

Radboud University



**THE INFLUENCE OF GESTURES ON LEARNING
ABSTRACT AND CONCRETE WORDS IN A SECOND
LANGUAGE**

BACHELOR'S THESIS

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Introduction

Nowadays in the era of globalization, there has been an increase in the demand of information exchange, which accentuates the need for the acquisition of at least two languages in order to have effective communication. Second language learning is never said to be easy and one of the most common reasons reported by students was that there was not enough guidance provided (Gass, 1990). In those cases, vocabularies were taught poorly and unsystematically, causing students trouble to memorize the words. Of course besides an ineffective learning approach, there are multiple reasons why learning a second language is difficult. This leads us to the question if there is any possible way in which it can become easier to learn a second language?

It is suggested that the non-verbal aspect of communication can play a large role in communicating. Abercrombie (1968, p.55) stated that: “We speak with our vocal organ, but we converse with our entire body”. Non-verbal components of communication consist of voice type, intonation, tempo, gestures, posture, distance, facial expressions, which all contribute to the meaning of a statement (Surkamp, 2015). Thus, every speech we make is accompanied by our body language. Non-verbal cues can be meaningful either with or without the presence of verbal practices. It might be that some of the components of non-verbal communication make foreign vocabularies easier to remember. In the present study, we will focus on hand gestures. It has been found that speech and gesture are closely related (Kendon, 2004; McNeil, 1992). Moreover, research also suggests that second language learning can be facilitated by using gestures (Gullberg, 2006).

Gestures consist of different categories. According to McNeill (1992), there are four types of gestures: iconic gestures, metaphoric gestures, beat gestures, and deictic gestures. Iconics illustrate semantic meaning of a word. In this case, people illustrate a physical object with their hands. For example, when somebody is talking about “the Earth”, he or she might make a gesture with an open-closed circle of their hands. Metaphorics are similar to iconics to some degree. The difference between them is that while iconics illustrate a concrete word, metaphorics represent an abstract concept. One example is that a heart-shaped hand gesture placed in front of your chest might indicate a loved affection to the partner who participates in the conversation. In this case, the abstract concept is *love*, which is illustrated by a metaphoric gesture. Beat gestures emphasize the rhythm of speech, and often serve the purpose of drawing attention. Beat gestures do not concern the content of speech but are more related to the tempo of the speech. They could be up-and-down movements of the hands, which coincide with the clauses or sentences. Finally, deictics are gestures of pointing fingers

towards a direction, people, or anything the speaker refers to. Besides these categories, there are different terms for the classification of gestures, such as affect gestures, or illustrators (So, Kita, & Goldin-Meadow, 2013). Although some names may be different, they all generally boil down to the same kinds: iconics, metaphoric, beat, and deictics, which were explained above.

Gestures have been demonstrated to facilitate learning vocabularies in both the first and the second language. For the first language, Baldwin (1991) indicated that sixteen-months-old babies mostly use their eyes to observe their surrounding and try to grasp the words' meaning by visual illustration. With the nature of delivering physical representation, iconic gestures help infants to acquire language more easily. During the toddler years, gestures have a significant role in helping children to learn a language, especially in vocabulary learning (Rowe, Ozcaiskan, Goldin-Meadow, 2008). This can be observed in two ways: through the gestures that children create themselves, and through the gestures that their parents deliver. Rowe, Ozcaiskan, Goldin-Meadow (2008) explained that vocabulary learning mostly takes place via the interaction between humans. In this case, parents are the ones who communicate with their children on a regular basis. Parents can react to children's signals in a manner that encourages word learning. For example: when a child does not know a name of an object and he points his finger towards that object, parents say the word to provide the verbal name for that object. The learning process takes place right at the moment when the child is curious about the object and he receives its label. Another way to help children in word-learning progress is their own signaling production. In the same study by Row, Ozcaiskan, Goldin-Meadow (2008), it was found that at the age of 14 months old, children have a full consciousness about gestures that their parents produce. Consequently, children produced more gestures and possessed a larger vocabulary when they received interactive gestures from parental responses. Likewise, children whose parents signaled less regularly owned a smaller vocabulary and produced fewer gestures.

