

Bachelor thesis

A comparison between nouns and verbs when using gestures in L2
comprehension

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Gesture and second language acquisition

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Abstract

The globalization has increased the interactions between people from different language backgrounds and learning a second language (L2) is becoming important in the international business world. When learning a language, gestures can enhance the learning process. This study investigated the effect of gestures on L2 vocabulary learning comparing nouns and verbs. Participants who learned 14 new Slovak words were divided in three groups: no gestures, viewing gestures and repeating gestures. The three conditions were performed significantly different in terms of word comprehension. Participants learned new L2 verbs better in the viewing gestures condition. Moreover, verbs were found to be better learned than nouns only in the viewing gestures condition. Thus, this suggests that gestures might help learning verbs better than nouns but further research is needed.

Keywords: gestures, comprehension, second language (L2), word type, nouns, verbs

Background

In a globalized world, learning languages becomes a must to communicate with one another especially in the business field. In fact, in international companies, employees and managers from headquarters need to interact with employees and managers in subsidiaries on a daily basis but those interactions often take place between people with different language backgrounds who learned a second language (L2). Thus, language plays an important role when communicating as people often interact in their L2. Also, in the process of communication, aside from verbal processes, people gesture. They use their hands to convey specific information or to give additional information to what is said (Kelly, Barr, Church, & Lynch, 1999) and those gestures benefit the listeners' comprehension and the speaker's speech production (Driskell, & Radtke, 2003). Thus, gestures benefit communication (Hotstetter, 2011). Moreover, gestures seem to benefit people's memory as Cook, Yip, and Goldin-Meadow (2010) found that people who enacted phrases during encoding had better recall rates than people who did not gesture. In another study, it seems that gestures may also promote retention rate in lexical learning (Lazaraton, 2004) and learning words is one of the challenges when learning a second language. In fact, research has proven that hand gestures facilitate learning of newly acquired words in a foreign language (Kelly, McDevitt, & Esch, 2009). Many have focused on the age of the participants (Allen, 1995) or on the cognitive processes of the second language acquisition with gestures (Morett, 2014).

Moreover, experimental investigations in the field of gestures and communication have been conducted on the type of gestures that facilitate second language acquisition. Kelly, McDevitt and Esch (2009) investigated the impact of iconic gestures compared to emblematic gestures and came to the conclusion that the semantic content of co-speech gestures plays a role in language learning. The benefit of using gestures when learning a L2 does not only come from the ability of gestures to capture the attention of the learner but also because of the semantic overlap between gesture and speech. Hence, iconic gestures might be more beneficial than meaningless gestures (Macedonia, Müller, 2010). Apart from the studies on the type of gestures, authors have also studied the effect of reproducing gestures compared to solely viewing them when learning a L2 (Allen, 1995; Huang, Kim, & Christianson, 2019). The overall result is that recall rates are higher for participants who reproduce the gestures than for those who just saw them but more experimental studies should investigate the benefit

of reproducing gestures to corroborate those findings. Finally, although type of gestures is a relevant field of research, there seems to be a definite need for investigation on the difference of the grammatical type of words in L2 acquisition with gestures. Thus, the present study aims to compare the comprehension of nouns and verbs in L2 when accompanied by gestures.

Literature review

To answer Kendon's (1994) question on whether gestures communicate, Hostetter (2011) synthesized in a meta analysis the results of many studies from the past decades and concluded that gestures do communicate. Communication is key when learning a language and it has been proven that gestures also benefit L2 learning. In fact, in a study where participants were shown a lecture in English, their second language, a comprehension task showed that the group who heard and viewed the lecture with gestures performed better than the group who only heard and viewed the lecture without gestures (Sueyoshi & Hardison, 2005). Also, in an overview of gesturing and second language acquisition, Gullberg (2006) explained that gesturing helps L2 learning because it enables the learners to compensate if they do not know a word or the grammar and it enables them to "keep the floor" while they are lacking fluency. Gesturing helps them to sustain interaction (Swain 2000) and it captures the attention of the listener. In addition to communication, learning a new language is also about encoding and recalling words and gestures can enhance vocabulary learning.

