 master students. Two subjects did not indicate their educational level.

A number of tests were conducted to test whether the subjects in the different gesture conditions differed from each other with regards to: gender, age and educational level. A Chi-Square analysis showed that there was no significant difference between the subjects in the different gesture condition with regards to their gender ( $\chi^2(2) = .068$ ,  $p = .967$ ). A second Chi-Square analysis showed that there was no significant difference between the subjects in the different gesture conditions with regards to their educational level ( $\chi^2(2) = 2.291$ ,  $p = .318$ ). A one-way analysis of variance showed no significant difference between the subjects in the different gesture conditions with regards to age ( $F(2,88) < 1$ ,  $p = .947$ ).

## **Design**

The study used a between-subjects design with gesture condition (iconic gesture; beat gesture; no gesture) as between-subject factor; subjects were exposed to only one of the three conditions.

## **Instruments**

This study had 1 dependent variable: “number of correctly remembered words”. This variable was operationalized by means of a word memorization task, which was based on the one used in Kelly et al. (2009). After the subjects had learned their first ten Tamil words in the training video, they participated in the first part of the word memorization task. In this word memorization task, all subjects were exposed to all of the first ten Tamil words again, for which a separate no-gesture video was made. The order of the words was randomized to rule out that subjects remembered the translation of the word due to the order they were presented in in the training video. After being exposed to every word in Tamil, the subject had 15 seconds to write down the Dutch translation on the answer sheet that was be given to them. After the subjects had learned 10 new Tamil words in the second part of the training video, they participated in the second part of the word memorization task. All 20 answers given in the word memorization task were coded as being either correct or incorrect. Spelling errors for the Dutch translation were not taken into account to the extent that it did not change the meaning of the word. If the subjects wrote down an answer that was not exactly the same as the one that was taught to them, but represented the same concept, it was counted as “correct”. If a subject left an item blank, it was coded as incorrect as it was argued that in the case of leaving something blank, the participant did not know the correct answer. Additionally, the answer sheet asked for the subjects’ gender, age and educational level.

## **Procedure**

Subjects were recruited on the campus of Radboud University. Once they accepted to take part in this experiment, they were taken to the room in which the experiment was conducted. Apart from informing the subjects that they had to watch a video and that they were learning words in the Tamil language, they were not informed about the aim of the experiment any further. After the subjects had watched the first part of the training video, they were exposed to the first part of the word memorization task. After they had seen every word, they had 15 seconds to write down the Dutch translations. As soon as the first part of the word memorization task was finished, the second

half of the word learning video started. After the subjects watched the second part of the training video, the subjects took part in the second part of the word memorization task that was the same compared to the first part. As soon as a subject was finished with their second word memorization task, they handed in their answer sheets and were subsequently informed that they could provide their email address if they wanted to be debriefed as soon as all data had been collected.

### Statistical treatment

To find support for our hypotheses a One-Way ANOVA was conducted.

### Results

Hypothesis 1 stated that both iconic gestures and beat gestures would enhance second language word learning. Hypothesis 2 stated that iconic gestures would be better at enhancing second language word learning than beat gestures. In order to find evidence for these hypotheses a one-way analysis of variance was conducted. The one-way analysis of variance showed a significant effect of gesture condition on number of correctly remembered words ( $F(2,88) = 4.52, p = .014$ ). Subjects in the iconic gesture condition performed significantly better in the word memorization task ( $M = 11.37, SD = 3.19$ ) than the subjects in the beat gestures condition ( $M = 9.2, SD = 2.64, p = .015$ , Bonferroni-correction;), which means that hypothesis 2 was supported by the data. There was no significant difference between subjects in the iconic gesture condition and the no gesture condition ( $p = .095$ , Bonferroni-correction). Moreover, there was no significant difference between subjects in the beat gesture condition and the no gesture condition ( $p = 1.00$ , Bonferroni-correction). The latter two findings mean that the data do not support hypothesis 1. (see table 1 for an overview of all the means and standard deviations per condition and see table 2 for an overview of how often every word was remembered in every condition).

