Radboud University

Investigating the effect of different types of gestures on second language acquisition

Nadia Hermsen
S4787625

n.hermsen@student.ru.nl

Introduction

As the world is becoming more and more globalized, it becomes more necessary that communication between people from different countries flows smoothly. Living in the world as we live in now often requires some understanding of foreign languages. Luckily, increasingly more individuals are able to and want to speak a second or even third language. The process of second language acquisition requires some training, but this can be facilitated by means of various factors, as was proven by various studies. The multimodality of communication, for example, might be useful in the optimization of the acquisition of a second language. According to Partan and Marler (2005), communication is multimodal when combined signals are obtained via more than one sensory channel. For example, speech (obtained via the ears) and gestures (obtained via the eyes). Gestures are a large part of multimodal communication and research has suggested that gestures may be a factor that can help in second language acquisition (SLA).

Different types of gestures exist, for example beat gestures, iconic gestures, metaphoric gestures and deictic gestures. One might ask him- or herself why studying gestures and SLA is important. Gullberg (2006) has one clear and obvious answer to this, namely that "gestures are everywhere and affect all human interactions". Indeed, much research has been done into the effect of gestures on SLA. However, in these studies the focus was typically on only one specific type of gesture (mainly on iconic or beat gestures). Much evidence has been found on the influence of iconic gestures on aspects of language learning, as well as evidence on the influence of beat gestures on language learning. Some studies compared the two, but not in their effect on SLA. Hence, this paper will not focus on one specific type of gesture, as was done in previous studies, but rather concentrates on comparing different types of gestures and what their effect is on second language acquisition. This seems very interesting because different gestures might have diverse effects on SLA. Expanding the knowledge about gestures' influence in SLA could, for example, help language teachers to make the best use of the gestures they practice. Moreover, it can help language learners to acquire knowledge of a language more easily.

Thus, it is known that second language acquisition can be influenced by different factors. Likewise, it is known that gestures can have an influence on SLA. However, it is still unknown which type of gesture has the biggest influence on SLA, more specifically, in learning vocabulary in a second language. Therefore, in this study, different types of gestures will be compared with regard to their influence in learning words in a second language. It is

hoped that with the results of this study, language instruction and language learning can be facilitated.

Theoretical framework

The process of learning a second language is called second language acquisition (SLA). According to Jack Richards (1985, as cited in Khasinah, 2014), SLA is "the process by which people develop proficiency in a second or foreign language." Krashen (1982) discusses how this language acquisition process works. He states that there are actually two independent processes. The first one is language acquisition, which is a subconscious process and functions in the same way as children learn their first language. The second process is language learning, which is a conscious process in which one knows about the rules of a language (e.g. grammar) and is acquainted with them. Then, what happens in these processes that one indeed does acquire the rules and is able to speak a particular language? According to Krashen (1982), this can be explained on the basis of the input hypothesis. This hypothesis states that individuals use languages' structures that have not yet been acquired, structures that are beyond the current level of competence. This is done by using more than just the linguistic competence, that is to say, one utilizes context, knowledge of the world and extra-linguistic information, for example. Then, as long as communication is successful and input is comprehended, competence can be provided automatically. This is a process that emerges over time.

Thus, SLA is a process that requires some effort. Research has shown that this process can be facilitated by many factors. Examples of factors that might influence SLA are age (Birdsong, 2018; Ortega, 2009), intelligence (Spolsky, 1985) and personality (Robinson and Katchan, 1994; Verhoeven and Vermeer, 2002). Another factor that might be useful in optimizing SLA, could be the multimodality of communication. Partan and Marler (2005) define multimodal communication as communication via combined signals which are received via more than one sensory channel (either via sight, sound, touch, smell or taste). An example of this multimodality is given by McGurk and MacDonald (1976, as cited in Partan and Marler, 2005). They found that seeing the articulatory gesture that accompanies a sound regulates the perception of speech sounds. This is called the McGurk-effect. An articulatory gesture is an example of nonverbal communication (obtained via the eyes) and speech is an example of verbal communication (obtained via the ears). Thus, it is multimodal as it is obtained via multiple sensory channels. Another example of multimodality is speech (verbal

communication, obtained via the ears) that is accompanied by gestures (nonverbal communication, obtained via the eyes). Research by Clark and Paivio (1991, as cited in Tellier, 2008), showed that when both verbal and nonverbal modalities co-occur, learning might be strengthened. Gestures are a large part of multimodal communication and thus might be useful as a tool in the optimization of second language acquisition.