Gestures also benefit the retention rate in lexical learning. In fact, in two experiments involving adult English speakers Kelly et al. (2009) proved that the adults learned Japanese words better when they viewed congruent representational gestures with the words they were learning. Thus, gestures help learning a second language not only because it enables the speakers to think and find their words or because it captures the attention of the listener. There seem to be a link between the semantic content of gestures and the semantic content of the word. These findings are corroborated by a study made on three processes in the acquisition of a L2 (i.e. communication, encoding and recall) (Morett, 2014). In the study, where 20 Hungarians words were taught to individuals with or without gestures, Morett (2014) proved that gestures facilitate communication but also encoding and recall in the early L2 learning stage. Moreover, Tellier (2008) showed in an experiment that children learn

words in a L2 more effectively when the words are accompanied by representational gestures that depicted their referent than when the words were presented with images or with speech alone. Thus, L2 words are recalled more effectively when gestures accompany them compared to when the words are presented without any gestures. However, McNeill (1992), one of the first to consider speech and gesture as dependent, differentiated several types of gestures.

In his taxonomy of gestures, McNeill (1992) classifies gestures as iconic, metaphorical, beat or deictic. Iconic and metaphorical gestures are also called representational gestures because they express concrete elements of the word they represent whereas beat gestures are simple rhythmic movements and deictic gestures simply direct the attention of someone by pointing to an object for example. These differences among gestures, in particular the difference between iconic and beats gestures, have been investigated in function of L2 acquisition. For example, a study comparing iconic and beat gestures (So, Sim Chen-Hui, & Low Wei-Shan, 2012) illustrated that both type of gestures improved L2 recall of words by adult participants which would suggest that both iconic and non iconic gestures benefit L2 learning.

However, in a study on memory performance, meaningless gestures seemed to be less helpful when learning L2 words than iconic gestures (Macedonia, Müller, & Friederici, 2010). In fact, in the study, participants were presented words with iconic gestures or words with meaningless gestures. By looking at the brain patterns, the results illustrated that iconic gestures facilitate L2 word learning compared to meaningless gestures. Nonetheless, in their study, Huang, Kim and Christianson (2019) did not find strong evidence that there is a difference between high iconic gestures and low iconic gestures when learning a second language. However, since it has been proven that representational gestures facilitate L2 comprehension (Smotrova & Lantolf, 2013) the present study will focus on high iconic gestures.

Watching gestures, especially high iconic gestures, when learning a L2 benefits the acquisition of words in a new language but previous researchers have also looked at the difference between reproducing or just viewing the gestures while learning a L2. It has been found that retention rate in lexical learning also benefits from the enactment of the gestures. In an experiment, young children had to learn new words in a L1 (Tellier, 2007). Participants who reproduced the gestures when learning the words showed better memorisation on the

free recall test than participants who did not reproduce the gestures. Another example is the study of De Nooijer, Van Gog, Paas and Zwaan (2013) which proved that on an immediate posttest, young participants benefited from imitating gestures during encoding and during retrieval. Although these experiments were conducted on the memorisation of words in a L1, they illustrate that memorisation of recently studied words benefits from the enactment effect. Other studies have proven that the enactment effect also applies to the learning of a L2. In an experiment involving 20 French children learning English words, the results showed that reproducing the gestures when learning the words helps the long term memorisation of those words in the L2 (Tellier, 2008). In another more biological experiment, imaging results of the brain also suggested that novel words were better encoded when gestures were reproduced by the participants (Krönke, Müller, Friederici, & Obrig, 2013). Thus, reproducing the gestures while learning a second language facilitates short term memorisation more than just viewing gestures.