Table 1. Number of correctly remembered words per condition (min=0, max=20)

Gesture condition	Number of Subjects	Mean(SD)
No gesture present	$\overline{n(31)}$	9.74 (2.86)

Beat gesture present	<i>n</i> (30)	9.20 (2.64)
Iconic gesture present	<i>n</i> (30)	11.37(3.19)

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Table 2. Number of correctly/incorrectly remembered words and percentage correct/incorrect within the word (per gesture condition).

		Iconic Gesture Count(percentage)	Beat Gesture Count(percentage)	No Gesture Count(percentage)
Heart	Correct	12(29)	11(27)	18(44)
	Incorrect	19(38)	19(38)	12(24)
Scissors	Correct	10(21)	18(37)	20(42)
	Incorrect	21(49)	12(28)	10(23)
House	Correct	19(35)	15(28)	20(37)
	Incorrect	12(32)	15(41)	10(27)
Triangle	Correct	2(20)	3(30)	5(50)
	Incorrect	29(36)	27(33)	25(31)
Curls	Correct	13(30)	12(27)	19(43)
	Incorrect	18(38)	18(38)	11(24)
Elephant	Correct	17(41)	13(32)	11(27)
	Incorrect	14(28)	17(34)	19(38)
Ball	Correct	11(29)	11(29)	16(42)
	Incorrect	20(38)	19(36)	14(26)
Rabbit	Correct	4(22)	5(28)	9(50)
	Incorrect	27(37)	25(34)	21(29)
Book	Correct	5(29)	2(12)	10(59)
	Incorrect	26(35)	28(38)	20(27)
Glasses	Correct	8(47)	2(12)	7(41)
	Incorrect	23(31)	38(38)	23(31)
Mountain	Correct	11(26)	18(42)	14(32)
	Incorrect	20(42)	12(25)	16(33)

Flute	Correct	14(30)	17(37)	15(33)
	Incorrect	17(38)	13(29)	15(33)
Bowl	Correct	19(36)	16(30)	18(34)
	Incorrect	12(31)	14(37)	12(32)
Guitar	Correct	31(34)	30(33)	30(33)
	Incorrect	0(0)	0(0)	0(0)
Moustache	Correct	13(31)	10(24)	19(45)
	Incorrect	18(37)	20(41)	11(22)
Slope	Correct	12(26)	13(28)	21(46)
	Incorrect	19(42)	17(38)	9(20)
Flat	Correct	29(34)	28(32)	29(34)
	Incorrect	2(40)	2(40)	1(20)
Rain	Correct	18(53)	9(26)	7(21)
	Incorrect	13(23)	21(37)	23(40)
Hat	Correct	29(34)	27(32)	29(34)
	Incorrect	2(33)	3(50)	1(17)
Bird	Correct	25(39)	16(24)	24(37)
	Incorrect	6(23)	14(54)	6(23)

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### Conclusion and Discussion

This study aimed at expanding on current theories of the influence of gestures on second language acquisition, more specifically, second language word learning. Several studies have looked into the effects of gestures on word memorization (Kusch et al., 2018; Macedonia et al., 2011; Kelly et al., 2008; Tellier, 2008, Kelly et al., 2009) and even on second language pronunciation (Gluhareva & Prieto, 2017), but mostly took only a single type of gesture into account. However, no study has looked into differences in effectiveness of different type of gestures for second language word learning.

The findings of this experiment did not support hypothesis 1. First of all, it was showed that there was no difference in word memorization between the iconic gesture group and the no gesture group. Additionally, it showed that subjects in the beat gesture group did not do better in

the word memorization task than the no gesture group. These results imply that using iconic gestures or beat gestures has no advantage over using no gestures with regards to word learning. Therefore, these results stand in contrast with previous literature (Goodrich & Hudson Kam, 2009; Kelly et al., 2009), as these studies showed that iconic gestures conditions do enhance second language word learning more so than no gesture conditions. Furthermore, Macedonia et al. (2011) found that iconic gestures enhance word memory more so than meaningless gestures. It can be argued that beat gestures –as used in this experiment– are meaningless too since they mostly look like up-down movements regardless of the speech they accompany. This means that this study’s finding –that there is no significant difference between beat and iconic gestures– is not in line with Macedonia et al. (2011).