According to Gullberg (2006, p.104), gestures can be defined as "symbolic movements related to ongoing talk and to the expressive effort or intention (what you are trying to say)". As stated by McNeill (1992), gestures can be differentiated as in 'Kendon's continuum'. Gestures that occur with *speech* are on the left side of this continuum: 'Gesticulation → Language-like gestures → Pantomimes → Emblems → Sign Languages'. McNeill (1992) further categorizes gesticulation into four categories: iconic, metaphoric, deictic and beat gestures. *Iconic* gestures display a close relationship to the concrete semantic content of speech. Their form and way of execution show aspects of the semantics that are also displayed in speech (McNeill and Levy, 1982 as cited in McNeill, 1992). *Metaphoric* gestures also display imagery, but they present an image of abstract concepts, such as knowledge or love. Thus, this makes them more complex. *Deictic* gestures are pointing motions, typically performed with a pointing finger. However, the head, nose, chin or a manipulated device can be used as well. Deictic gestures hardly ever point to concrete objects during narration, according to McNeill (1992). Usually the meaning of the gesture relies on the referential value assigned to the selected part of a gesture space. *Beat gestures* are movements that do not depict a clearly visible semantic meaning. They are related to the rhythm of speech (also called prosodics). Beat gestures can be identified by means of the following characteristics: they are biphasic, small, movements with low energy, and can be seen as quick flicks of the fingers or hand. They occur wherever the hands may be (McNeill, 1992).

Most studies on gestures and second language acquisition have investigated the influence of iconic and beat gestures. For example, in a study by Goodrich and Hudson Kam (2009) it was examined whether learners can utilize information that is included in iconic gestures to learn the meanings of novel verb forms. This was done by means of an experiment, in which participants had to learn four new verbs that belonged to novel actions carried out by unfamiliar toys. Participants either saw 1) verbs accompanied by an iconic gesture (action) from which meaning could be inferred, 2) verbs accompanied by an other-gesture from which no meaning could be deduced, or 3) verbs accompanied by no gesture. The interpretation of a verb was evaluated by using a forced choice task. Participants had to

point to, touch or indicate their answer to the question "Sam really likes to (*novel verb*). Which toy lets Sam go (*novel verb*)-ing?" The results suggested that iconic gestures might be useful to assess the meaning of new verbs in a new language.

These findings are in line with other research on iconic gestures, for instance by Kelly, McDevitt and Esch (2009). In their study, two experiments were conducted. In the first experiment, English speaking participants had to learn Japanese nouns and verbs. The instructor would introduce the word and define it two times. Participants were trained in all four within-subjects conditions: speech, speech and congruent gesture, speech and incongruent gesture and repeated speech. In the speech condition, participants were told the instructions without seeing a gesture. In the congruent gesture condition, an iconic gesture that was semantically in line with the Japanese word and English translation, was added to speech. In the incongruent gesture condition then, the Japanese word and English translation were not semantically in line with the gesture being produced. The repeated speech condition was equal to the speech condition, only the instructions were told twice. Words were trained in three sessions, with 2-minute breaks in-between. The same words were trained, but for every session in a different order. After a final 5-minute break, the experimenter performed two memory tasks: a free recall test, in which the participants wrote down the English translation, and a recognition task, in which the participants had to circle the correct English translation. Participants had to return two more times to do a follow-up memory test.

In the first experiment by Kelly et al. (2009), it was confirmed that in a novel language, gesture does influence the learning and remembrance of words. Gesture supports learning in two ways. Firstly, congruent gestures produce better memory than speech alone, and incongruent gestures produce worse memory. Secondly, the positive effects of congruent gestures on learning were not just caused by extra exposure to the meanings of the new words. This was shown in the repeated speech condition, as subjects memorized more words when definitions were allocated across speech and gesture instead of packed into speech only. In the second experiment, the results from the first experiment were reproduced. In this experiment, subjects could again recall more words if a congruent gesture was being produced.