Gestures clearly benefit learning a L2 and enactment might be even more beneficial as proven by several studies. However, what seems to be missing in the field of word learning is research incorporating word class and the effect of gesture on L2 word learning. One might hypothesize that verbs would be easier to learn with representational gestures because they depict an action but in a study without gestures, Gentner (1981) found that verbs are harder to learn than nouns. Moreover, several studies on the acquisition of new words apart from gestures illustrated that verbs are more difficult to learn than nouns in English (Fernald & Morikawa, 1993; Tardif, Shatz, & Naigles, 1997). This might be due to the emphasis adults puts on nouns when children are learning English as their L1. In fact, in a cross-linguistic study Choi & Gopnik (1995) have shown that verbs are more accessible to Korean children from the beginning compared to English children. Thus, findings on word class are contradictory. The first study to investigate the effect of gestures on L2 verbs and nouns is recent. Garcia-Gamez & Macizo (2019) have conducted two experiments to compare the learning of L2 verbs and nouns with gestures. Participants recalled nouns better than verbs but this discrepancy disappeared when congruent gestures were used. This might be explained by the semantic overlap that exist between verbs and congruent gestures but it is clear that further research is needed. Thus, to answer a call from Tellier (2008) and to add to the previous research, this study investigates if there is a difference on the memorisation of nouns and verbs in second language acquisition when using gestures.

Findings on word class are contradictory. Hence, the present study will bring further insight to the field of gestures and second language acquisition by comparing word class. This brings the following question:

To what extent do gestures facilitate learning nouns in a L2 compared to verbs ?

To answer this research question, three sub questions have been included in the study:

- Does the use of gestures facilitate L2 comprehension of new words compared to no gestures ?
- Is it easier to learn verbs or nouns in a novel L2 when those are supported by gestures ?
- Does reproducing gestures facilitate L2 comprehension of new words compared to viewing gestures?

These questions trigger three different hypotheses:

H1: Using gestures facilitates L2 word learning significantly better than not using gestures at all.

H2: Gestures facilitate L2 word learning significantly better for verbs compared to nouns.

H3: Reproducing gestures facilitates L2 word learning significantly better than viewing gestures.

Method

Materials

The stimulus material for this study consisted of videos in which Slovak was taught to Dutch native speakers. The first independent variable is the word type which consist of two levels: nouns or verbs. The second independent variable is gesture production which consist of three

levels: no gestures at all, gesture viewing and gesture production. The study used 14 Slovak words (see Appendix 1 for the chosen words). In order to select those words, 14 Dutch high iconicity signs (see Appendix 2 for some examples of the signs) were chosen from a study of Ormel et al. where 20 deaf adult proficient signers rated the iconicity of 400 videos of signs on a scale from 1 to 7 (1 non-iconic, 7 extremely iconic). Cognates were controlled between the Dutch (L1) words and the Slovak (L2) translation of those words by eliminating any words that were too similar in both languages and several others. Table 1 and 2 show the concreteness (Brysbaert, Stevens, De Deyne, Voorspoels, & Storms, 2014) and the frequency (Keuleers, Brysbaert, & New 2010) of the chosen words and nouns. In table 1, the word “liften” is seen as a noun because it is considered as the plural of “lift” which means “elevator”. However, it will be used as a verb in this study. Finally, word length was controlled between the nouns ($M = 6.14$) and the verbs ($M = 7$).

Table 1. *Concreteness (means and standard deviations), frequency per million words with length and Word type (V = verb and N = noun) of the 7 chosen verbs*

Word	Length	Concreteness $n = 15$ $M (SD)$	Frequency.million	Word type
Schieten	8	4.47 (0.52)	132.34	V
Praten	6	3.87 (1.13)	642.27	V
Schaatsen	9	4.47 (0.83)	5.44	V
Mengen	6	3.80 (1.01)	4.55	V
Liften	6	3.67 (1.11)	6.75	N
Hardlopen	9	3.80 (1.21)	2.52	V
Komen	5	3.33 (1.05)	1143.88	V

Table 2. *Concreteness (means and standard deviations), frequency per million words with length and Word type (V = verb and N = noun) of the 7 chosen nouns*

Word	Length	Concreteness <i>n</i> = 15 <i>M</i> (<i>SD</i>)	Frequency.million	Word type
Bloem	5	4.67 (.49)	13.49	N
Fout	4	2.20 (0.68)	5.28	N
Gordijn	7	4.67 (1.05)	4.46	N
Appel	5	4.67 (.90)	10.20	N
Vliegtuig	9	4.80 (.77)	89.92	N
Varken	6	4.80 (.56)	24.74	N
Wereld	6	3.33 (1.45)	10.50	N

A video was created for each word in Slovak and in Dutch with or without gestures. Each video showed a fluent Slovak speaker saying a Slovak word and a fluent Dutch speaker saying the Dutch word. Both enacting the gesture that goes with the word for the videos with gestures or keeping the hands still for the videos without gestures.