A possible explanation for the similarity in scores between the iconic gesture condition and the no gesture condition and between the beat gesture condition and the no gesture condition might be that the latter group might have benefitted from clearer facial cues. The no gesture condition video was recorded from the chest up to rule out that any gestures would be caught on the video. The video was therefore more zoomed in and the face was visible more clearly, which could have functioned as attention grabbing and consequently have led to more correct answers.

However, the study did find that the subjects in the iconic gesture condition performed better in the word memorization task than subjects in the beat gesture condition. This finding supports hypothesis 2. A possible explanation for this effect could be that iconic gesture share a close semantic relation with the word it represents as explained by McNeill (1992), whereas a beat gesture is related to the rhythm of the speech and not the word itself because of which looks the same for every word.

The descriptive table (see table 2) showed that certain words were remembered were well compared to other words. The Dutch translation of the Tamil word “Kiṭṭār” (guitar) was remembered correctly by all subjects. This could be due to the fact that it sounds similar to the English word “guitar”, which could have made it easier to remember the Dutch translation. The Tamil word “Piḷāṭ” (flat), was also remembered very well across all conditions. This could be explained due to its close relation with the Dutch translation (plat) in terms sound, which could have made it easier to remember the translation.

**Future research**

This study looked at the effect that different types of gestures could have on second language word learning and which type is most effective. Even though a part of our findings is in contrast with previous literature (Kelly et. al, 2009), the study did provide new insights into the superiority of iconic gestures over beat gestures with regards to second language word learning. Based on the belief that the domain of gesture studies that focus on gestures and their effect on language acquisition deserves more research, and based on limitations of the current study, several opportunities for further research have been formulated.

As explained earlier, the no gesture condition video was recorded more zoomed in on the face of the speaker than in the other two conditions. This was done to make sure no gestures would be visible. However, this might have influenced the attention of the subjects and consequently caused the similarity in scores between the subjects in the iconic gesture condition and in the no gesture condition and between the subjects in the beat gesture condition and no gesture condition. Future research should carefully control for facial cues/expressions to be equally visible across all conditions.

A second practical limitation of this study is that subjects were tested instantly on their word memorization. Like the experiment by Kelly et. al (2009), this study could conduct a post-test a few days after the actual experiment to see if short-term memory played a role in the results and to see if gestures also have an effect on the long-term second language word learning.

A final recommendation for further research is looking at the effect gestures might have on learning second language verbs, since this study has solely looked at the effects gestures have on learning second language nouns. In order to draw conclusions on the effects gestures might have on second language acquisition, it is necessary to analyze more language components than just nouns.

**Implications**

This study showed that using iconic gestures in the second language word learning process has no advantage over using no gestures. Secondly, it showed that using beat gestures has no advantage over using no gestures. However, the study did show that using iconic gestures in this process is

better than using beat gestures. On the basis of these findings, some implications were formulated. First of all, if teachers use gestures in their communication with students, they should aim at using iconic gestures rather than beat gestures. However, it remains questionable to what extent teachers can control which gestures they produce, as people are not always aware of the gestures they produce. Moreover, this study has added new insights to consisting theories with regards to the effect different gestures have on second language acquisition.

### Literature

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## Appendix 1. Tamil words with English and Dutch translations.

Tamil Word	English Translation	Dutch translations
Itayam	Heart	Hart
Kattarikkōl	Scissors	Schaar
Vīṭu	House	Huis
Mukkōṇam	Triangle	Driehoek
Curul	Curls	Krullen
Yāṇai	Elephant	Olifant
Pantu	Ball	Bal
Muyal	Rabit	Konijn
Puttakam	Book	Boek
Kaṇṇāṭi	Glasses	Bril
Malai	Mountain	Berg
Pullāṅkuḷal	Flute	Fluit
Kiṇṇam	Bowl	Kom
Kiṭṭār	Guitar	Gitaar
Mīcai	Moustache	Snor
Cāyvu	Slope	Helling
Piḷāṭ	Flat	Plat
Malai	Rain	Regen
Toppi	Hat	Hoed
Paravai	Bird	Vogel