More evidence on the influence of iconic gestures on SLA was found by Tellier (2008). Tellier investigated the influence of iconic gestures on memorization in SLA. In a 4-week lasting experiment that was conducted, twenty French children, with no knowledge of English, took part. They had to learn eight English words. These words were easy to illustrate both with pictures and gestures. Two videos were made with a demonstration of the words

and their visual counterpart: one video consisted of words with iconic gestures, the other video contained words with pictures. The video was also used in the assessments, but in a different order. The children had to participate each week, so took part in four sessions in total. During the first three sessions, participants had to repeat the English words five times. In the gesture-condition, children had to recreate the gesture while saying the words another time. The results showed that the gesture group performed significantly better than the picture group. Gestures have a stronger influence than pictures on memorization when they are reproduced and thus act as a motor process. This finding could be relevant for teachers, as they can use gestures to help young children to learn a second language. Thus, this study also provides evidence that iconic gestures may have an influence in second language acquisition.

Focussing on beat gestures, there is some evidence that beat gestures have an influence on learning a second language as well. In Kushch and Prieto Vives (2016), the effects of beat gestures combined with focal pitch accents on L2 new vocabulary learning were evaluated by means of an experiment. Catalan participants had to learn 16 words in a novel second language (Russian). Participants were placed in four different conditions: no prominence in speech nor gesture, prominence in both speech and gesture, prominence in speech but not in gesture or the other way around: prominence in gesture but not in speech. Every participant saw 16 words in all 4 conditions, thus 64 words in total. For each Russian word, four videos were created that correspond with the four conditions. In the video, an instructor would say the target Russian word in a standard context sentence. Participants were trained and tested. In the test session, two memory tasks were performed: a free recall test (participants heard the same audio two more times but in a different order, then had to write down the Catalan translation) and a recognition task (they heard the audio twice and had to choose between four options). The results showed that the biggest effect was found when the target word was presented with a beat gesture and focal pitch accent. Beat gestures produced naturally (with focal pitch accent) thus favour vocabulary learning in a second language.

More evidence on the effect of beat gestures on SLA was found by Gluhareva and Prieto (2017). In their experiment, Spanish participants with an upper-intermediate level of English were trained and assessed on their development of native-like speech. The speech of participants was recorded before and after training, so that the experimenters were able to make a comparison. Participants were shown 12 videos with prompts (images and instructions of everyday situations that a participant might encounter when living in an English-speaking country). Each participant saw six prompts being presented with gestures and six prompts without gestures, only the order differed. So, in condition A, they saw items 1-6 with gestures

and 7-12 without gestures, and in condition B, they saw it the other way around. In the video with beat gestures, the instructor would state the target phrase while using beat gestures (either up-and-down or back-and-forth). On the contrary, in the no-beat condition, the instructor would not use any gesture. Then, in the assessments, participants had to record a short response to each of the prompts. What was found was that training with beat gestures significantly improved the participants' accentedness ratings. Their speech was less-accented for difficult items: they presented those with a more native-like speech. Hence, this is another indication that not only iconic, but also beat gestures can have an influence on SLA.

Very few studies investigated both iconic and beat gestures and their influence in any aspect of SLA. One example, however, is the study by So, Sim Chen-Hui and Low Wei-Shan (2012). In their study, they did two similar experiments, one with adults and one with children. Participants were native speakers of English and were presented a video in which a narrator recited three lists of English verbs using (no) gestures. For the adults, each list contained ten verbs (thirty verbs in total), whereas for the children, each list contained five verbs (fifteen verbs in total). For one list, the narrator recited the verbs and produced iconic gestures, for the other he recited the verbs and produced beat gestures and for the third list he recited the verbs without using any gesture. Thus, in the end, participants had seen three lists in three different conditions. The iconic gesture was semantically related to the target word and the beat gesture was one of the most typical, namely flipping the right hand with open palm outward once. After seeing the video, participants were asked to recall as many words as possible. Participants were holding an object in their hand to make sure that they would not reproduce gestures while watching the video and recalling the words. Results showed that both adults and children recalled more words when seeing iconic gestures than when seeing no gestures. However, adults' word recall was also enhanced by seeing beat gestures, to the same extent as for iconic gestures. However, this effect was only found in adults. The recall of children was only enhanced by seeing iconic gestures. For the children, seeing beat gestures did not improve the recall of words. In summary, iconic gestures were shown to facilitate recall for both adults and children, whereas beat gestures only facilitate recall for adults. This could suggest that iconic gestures may have a bigger influence on word memorization in SLA than beat gestures.