Subjects

A total of 66 subjects participated in the study with 62.1% of female ($N = 41$). The majority of the participants had a WO level of education (66.6%), the others had HBO, MBO or VWO level. The average age approximated to roughly 22 years ($M = 21.88$, $SD = 1.76$, range = 6, minimum = 19, maximum = 25). English and German were the most common L2 and L3 languages of the participants and some participants also had Spanish, Italian or French as L2 or L3. Table 3 displays the means and standard deviations of the participants' self-assessed proficiency in their L2 and L3. None of the participants had prior knowledge about the Slovak language or any language from Eastern European countries. Any multilingual student, i.e. who has multiple native languages, was excluded from the study. A one-way analysis of variance showed that age was equally distributed among the three conditions ($F(2, 63) < 1$). A chi-square test showed that gender was equally distributed among the three conditions ($\chi^2(2) = 1.41$, $p = .494$). A chi-square test showed that educational level was equally distributed among the three conditions ($\chi^2(10) = 14.40$, $p = .156$).

Table 3. *The number of participants (n), means and standard deviations (between brackets) for self-assessed proficiency in function of L2 and L3 and gesture production (0 = not well, 10 = very well)*

	Self assessed proficiency L2	Self-assessed proficiency L3
	<i>n</i>	<i>n</i>
	<i>M (SD)</i>	<i>M (SD)</i>
Viewing gestures	23 7.49 (1.35)	23 4.17 (2.68)
Repeating gestures	22 7.12 (3.08)	22 4.15 (3.18)
No gestures	21 8.3 (0.79)	21 5.04 (2.96)

Design

A 2 x 3 repeated-subjects design was used where the between-subject factor “gesture production” had three levels and the within-subject factor “word type” had two levels. Three groups were created to compare the three types of gestures production: no gestures, gesture viewing and gesture production. Each group received 7 verbs and 7 nouns. Figure 1 shows the analytical model used for this study.

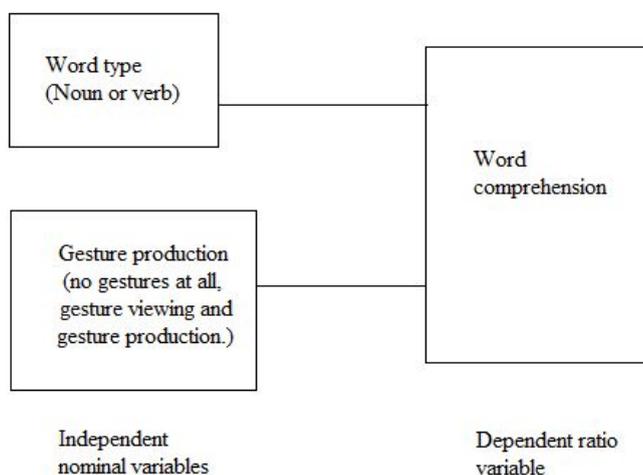


Figure 1. *Analytical model*

Instruments

The dependent variable of the study was the amount of Slovak words the participants could understand and translate towards Dutch. To test this, a word-comprehension-task was conducted. A word was considered as incorrect when the Dutch meaning did not correspond to the Slovak word. The participants were tested on their comprehension of the Slovak words they just learned and had 15 seconds to write down the translation in Dutch of the Slovak word they heard. The videos were edited through a computer with the program “Hitfilm Express” with a 1080p Full HD template and the frame rate was 25 fps.