Extending the general function of gestures in learning the first language, research also showed the crucial role of gestures in second language acquisition. Cao and Chen (2017), for example, found that gestures had a positive outcome for both speakers and listeners. Gestures were not only shown to be effective in second language listening comprehension and word learning, but also used as L2 teaching strategies for schooling system. They suggested that gesture is a key educational tool in second language learning, deserving attention from both learners and teachers. Other findings have also been provided by Huang, Kim, and Christianson (2019), who conducted a research on 30 participants, age ranging from 18 to 53

years old. The study has shown that the process of learning new words in L2 was improved by the presence of gestures. All forms of gestures were proven to be helpful as long as they were not confusable and the number of words presented was limited. Iconic gestures seem to be the most prevalent in spoken language. However, it is important that iconic gestures have a congruent relationship with meaning of the words (Huang, Kim, and Christianson, 2019). In the experiment, Huang, Kim & Christianson (2019) divided the participants into two groups. Group 1 was exposed to congruent iconic gestures and group 2 was exposed to non-iconic congruent gestures. For example, for group 1, the iconic gesture for “drink” was paired with *nomu* (drink in Japanese) and for group 2, the iconic gesture for “drink” was paired with *tataku* (hammer) in Japanese. Results showed that group 1 performed better in the memorization task than group 2. Explanation given was that the mismatch between meaning and gestures was confusable for the learners, causing interference effect in memorizing process. Another study was conducted by Kelly and Lee (2012), who compared the effect of gestures on learning Japanese words between ‘easy’ and ‘difficult’ pronunciation. Surprisingly, they found that gestures did not help but actually hurt the learning process for complex phonemes. Participants in the no-gesture condition could remember the words with complicated pronunciation more than participants in the gesture condition. The authors explained that gestures were semantically more difficult to understand in hard condition. Participants in gesture condition were simply distracted by gestures, leading to the lack of concentration. As a result, they could not distinguish between words within the same categories

Learning a language consists of learning the vocabulary, grammars, syntax, and phonetics, etc. Focusing specifically on vocabulary, it may matter for learning whether a word is concrete or abstract because studies suggest that abstract words are harder to learn than concrete words (Repetto, Pedrolì, and Macedonia, 2017; Kousta et al., 2011; Paivio, 1971). According the Cambridge dictionary, a concrete noun is a noun that refers to real physical objects. In the current study, concrete words will be considered as a broader concept, which both refers to physical objects and events that are available to the senses. Examples of concrete words include *chair, house, running, crying, computer, green, hot, spicy*. These can all be experienced by our senses, for example: a chair and a house can be seen, hot and spicy can be felt. Opposite to concrete words, an abstract word refers to things that do not exist as a material object (Cambridge dictionary). The definition of abstract words used in the current study is any concept that has no physical referents. Examples of abstract words are *responsibility, honesty, bravery, cowardly, poverty, failure, morality*. These words cannot be

experienced by the senses. We can say that “I see a house” but we cannot say “I see morality” because morality is not tangible and cannot be visualized.

There have not been many studies discussing the differences in learning concrete and abstract words. However, Repetto, Pedroli, and Macedonia (2017) shed light on the subject by giving a suggestion that abstract words could be more difficult to learn, compared to concrete words. The explanation was that people’s mental representation of abstract words is lacking sensory-motor features, which makes abstract words less likely to be captured in the brain system. In addition, that concrete concepts have cognitive advantage over abstract concepts is attributed to the fact that they have stronger associations to contextual knowledge than abstract concepts (Kousta et al., 2011). According to the context availability model (Barsalou et al., 1983), concrete words are easier to learn because people have the ability to associate concrete learning materials with their prior knowledge. Abstract concepts, on the contrary, are said to be more poorly comprehended and recalled because learners experience more difficulty in accessing the relevant knowledge for understanding abstract learning materials. Therefore, concrete words activate the semantic network more extensively than abstract words. More explanation for the difference in memorization between concrete and abstract words was found in Paivio’s dual coding model (1971). He expounded that concrete words are superior to abstract words in memorization because concrete words have two systems for memory storage, which are the verbal system (consists of verbal cues) and the imagery system (consists of images) whereas abstract words only have one system for storage, the verbal system. Therefore, abstract words are less easily accessible during mental processes. As a result, it takes longer for learners to envisage abstract words but quicker for concrete words to comprehend. This explains why it is more difficult to learn abstract words than concrete words.