In conclusion, various studies have shown that iconic gestures can have an influence on language learning and memorization. Likewise, it is shown by different researchers that beat gestures may affect SLA as well. However, the few studies that compared both iconic

and beat gestures suggest that beat and iconic gestures may not work for everybody equally well.

The present study

As is stated before, previous studies have attempted to study the effect of gestures on second language acquisition. Research has been done on iconic gestures, beat gestures and their effects on second language acquisition. However, little research has been done on which type of gesture has the biggest influence on the memorization of words from a novel second language. The two hypotheses that this paper will address are:

Hypothesis 1: Gestures facilitate the memorization of words in a second language compared to no gestures.

Hypothesis 2: Iconic gestures facilitate the memorization of words in a second language compared to beat gestures.

Methodology

The methodology of this experiment was based on the experiment conducted by Kelly et al. (2009), only some changes were made to fit this study.

Subjects

A total of ninety-one Dutch subjects participated in the experiment. Dutch participants were chosen as they all have the same L1, which makes any influence of L1 on learning a second language the same for all participants. It was made sure that no participant had any knowledge of Tamil language (the second language used for this study). Participants were randomly recruited from the Radboud University campus and were rewarded for participating with a piece of chocolate or some sweets.

Of all subjects, eighty were bachelor students and nine were master students. Two subjects did not indicate whether they were a bachelor or master student. A Chi-square test showed no significant relation between educational level and gesture condition (X^2 (2) = 2.29, p = .318). All participants were adults and students, ranging from eighteen to twenty-seven years old (M = 20.71, SD = 1.69). A one-way analysis of variance was conducted and showed no significant effect of age on gesture condition (F (2, 88) = .055, p = .947). Of all subjects, forty-one participants were male and fifty participants were female. A Chi-square test showed no significant relation between gender and gesture condition (X^2 (2) = .07, p = .967).

The independent variable in this study was gesture condition. The stimuli consisted of three videos (one for each gesture condition) in which a bilingual speaker of Dutch and Tamil gave instructions in Dutch about the Tamil language. This language was chosen as the probability is very low that Dutch native participants will have any knowledge about this language. In the videos, the speaker first said the Dutch word and then followed with the Tamil translation. This was repeated one time, so for example: "Vogel is Paravai. Vogel is Paravai." (Bird means Paravai, bird means Paravai). Then, the instructor continued with the next word. For each condition, a different video was made. The first video contained instructions given without gestures. In this video, the camera was zoomed in on the face, to make sure that any hand movements were not visible and not distracting. Thus, the focus was only on the face of the instructor. The second video contained instructions with the use of beat gestures. Beat gestures were produced at the moment where the Tamil word was stressed. The beat gesture consisted of the right hand going up and down, touching the left hand when making the down-movement. In the third video, instructions were given while using iconic gestures. The iconic gesture was produced at the same time as the Tamil word was said (see figure 1 for an example of the word 'Bird' being produced in the three conditions). The gesture to be produced was decided upon by a team of researchers. One researcher stated a certain word, after which every other researcher made a gesture that (according to that researcher) belonged to that word. The gesture that was produced most often, was chosen to be produced in the instruction video. All videos contained the same twenty words, in the same order. The list of words that was used contained nouns only and decisions on which words were going to be included, were made based on what words were appropriate enough to use in the iconic gesture condition, according to the team of researchers. A word was included when the majority of the team was in favour of this word. The words that were used can be found in table 1.

[These pictures are deleted as the person in the image wanted them to stay private]

Figure 1: Example of the word 'Bird' accompanied by either no gesture, beat or iconic gesture.