Procedure

Subjects were recruited through Qualtrics. Before starting the learning process, participants were explained part of the aim of the study and what the participation would involve. The subjects were only told that they would learn new Slovak words and that they would be tested on the words they just learned. Once they had consented to participate, subjects were randomly assigned to one of the three groups. The video started with an introduction explaining them that they would be presented 14 Slovak words and their translation in Dutch and one video asked them to reproduce the gesture. See Appendix 3 for the full instructions for each group. Then the videos to teach them the Slovak words would start. To give them a small break, they had to fill in a questionnaire with additional information about gender, age,

level of education, type of studies, language they knew and a question to ask them if they wanted the results of the experiment. After another learning phase they were tested on the words with a word comprehension task where they had to write down the Dutch translation of the Slovak words they heard. The experiment took 20 minutes in total.

Statistical treatment

Repeated measures analysis with “word type” as the within-subjects factor (2 levels) and “gesture production” as the between-subject factor (3 levels) and a one way analysis of variance (ANOVA) were carried out.

Results

The aim of this study is to investigate the effect of gestures on the comprehension of L2 nouns and verbs.

The effects of word type and gesture production on word comprehension for the three gestures conditions.

A repeated measures analysis for word comprehension with word type as within-subject factor and gesture production as between-subject factor showed a significant main effect of gesture production ($F(2, 63) = 3.69, p = .030$) but the effect of word type on word comprehension was not statistically significant ($F(1, 63) = 1.69, p = .198$). The interaction effect between word type and gesture production was significant ($F(2, 63) = 4.83, p = .011$). Table 4 displays the means and standard deviations for word comprehension of the nouns and verbs for the three different gesture conditions. Figure 2 illustrates the significant interaction between word type and gesture production.

Table 4. *The number of participants (n), means and standard deviations (between brackets) for word comprehension in function of word type and gesture production (0 = no correct answers, 7 = all correct answers)*

	Comprehension Nouns	Comprehension Verbs
	<i>n</i>	<i>n</i>
	<i>M (SD)</i>	<i>M (SD)</i>
Viewing gestures	23 2.0 (1.62)	23 2.91 (1.83)
Repeating gestures	22 1.45 (1.56)	22 1.36 (1.65)
No gestures	21 2.52 (1.43)	21 2.33 (1.43)