Previous studies which have investigated the role of gesture in second language vocabulary acquisition have generally not taken into account the difference between concrete and abstract words. For example, Tellier (2005) tested whether teachers’ gestures help young children in second language vocabulary acquisition. Although the results show that children who were exposed to the gesture condition performed better in vocabulary memory tasks than those in the no-gesture condition, it was not clear whether the effect of gestures could be different for abstract words since the vocabulary selected for the study consisted of everyday concrete words. Another example is the study by Macedonia and Knösche (2011) who examined the impact of enactment effects on learning abstract words and further investigated whether learning words with gestures facilitated sentence production. In the study, they

compared the effect of enactment (a no-gesture condition versus a gesture condition) on L2 vocabulary learning. Participants were asked to learn 32 sentences which contained abstract words, 16 of which were accompanied by a symbolic gesture for every word and the other 16 were not accompanied by gestures. The overall results showed that learners had better memory for words encoded with gestures. Furthermore, learners produced sentences whose words illustrated with gestures more frequently than sentences whose words illustrated with no gestures. However, it is still unknown whether these enactment effects would be better or less effective for concrete words, since Macedonia and Knösche (2011) only included abstract words in their study. Expanding the concept of enactment effect, Repetto, Pedroli, and Macedonia (2017) compared the impact of pictures and gestures on second language learning. Participants in the study by Repetto, Pedroli, and Macedonia (2017) were divided into three groups. Group 1 learned words illustrated with gestures. Group 2 learned words illustrated with pictures, and group 3 learned words illustrated with neither gestures nor pictures. Results showed that group 1 performed better than group 2, and both group 1 and group 2 performed better than group 3. They theorized that better memory with gestures was dependent on multimodal encoding where the brain senses data in a multimodal way. Despite providing consistent results with other research, this study only focused on abstract words, which raises the question of whether there would be the same results for concrete words. In spite of lacking the direct comparison between abstract and concrete words, Tellier (2005), Macedonia and Knösche (2011) and Repetto, Pedroli, and Macedonia (2017) confirmed the theory that gestures have facilitative effects on memory for foreign language words.

To summarize, the difference in the effect of gestures on abstract and concrete words has not yet been thoroughly researched, although it can be expected that the facilitative effect of gestures during second language vocabulary acquisition may differ between concrete and abstract words. To fill this research gap, this present study will investigate the effect of gestures on learning foreign abstract versus concrete words. The theoretical overview presented in this section leads to the following research question:

What is the effect of gestures on learning abstract and concrete words in a second language?

Following the existing theory that gestures have facilitative effects on learning a foreign language (Cao and Chen, 2017; Huang, Kim, and Christianson, 2019; Tellier, 2005; Macedonia and Knösche, 2011) and abstract words are more difficult to learn than concrete words (Repetto, Pedroli, and Macedonia, 2017; Kousta et al., 2011, and Paivio, 1971), the following hypotheses are formulated:

H1: Gestures help to learn both concrete and abstract words as compared to no-gesture

H2: Gestures help to learn concrete words better than abstract words.

Methodology

Materials

The stimulus material for this study consisted of videos in which Vietnamese words were taught. The language chosen for the L2 was Vietnamese because this language is not spoken by the majority of the Dutch population. A list of 8 Vietnamese words was constructed, of which 4 were concrete and 4 were abstract. This means there were 4 words for each level of the independent within subject variable ‘Type of word’. The words were video-recorded within short sentences, in 2 versions (gesture/no gesture): one of each level of the independent between subject variable ‘Gesture’. For the no-gesture condition, a Vietnamese native speaker pronounced 8 short sentences (in the form of “X means Y”) which included every word in both Vietnamese and Dutch with an interval of 5 seconds. Each sentence was repeated twice. For the gesture condition, the content was the same as in the no-gesture condition but the speaker illustrated the sentences with gestures. Gestures were produced at the same time as the Vietnamese words were pronounced. Subtitles for each sentence were shown at the bottom of the screen and displayed simultaneously as the sentence was pronounced by the speaker. The example of one sentence extracted from the video is: “Máy bay betekent vliegtuig. Máy bay betekent vliegtuig” (Máy bay means airplane).