Table 1: Tamil translations of Dutch words

Dutch word (and English translation)	Tamil translation
Bril (Glasses)	Kaṇṇāṭi
Boek (Book)	Puttakam
Konijn (Rabbit)	Muyal
Bal (Ball)	Pantu
Driehoek (Triangle)	Mukkōṇam
Huis (House)	Vīṭu
Schaar (Scissors)	Kattarikkōl
Hart (Heart)	Itayam
Olifant (Elephant)	Yāṉai
Krullen (Curls)	Curuḷ
Vogel (Bird)	Paṟavai
Hoed (Hat)	Toppi
Gitaar (Guitar)	Kiṭṭār
Kom (Bowl)	Kiṇṇam
Fluit (Flute)	Pullāṅkuḻal
Berg (Mountain)	Malai
Regen (Rain)	Maḻai
Plat (Flat)	Piḷāṭ
Helling (Slope)	Cāyvu
Snor (Moustache)	Mīcai

Design

A between-subject design was used in this research. Respondents were placed in one of three different conditions. Thirty-one participants were put in the first condition, in which speech was not accompanied by any gestures. Thirty other participants were put in the second condition, in which speech was accompanied by beat gestures. The last thirty participants were put in the third condition, which was the iconic gesture condition. The distribution of subjects in the conditions was done by means of convenience sampling. Researchers walked around 'De Refter', a restaurant on the Radboud University campus, and asked people to participate in an experiment on word memorization. Participants were equally distributed throughout all three conditions. The independent variable was gesture (nominal, with three levels: iconic gestures, beat gestures, no gestures) and is a nominal variable. The dependent

variable was the amount of words that is correctly memorized (ratio: scores between 0 and 20).

Instruments

The dependent variable was the number of words that was correctly memorized. This was measured by means of a WRT (Word Recall Task). This task was based on the WRT (Word Recognition Task) used in Kelly, McDevitt and Esch (2009). Thus, note that recognition was changed into recall in this study, as it was looked into memorization instead of recognition The WRT consisted of showing two videos without gestures. The first part of the WRT-test was inserted after ten words from the instruction video, and the second part of the WRT was added after the last ten words from the instruction video. In the videos for the WRT task the instructor repeated the Tamil words used in the instruction video, but no Dutch translations were given. Also, the order of words was randomized so that participants did not hear the words in the same order as before. After listening to each Tamil word, the participant had fifteen seconds to write down the Dutch translation on a piece of paper. This paper was a form to fill in. It only required the participant to write down the following things: the age, the gender, the level of education, the study they did, which languages they spoke and the translations of the Tamil words in the WRT. The translations were then coded as correct/incorrect. As long as it did not affect the meaning of the Dutch word, potential spelling errors were not taken into account. Answers that represented the same semantic meaning as the correct answers were also counted as correct (e.g. 'schaal' instead of 'kom'). This means that each participant had a number of correct answers, which could range from 0 (all incorrect), to 20 (all correct).

Procedure

Subjects were individually tested. They were placed in front of a computer and were told to first read the instructions in which it was stated that this experiment was conducted in order to test for memorization of words. After they had read the instructions, they had to raise their hand so that the researchers could pick up the instruction forms. If this was done, they could start watching the video. The video, with exception of the Tamil words of the material, was in Dutch. After hearing the first ten instructions, the participants did the first part of the WRT. After this, they continued with hearing ten more (different) words. After this, they received the second part of the WRT. In the end, participants that were interested in the explanation

about the experiment could give their email, so that we could sent them the results and explanation after the experiment was finished.

Statistical treatment

To answer the research question, statistical tests were used via SPSS. To check for statistically significant effects of the independent variable, which is gesture (with three levels: iconic, beat and no gesture), on the dependent variable, which is the amount of correctly memorized Tamil words, a one-way ANOVA test was used.

Results

A one-way analysis of variance showed a significant effect of type of gesture on the number of correctly memorized words (F (2, 88) = 4.52, p = .014). The number of correctly memorized words was higher for iconic gestures (M = 11.37, SD = 3.19), than for beat gestures (M = 9.20, SD = 2.64, p = .015, Bonferroni-correction), thus confirming the second hypothesis that iconic gestures facilitate the memorization of words in a second language compared to beat gestures (see Table 2 for all mean scores and standard deviations). There was no significant difference between seeing no gestures (M = 9.74, SD = 2.86) and seeing iconic gestures (p = .095, Bonferroni-correction). In addition, there was no significant difference between seeing no gestures and seeing beat gestures (p = 1, Bonferroni-correction). This means there has not been any evidence to accept hypothesis 1: gestures do not appear to facilitate the memorization of words in a second language compared to no gestures.

Table 2: Means and standard deviations for the number of correctly memorized words in function of type of gesture.