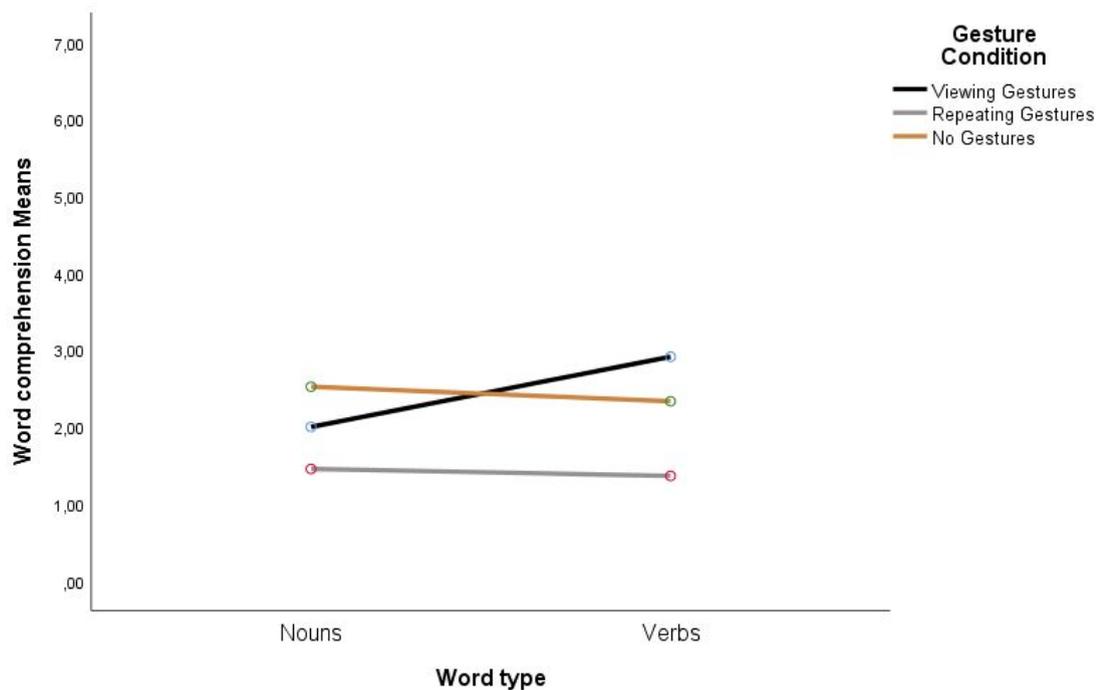


Figure 2. *Illustration of the significant interaction between word type and gesture production*

As a next step, in order to disentangle the interaction, the repeated measures analysis was performed for each of the three conditions separately. In order to do so, the file was split for gesture condition. The difference between the two word types was only found for the gestures viewing condition ($F(1, 22) = 13.24, p = .001$), not for the repeating gestures condition ($F(1, 21) < 1$) nor for the no gestures condition ($F(1, 20) < 1$). In the viewing condition, the comprehension of verbs ($M = 2.91, SD = 1.83$) was better than the comprehension of nouns ($M = 2.00, SD = 1.62$). In the repeating gestures condition, the nouns ($M = 1.45, SD = 1.56$) were equally remembered as the verbs ($M = 1.36, SD = 1.65$) and in the no gestures condition the nouns ($M = 2.52, SD = 1.43$) were also equally remembered as the verbs ($p = .55, M = 2.33, SD = 1.43$).

The effects of gesture production on word comprehension for the two word types.

In order to compare the three conditions for each word types, a one way analysis of variance was carried out. The results showed a significant effect of gestures condition on verb comprehension ($F(2, 65) = 5.039, p = .009$) but not on nouns comprehension ($F(2, 65) = 2.569, p = .085$). The comprehension of verbs of the viewing gesture condition ($M = 2.91, SD = 1.83$) was better than the comprehension of verbs of the repeating gestures condition ($p = .008$, Bonferroni correction; $M = 1.36, SD = 1.65$). There was no difference between the comprehension of verbs of the viewing gesture condition and the no gestures condition ($p = .747$, Bonferroni correction; $M = 2.33, SD = 1.43$). There was no difference between the comprehension of verbs of the repeating gestures condition and the no gestures condition ($p = .747$, Bonferroni correction; $M = 2.33, SD = 1.43$).¹

¹ The overall pattern of the analysis remains the same when the covariate “language fluency” is added. There is no main effect of gesture production nor of word type but the interaction remains. Thus, an unequal distribution of language fluency can affect the results and future studies need to investigate if an unequal distribution of language fluency makes a difference in learning another language.

Conclusion and discussion

Conclusion

The aim of the study was to compare the comprehension of nouns and verbs in L2 when accompanied by gestures. It was anticipated that using gestures would facilitate L2 word learning better than not using gestures at all (Morett, 2014; Tellier, 2008) and that reproducing gestures would facilitate L2 word learning better than just viewing gestures (Tellier, 2007; De Nooijer et al., 2013). However, it appeared overall (i.e. when the distinction between verbs and nouns was ignored) that gestures do not have a significant advantage on no gestures. Surprisingly, viewing gestures was found to be more helpful than repeating gestures when verbs and nouns were separated and verbs seemed to be remembered better. Those findings contradict previous research which have suggested that viewing gestures and reproducing gestures benefit L2 word learning more than not using gestures (Tellier, 2008; Huang, Kim, & Christianson, 2019).

Moreover, it was hypothesized that verbs would be better learned than nouns. However, this experiment did not detect any evidence for the difference in L2 word learning depending on word type when participants learned new words without any gestures nor when they learned words by repeating the gestures. Nonetheless, verbs were found to be better learned than nouns in the viewing gesture condition. Those findings corroborate Garcia-Gamez & Macizo's (2019) study on verbs and nouns, which showed that without gestures the acquisition of nouns was better than verbs but that the difference between verbs and nouns disappeared when gestures were added during the L2 word training. In addition, the present study is showing an even more favorable image of verbs when compared to nouns. Further work needs to be done to establish whether verbs are indeed learned more easily than nouns in specific contexts.