Table 1 below presents an overview of the Vietnamese words and their English and Dutch translation, which were included in this study. The concrete and abstract words were chosen from the study by Macedonia, Müller and Friederici (2011) and Macedonia and Knösche (2011). The frequency of the words was tested by using the database from Keuleers, Brysbaert, and New (2010), which measures the frequency of Dutch words based on film subtitles to ensure similar scores of frequency between abstract and concrete words. The level of abstractness and concreteness was measured based on the dataset from Brysbaert, Stevens, Deyne, Voorspoels & Storm (2014). The study set a measurement scale from 1 to 5 ranging from abstractness to concreteness for 30,000 Dutch words. Higher scores indicate the high level of concreteness and low scores indicate the high level of abstractness. All chosen concrete words had scores above 4 and all abstract words had scores below 2.50. The words

within the same categories (abstract/concrete) had similar scores. A table with numbers for abstract and concrete words can be found in appendix A.

In order to assess whether the gestures were appropriate for the words, a pretest was conducted. Researchers first came up with gestures for each word, which was based on the criteria that the selected gestures represented the meaning for each word. Gestures were produced by two arms and two hands. The hand positions did not change during the gesturing period. After that, researchers presented gestures while saying the words to 10 participants. Participants were asked whether they think that gestures matched the words' meaning and whether they could reproduce the gestures themselves. If they believed the gestures mismatched the words' meaning or the gestures were too hard to reproduce, they were asked to give other suggestions. The pre-test showed that participants agreed that the chosen gestures were suitable for the words and easy to reproduce. Below, a screenshot is displayed, in which the instructor performed gestures for a concrete word (máy bay) (see figure 1) and an abstract word (cảnh báo) (see figure 2). In the experiment, participants saw the entire upper body of the speaker, but the speaker has been made anonymous only in this report.

Table 1. Selected Vietnamese words with Dutch and English translation.

Vietnamese words	English translation	Dutch translation
máy bay	airplane	vliegtuig
kính mắt	glasses	bril
râu mép	moustache	snor
cái bát	bowl	kom
kiến thức	understanding	begrip
ủng hộ	donation	donatie
quy trình	procedure	procedure
cảnh báo	warning	waarschuwing



Figure 1: Instructor performing gesture for a concrete word (*máy bay*, airplane)



Figure 2: Instructor performing gesture for an abstract words (*cảnh báo*, warning)

Subjects

A total of 116 Dutch native participants took part in the experiment (age: $M = 25.82$, $SD = 12.50$, age range: 16 years old – 64 years old, gender distribution: 36 males, 80 females). Participants had full capability of listening, speaking, reading, writing, had Dutch as the first language and no knowledge of the Vietnamese language. Approximately 64% of the participants were doing their bachelors, including WO and HBO, 15% were doing their masters, 15% were following secondary education, and 8% were following other programs (MBO, PhD, post master WO). To assess the similarity of participants' characteristics in both gesture conditions, the following analyses were conducted. A one-way ANOVA of variance showed no significant effect of gesture condition on age ($F(1, 114) = .003$, $p = .955$). A Chi-square test showed no significant relation between gesture condition and gender ($\chi^2(1) = .249$, $p = .689$) and no significant relation between gesture condition and educational level ($\chi^2(4) = 3.433$, $p = .488$). Therefore, it can be concluded that the characteristics of age, gender and educational level were equally distributed across gesture and no-gesture groups.

Design

A 2x2 mixed design experiment was conducted. Gesture (2 levels: gesture, no gesture) was a between-subjects variable and type of word (2 levels: concrete, abstract) was a within-subjects variable. Participants were randomly distributed across the two gesture conditions.

Instruments

The dependent variable of the study was the number of words which were correctly memorized by the participants. To test this, a memorization task was conducted. After watching the video, participants were required to do a test, which asked participants to translate the words they had just learned from Vietnamese to Dutch. To make sure that

participants did not remember the order of the words shown in the video instead of their meanings, the order of the words in the memorization task was not the same as the order in which they were shown in the video. Participants could take as much time as they needed for the memorization task. The test questions for this study can be found in appendix B.