Gesture condition	Number of subjects	Mean (SD)
No Gesture	31	9,74 (2.86)
Beat Gesture	30	9,20 (2.64)
Iconic Gesture	30	11,37 (3.19)

Table 3: Number and percentages of correct/incorrect answers per word

Word	Correct	Percentage correct (%)	Incorrect	Percentage incorrect (%)
Hart	41	45%	50	55%
Schaar	48	53%	43	47%
Huis	54	59%	37	41%
Driehoek	10	11%	81	89%
Krullen	44	48%	47	52%
Olifant	41	45%	50	55%
Bal	38	42%	53	58%
Konijn	18	20%	73	80%
Boek	17	19%	74	81%
Bril	17	19%	74	81%
Berg	43	47%	48	53%
Fluit	46	51%	45	49%
Kom	53	58%	38	42%
Gitaar	91	100%	0	0%
Snor	42	46%	49	54%
Helling	46	51%	45	49%
Plat	86	95%	5	5%
Regen	34	37%	57	63%
Hoed	85	93%	6	7%
Vogel	65	71%	26	29%

Discussion

This study aimed to examine whether gestures facilitate the memorization of words in a second language compared to no gestures. The results indicate that seeing gestures does not facilitate word recall in comparison with seeing no gestures. This means that the first hypothesis was not supported by the data. The fact that seeing gestures did not lead to more correct answers is not in line with outcomes of previous studies (Kelly et al., 2009; Kushch and Prieto, 2016; Gluhareva and Prieto, 2017). Kelly et al. (2009), for example, have shown that iconic (congruent) gestures enhanced memory compared to speech alone (meaning that no gestures were present). In addition, Kushch and Prieto (2016) found that including beat gestures did work better than not including any gestures. The differences between the findings

of these previous studies and this study might be explained by the fact that, in the current experiment, camera positions across conditions were different. In the experiment by Gluhareva and Prieto (2017), the instructor was positioned with the hands in a neutral position, whereas in the current experiment, the hands of the instructor were not visible at all. For the no gesture condition in the current experiment, the video was zoomed in on the face of the instructor, whereas for the iconic and beat gesture condition the face, torso and hands were visible. It was chosen to zoom in on the face in the no gesture condition, in order to prevent that participants would be distracted by possible hand movements. However, a possible consequence of this camera positioning is that it may have enhanced the recall of words, as participants saw the face in more detail. As a consequence of that, participants could have been more able to lip-read the articulation than participants who were in the iconic or beat gesture condition. The possible effect of zooming in one the face can be seen as a limitation to the current study.

The present study also explored whether iconic gestures facilitate the memorization of words in a second language compared to beat gestures. The findings indicate that iconic gestures indeed might work better than beat gestures. This means that our second hypothesis was supported by the data. There have been few studies that have compared both iconic and beat gestures in their effect on SLA. However, a possible explanation for the results that were found can be derived from the differences between types of gestures. According to McNeill (1992), iconic gestures are closely related with the semantic meanings of words. Beat gestures do not display such a semantic meaning, but are related to the rhythm of speech (which is called prosodics). Hence, when one wants to improve the learning of new words, it seems logical that iconic gestures are more relevant and helpful as one can match the iconic gestures with the meaning of a particular word. In addition, it seems logical that beat gestures are thus less relevant, as prosodics are less relevant in learning words with a semantic meaning.

However, the results of the current study have to be treated with caution due to some limitations. As can be seen in Table 3 in the results section, some words seemed easier to remember for participants than other words. This could have had an effect on the results in the WRT. *Gitaar* (guitar), for example, was correctly answered by all participants (100%). Another word that seemed quite simple to remember was *Plat* (flat) (95%). However, *Driehoek* (triangle) was answered incorrectly by 89% of the participants. Another word that appeared to be hard to remember was *Boek* (book), as it was answered incorrectly by 81% of all subjects. The fact that the level of difficulty changed substantially per word, could possibly have been prevented, which leads to options for future research. In future research, for

example, including a pre-test to test for the difficulty of words seems relevant to prevent this fluctuation in word difficulty from happening again. By means of a scale with questions such as "Do you know the meaning of this word?", "Can you guess what this word means" or "How easy does this word seem to you?", an improved list of words can be composed.