Discussion

Previous empirical studies showed that gestures benefit L2 word learning and promote retention rate in lexical learning (Lazaraton, 2004; Tellier, 2008). This current study investigated further the benefit of gestures when learning new words in a second language. Contrary to expectations, this study did not find a significant difference between the viewing gestures condition, the repeating gestures condition and the no gestures condition for the

comprehension of new words in a L2. In fact, when the difference between word type is not considered the general findings are not consistent with that of Kelly et al. (2009) who showed that adults learned Japanese words better when they viewed congruent representational gestures with the words they were learning. Moreover, it has been suggested that reproducing gestures is better than solely viewing gestures when learning new L2 words (Allen, 1995; Tellier, 2008; Huang, Kim, & Christianson, 2019). Thus, that recall rates are higher for participants who reproduce the gestures than for those who just saw them. However, this does not appear to be the case in this current study as participants who reproduced the gestures did not perform better on the comprehension test than the other participants who only viewed the gestures. This result might be explained by the fact that the research was conducted online and each participants completed the training phase in different environments and might have forgotten to reproduce the gestures. Thus, it might be that the participants who supposedly learned the new words by repeating the gestures actually only viewed the gestures.

As mentioned in the literature review, findings on the difference between word class when learning new words are contradictory. One recent study by Garcia-Gamez & Macizo (2019) showed that participants recalled nouns better than verbs but this discrepancy disappeared when congruent gestures were used. In the current study, the difference between word type occurred only when participants viewed the gestures and the comprehension rates were higher for verbs than nouns. This could be explained by the semantic overlap that exists between verbs and congruent gestures. It appears that gestures help the comprehension of verbs better than nouns when learning a L2 because the enactment of the verb can be related to the action of the verb. Those findings also support the idea that the benefit of using gestures when learning a L2 comes from the semantic overlap between gesture and speech as the gestures were iconic gestures (Macedonia, Müller, & Friederici, 2010). There is abundant room for further progress in determining if verbs are better learned than nouns when using gestures.

Limitations and further studies

The most important limitation lies in the fact that the study was carried out online and not in a laboratory or in a classroom. In fact, there is a possibility that the participants might have been distracted during the learning or test phases as each participants completed the test in a

different environment and it was not possible to assess if participants in the reproducing group reproduced all the gestures compared to a study carried out in a laboratory. Moreover, the online study might not have motivated the participants enough because no incentive was offered at the end of the test. Finally, the order of the words in the current study was not randomized which could have affected the results. A recency effect or a primacy effect could have occurred (Yoo, & Kaushanskaya, 2016; Gershberg, & Shimamura, 1994). Thus, in a real-life setting, the order of the words would be randomized.

It is also unfortunate that even if the participants were asked to wear headphones, the sound quality might have been a problem for the understanding of the audio in the videos. The poor sound quality might have added to the complexity of the task. Thus, the learning phase as well as the test phase might have been more difficult for the participants if they could not hear the words well enough. Therefore, it might be relevant to reproduce this study in another environment, with better sound quality and a randomized order of the words.

The generalisability of these results is also subject to certain limitations. For instance, the majority of the participants were students and not working people. Maybe students are more used to learn and a difference could emerge if the study was to be carried out with older working participants. Also, all the participants in this study were Dutch and had Dutch as their first language. In a previous cross-linguistic study, Choi & Gopnik (1995) showed that there was a difference between Korean children and English children when it comes to learning words. In fact, verbs were accessible earlier for the Korean children than the English children. There might be an impact of the L1 when learning a L2 and more specifically an impact on the word type. Thus, it could be relevant to compare the comprehension rates of new words in a L2 for participants with different L1 backgrounds. Also, the time frame of this study was short and the comprehension test was taken minutes after learning the new words. Thus, the findings cannot be generalized to long-term learning and further research is needed over longer time frames.

It was found in this study that viewing gestures benefit learning new words and that verbs are better learned than nouns. Further research should be carried out to investigate the difference between nouns and verbs but also between other word types.