The answers given by the participants were coded as being either correct or incorrect. Only the meaning of the words was taken into account, not the spelling errors. If the participants made a spelling mistake but the concept of the words was remained, it was coded as correct. If the answer was left blank or not matching in terms of meaning, it was coded as incorrect. Correct answers were coded as 1 and incorrect answers were coded as 0. To measure inter rater reliability, every answer was coded twice by two independent coders. The inter rater reliability of the variable “number of correctly memorized words” was good: $\kappa = .979, p < .001$. After the inter rater reliability was calculated, coders came together to discuss any differences and came to a consensus.

Procedure

Participants were tested individually. The experiment was conducted online, using Qualtrics system from Radboud University. Participants were recruited via a Qualtrics link, leading to the experiment. Each participant was randomly given one of the two conditions. They were first required to fill in personal information, such as age, gender, educational level, and their mother languages. After that, they were required to read the instruction of the experiment carefully (see appendix B for all details). They needed to make sure that they had a quiet space and strictly followed the instruction of the experiment. Participants were advised to watch and listen to the video carefully since they were not allowed to pause the video. For the video illustrated with no gestures, participants were asked to repeat the word out loud and learn as many Vietnamese words as possible. For the video illustrated with gestures, participants were asked to repeat the word out loud while performing the accompanying gesture, and learn as many Vietnamese words as possible. The reason why participants were required to reproduce gestures while learning is that it has been demonstrated by Tellier (2005) that gesture reproduction helps to learn foreign language vocabulary. After watching the videotape, participants were asked to do a word memorization test, which was explained in the instrument section. The whole experiment took approximately from 10-15 minutes.

Statistical treatment

The data was analyzed using SPSS. A repeated-measures ANOVA test was conducted, with gesture as the between-subjects factor and type of word as the repeated factor/variable.

Results

A repeated measure ANOVA showed that there was a significant effect of type of word (concrete/ abstract) on correct answers ($F(1, 114) = 22.90, p < .001$). The number of correct answers for concrete words ($M = 1.79, SD = 1.01$) was higher than the number of correct answers for abstract words ($M = 1.24, SD = 1.07$). There was no effect of gestures on the number of correct answers ($F(1, 114) = 0.79, p = .375$). There was a significant interaction effect between gestures and type of word ($F(1, 114) = 7.73, p = .006$).

Separate repeated measure ANOVAs showed a significant effect of type of word on number of correct words for the gesture condition ($F(1, 61) = 32.29, p < .001$). In the gesture condition, participants had more correct answers for concrete words ($M = 1.89, SD = 0.11$) than for abstract words ($M = 1.03, SD = 0.13$). There was no significant effect of type of word on number of correct words for the no gesture condition ($F(1, 53) = 1.78, p = .188$). Table 1 below shows the means and standard deviation for the number of correct answers for concrete and abstract words in both gesture and no-gesture condition.

Table 1. Means, standard deviations (between brackets) of corrects answers (0 = incorrect, 1 = correct) for concrete and abstract words (1 = concrete, 2 = abstract).

	Gesture ($n = 62$)	Without gesture ($n = 54$)	Total ($n = 116$)
	Mean (SD)	Mean (SD)	Mean (SD)
Concrete words	1.87 (0.89)	1.70 (1.14)	1.79 (1.01)
Abstract words	1.03 (1.05)	1.48 (1.05)	1.24(1.07)

Conclusion

The current study was conducted to research to what extent gestures had an effect on learning concrete and abstract words in a foreign language. The study was conducted to answer the following question:

What is the effect of gestures on learning concrete and abstract words in a second language?

Based on the theories that gestures have facilitative effects on learning a second language (Cao and Chen, 2017; Huang, Kim, and Christianson, 2019; Tellier, 2005; Macedonia and Knösche, 2011), and concrete words are easier to learn than abstract words (Repetto, Pedroli, and Macedonia, 2017; Kousta et al., 2011; Paivio, 1971), two hypotheses were formulated. The first hypothesis expected that gestures, as compared to no gestures, would help to learn both type of words. The second hypothesis predicted that gestures would help to learn concrete words better than abstract words.

As stated in the results, there was a significant effect of the type of word on the number of correct answers, but no significant effect of gestures. In general, more correct answers were shown for concrete words than abstract words. In the gesture condition, participants had more correct answers for concrete words than abstract words. In the no-gesture condition, participants had a similar number of correct answers for both abstract and concrete words.