Another limitation might be that some similarities were found between words, which shows that the word list that was used in the current experiment might not have been ideal. For example, some words sounded almost the same in Tamil, for example the Tamil words for rain (Maḻai) and mountain (Malai). In addition, some English words sounded the same as the Tamil words (for example, 'Guitar' and 'Kiṭṭār' or 'Flat' and 'Piḷāṭ' and 'Curls' and 'Curuḷ'). Here, it could have been the case that participants used their knowledge of English, which could have overruled any possible effects of gesture conditions. Thus, these words might have been more easy for participants. Other similarities between words may have caused some confusion as well. There were two cases in which the answer was not the desired answer, but it did have more or less the same semantic meaning (e.g. 'schaal' instead of 'kom', where both words mean bowl; and 'circel' instead of 'bal', which both represent a round shape). Because these words have the same semantic meaning, they were counted as correct. All these special cases may have influenced the results. Future research might solve this problem by creating a word list in which all words are comparable in as many ways as possible (for example, in the level of difficulty and in the word type: the use of only nouns or verbs). Likewise, researchers should take a critical look at the difficulty of words and how the iconic gestures look for both Tamil and Dutch words, so that the gestures will not be easier for one language than for the other language. Another possibility for future research might be to conduct research into the effects of gestures on long-term memorization, as the current research focusses on short-term memorization. Furthermore, future research is needed to expand the findings of the current study, as this study is the first to compare iconic gestures with beat gestures and no gestures in their effect on SLA.

The results of this study could be of societal relevance for language teachers. For instance, if a teacher wants to teach new words from a certain language and enhance recall. If a teacher then has to choose between supporting by gestures or not using any gestures, it does not matter what is chosen. However, if it is chosen to support the explanation by a gesture, an iconic gesture works better than a beat gesture.

Conclusion

The findings showed that gestures do not necessarily facilitate the memorization of words in a second language better than no gestures. However, as hypothesized, seeing iconic gestures works significantly better than seeing beat gestures. This suggests that if one wants to improve recall, the use of iconic gestures will work better than using beat gestures. However, if one has to choose between using beat gestures and using no gestures, it does not really matter.

Reference list

Birdsong, D. (2018). Plasticity, variability and age in second language acquisition and bilingualism. *Frontiers in Psychology*, *9*, 81.

Gluhareva, D., & Prieto, P. (2017). Training with rhythmic beat gestures benefits L2 pronunciation in discourse-demanding situations. *Language Teaching Research*, *21*(5), 609-631.

Goodrich, W., & Hudson Kam, C. L. (2009). Co-speech gesture as input in verb learning. *Developmental Science*, *12*(1), 81-87.

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.

Khasinah, S. (2014). Factors influencing second language acquisition. *Englisia Journal*.

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.

Krashen, S. (1982). *Principles and practice in second language acquisition.* Oxford, NY: Pergamon

Kushch, O., & Prieto Vives, P. (2016). The effects of pitch accentuation and beat gestures on information recall in contrastive discourse. *Language, Cognition and Neuroscience, 33*(8), 992-1004.

McNeill, D. (1992). *Hand and mind: What gestures reveal about thought.* Chicago: University of Chicago press.

Ortega, L. (2009). *Understanding Second Language Acquisition.* New York, NY: Routledge

Partan, S. R., & Marler, P. (2005). Issues in the classification of multimodal communication signals. *The American Naturalist*, *166*(2), 231-245.

Robinson, D., Gabriel, N., & Katchan, O. (1994). Personality and second language learning. *Personality and Individual Differences*, *16*(1), 143-157.

So, W. C., Sim Chen-Hui, C., & Low Wei-Shan, J. (2012). Mnemonic effect of iconic gesture and beat gesture in adults and children: Is meaning in gesture important for memory recall? *Language and Cognitive Processes*, *27*(5), 665-681.

Spolsky, B. (1985). Some psycholinguistic conditions for second language learning. *Per linguam*, *1*(2).
https://doi.org/10.5785/1-2-499

Tellier, M. (2008). The effect of gestures on second language memorisation by young children. *Gesture, 8*(2), pp.219-235.

Verhoeven, L., & Vermeer, A. (2002). Communicative competence and personality dimensions in first and second language learners. *Applied Psycholinguistics*, *23*(3), 361-374.

Appendix A. Statement of own work

Print and sign this *Statement of own work* form and add it as the last appendix in the final version of the Bachelor's thesis that is submitted as a hard copy to the first supervisor.

Student name: _Nadia Hermsen_

Student number: _s 4787625_

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