Based on the results from the current study, it can be concluded that gestures do not help to learn a foreign language. However, if gestures are used, people will learn concrete better than abstract words. Therefore, the first hypothesis, which predicted that gestures would help to learn both concrete and abstract words, is rejected. However, the second hypothesis, which expected that gestures would help to learn concrete words better than abstract words, is supported.

Discussion

First of all, with regard to the effect of gestures, the findings of this study oppose some findings of previous studies examining the effect of gestures on second language learning. Tellier (2005) tested the influence of gestures on learning a foreign language with French children and found that children in the gesture condition performed better than children in the no-gesture condition. Similar results were found by Huang, Kim, and Christianson (2019), Macedonia and Knösche, (2011) that participants exposed to the vocabulary accompanied by gestures could remember the words better than participants exposed to the vocabulary illustrated with no gestures. In contrast, this present study did not prove an effect of gestures on second language acquisition. The differences between the results by Macedonia and Knösche (2011) and the results of this study can be explained that participants in this study had to learn Vietnamese language, the language which is not commonly spoken among the Dutch population. Therefore, Dutch participants may have little exposure to this language and find it difficult to learn. Participants in the study by Macedonia and Knösche, (2011) had

German as the first language. In the experiment, they were asked to learn Italian language. Since German and Italian are both European languages, German people may have a certain exposure to Italian and find it more familiar and easier to learn.

With respect to the effect of type of word, this study showed that gestures have facilitative effects for learning concrete words, but not for learning abstract words. In other words, people will learn concrete words better than abstract words if they see vocabulary illustrated with gestures. This may be explained by the theories which stated that concrete words are easier to learn than abstract words (Repetto, Pedroli, and Macedonia, 2017; Kousta et al., 2011; Paivio, 1971).

Although this study did not show a significant effect of gestures on learning abstract words, it is surprising to observe that the mean score of correct answers for abstract words in the gesture condition is lower than that in the no-gesture condition. These findings oppose other studies which exclusively supported the role of gestures in learning abstract words (Macedonia and Knösche, 2011, Repetto, Pedroli, and Macedonia, 2017). Nonetheless, these differences in findings may be explained based on the study by Kelly and Lee (2012) who investigated the effect of gestures on second language acquisition by comparing the effect of gestures on learning Japanese words between ‘easy’ and ‘difficult’ pronunciation. They found that participants in the no-gesture condition could remember the words with difficult pronunciation better than participants in the gesture condition. Although Kelly and Lee (2012) compared learning phonetically difficult pairs and phonetically easy pairs, the concept seems to be similar to the current study, in which concrete words are considered as ‘easy’ and abstract words are considered as ‘difficult’. The findings of this study can be related because it appears that on both studies; gestures are only helpful in the ‘easy’ task, but not in the ‘difficult’ task. The possible explanation for this is that gestures were semantically more difficult to understand in a hard condition. Participants on the gesture condition were simply distracted by gestures, leading to the lack of concentration. As a result, they could not distinguish the words within the same category (Kelly and Lee, 2012).

There are several limitations to be considered in this study. First, the experiment was conducted online, and because of this, it cannot be guaranteed that the participants strictly followed the instructions. The concern is whether participants in the gesture condition reproduced gestures while they were learning the words. In case that only some participants reproduced gestures and some did not, the results for these participants would differ within the gesture condition, and thus would not represent the true outcome of the experiment. The second concern is whether all the participants did the experiment seriously. At the beginning,

participants were instructed not to pause the video while watching and listening, because by watching the video without pauses, they could concentrate fully and had enough time to learn every word. However, since this is an online experiment, it is impossible to supervise the participants. Participants might have paused the video for any personal reasons (i.e: interruptions, multitasking, distraction, etc). In case participants paused the video while learning abstract words and they remembered abstract words worse than concrete words, their performances would not demonstrate the effect of type of word or the effect of gestures, but was the result of the lack of concentration.

This study had made a contribution to the research field of gestures and speech. First, this current study has not confirmed the role of gestures in second language acquisition. Second, no study has been conducted before to compare the effect of gestures between learning abstract words and concrete words in a foreign language, the results of this study reveals novel findings. The outcome of this study can benefit educational system by presenting the relation between gestures and language, from which an effective method could be formulated to support the learning process for students. Lecturers, who want to facilitate second language learning for their students, now know that the support of gestures is not necessarily useful. However, if gestures are used, teachers are advised to use gestures for concrete words when they teach foreign vocabulary to students. Language learners are also encouraged to learn concrete words illustrated with gestures. For future research, a replication of the present study which is conducted in a real-life setting to avoid the same limitations may give further insight in the field of gestures and second language acquisition.

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Appendices

Appendix A

Table 2. The level of frequency and concreteness for the selected abstract and concrete words.

Dutch word - English translation - Vietnamese translation	Type of words	Level of concreteness	Level of frequency
Vliegtuig - airplane - máy bay	concrete	4.80	89
Bril - glasses - kính mắt	concrete	4.87	24
Snor - moustache - râu mép	concrete	4.80	9
kom - bowl - cái bát	concrete	4.60	data only available for the verb conjugation 'kom'
begrip - understanding - kiến thức	abstract	1.53	14
donatie - donation - ủng hộ	abstract	2.47	3
waarschuwing - warning - cảnh báo	abstract	2.47	21
procedure – procedure - quy trình	abstract	2.20	12

Appendix B

Instruction and test questions

Introduction

Dear participant,

We are five students of International Business Communication at the Radboud University, and we are currently writing our bachelor thesis. Your participation to our research is therefore appreciated very much.

For the common interest of the study, it is essential that during the experiment, you are in a quiet area where you can concentrate well.

The experiment will start with a questionnaire. This questionnaire contains a couple of demographic questions concerning, for example, your age and gender. Next, you will watch a video. For this part, it is important that you can watch the video with the sound turned on. The last part of the experiment will be a language test. In total, the experiment will take approximately 10 minutes of your time.

Your participation to this study is voluntary. Therefore, you can stop your participation at any given time during the experiment. You do not have to indicate why you are quitting the experiment. You can ask to have your research data removed up to two weeks after your participation by emailing k.gravemaker@student.ru.nl. You can also contact this email address for other questions or complaints. All questions that you answer in this research will be anonymous. The anonymized data will be available to other researchers for at least 10 years. If we share data with other research, it will be impossible to trace the data back to you. All information will be used for datasets, articles and presentations related to this study only. By clicking the button 'I agree, proceed with the questionnaire', you confirm that you:

- Have read this information
- Participate to this research voluntarily
- Are 16 years of age or older

Thank you in advance for your participation.

Sincerely,

Trang, Hilde, Trix, Sanne and Kim

Buttons:

- Agree, proceed with the questionnaire
- Do not agree, I do not want to participate to this research

Demographics

1. How old are you?

2. What is your current or highest finished level of education?
 - Secondary school
 - Bachelor HBO
 - Bachelor WO
 - Master WO
 - Other, namely...
3. What is your gender?
 - Male
 - Female
 - Other, namely...
 - I prefer not to say
4. What languages do you speak?
 - Dutch
 - English
 - German
 - French
 - Spanish
 - Other, namely...
 - Other, namely

Explanation and video with gesture

You will now watch a video in which you will see and hear 8 Vietnamese words with their Dutch translation. Every word appears twice, followed by a 5 second break. In these 5 seconds, we ask you to repeat the word out loud while performing the accompanying gesture. It is the aim that you learn as many Vietnamese words as possible. Please do not pause the video.

Be careful: This is not an easy test, so watch and listen to the video closely.

Explanation and video without gesture

You will now watch a video in which you will see and hear 8 Vietnamese words with their Dutch translation. Every word appears twice, followed by a 5 second break. In these 5 seconds, we ask you to repeat the word out loud. It is the aim that you learn as many Vietnamese words as possible. Please do not pause the video.

Be careful: This is not an easy test, so watch and listen to the video closely.

Test questions

1. What is the Dutch translation of máy bay?.....
2. What is the Dutch translation of kính mắt?.....
3. What is the Dutch translation of râu mép?.....
4. What is the Dutch translation of cái bát?.....
5. What is the Dutch translation of kiến thức?.....
6. What is the Dutch translation of ủng hộ?.....
7. What is the Dutch translation of quy trình?.....
8. What is the Dutch translation of cảnh báo?.....

Final message

You have reached the end of the questionnaire.

Thank you very much for your participation

Your answers have been saved. You can now close this window.

Statement of Own Work

Student name: Cao Minh Trang.

Student number: S1004493

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Date:

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