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Appendix 1

Table 1 *Seven chosen verbs in Dutch and their Slovak and English translation*

Word in Dutch	Word in Slovak	Word in English
Schieten	strielať	Shoot
Praten	rozprávať	Talk
Schaatsen	korčuľovať	(Ice) Skate
Mengen	zmiešať	Mix
Liften	zdvihnúť	Hitch-hike
Hardlopen	bežať	Run
Komen	prísť	Come

Table 2 *Seven chosen nouns in Dutch and their Slovak and English translation*

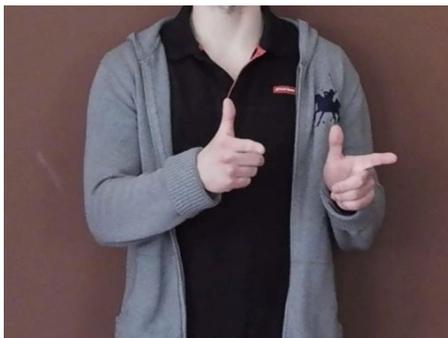
Word in Dutch	Word in Slovak	Word in English
Bloem	kvetina	Flower
Fout	uterák	Mistake
Gordijn	záhrada	Curtain
Appel	jablko	Appel
Vliegtuig	lietadlo	Plane
Varken	prasa	Pig
Wereld	hrebeň	World

Appendix 2 *Examples of signs*

Dutch instructor performing the gesture for the word “mengen” (to mix) in the viewing gestures condition and the repeating gestures condition.



Slovak instructor performing the gesture for the word “schieten” (to shoot) in the viewing gestures condition and the repeating gestures condition.



Appendix 3

Instructions for the videos

Video 1 (Gesture Viewing)	Video 2 (Gesture Production)	Video 3 (Control Group)
<p><i>Pre-Experiment Instruction</i></p> <p>In the following video you will be taught 14 Slovak words. You'll see two instructors: one Dutch and one Slovak instructor. First the Dutch instructor will pronounce the Dutch word, followed by a Slovak translation by the Slovak instructor. One word and it's translation will be repeated twice before going to the next word. When the teaching part is over, the test will begin. Good luck!</p>	<p><i>Pre-Experiment Instruction</i></p> <p>In the following video you will be taught 14 Slovak words. You'll see two instructors: one Dutch and one Slovak instructor. First the Dutch instructor will pronounce the Dutch word, followed by a Slovak translation by the Slovak instructor. One word and it's translation will be repeated twice before going to the next word. The instructors will be using gestures. Please try to repeat those gestures as well as you can while listening to the words. When the teaching part is over, the test will begin. Good luck!</p>	<p><i>Pre-Experiment Instruction</i></p> <p>In the following video you will be taught 14 Slovak words. You'll see two instructors: one Dutch and one Slovak instructor. First the Dutch instructor will pronounce the Dutch word, followed by a Slovak translation by the Slovak instructor. One word and it's translation will be repeated twice before going to the next word. When the teaching part is over, the test will begin. Good luck!</p>

<p><i>Teaching</i></p> <ul style="list-style-type: none"> - Dutch instructor on the left - Slovak instructor on the right -Instructors will use gestures while pronouncing the words - One second screen in which is the number of the word being taught next (1,2,3...) 	<p><i>Teaching</i></p> <ul style="list-style-type: none"> - Dutch instructor on the left - Slovak instructor on the right -Instructors will use gestures while pronouncing the words - One second screen in which is the number of the words being taught next (1,2,3...) 	<p><i>Teaching</i></p> <ul style="list-style-type: none"> - Dutch instructor on the left - Slovak instructor on the right -Instructors will NOT use gestures while pronouncing the words - One second screen in which is the number of the words being taught next (1,2,3...)
<p><i>Pre-Test Instruction</i></p> <p>In the next video you will see the Slovak instructor pronouncing the Slovak words twice, after which you will have 15 seconds to write down the Dutch translation on your answer sheet. The words will not be in the same order as in the teaching part. When the test is over, please raise your hand. Good luck!</p>	<p><i>Pre-Test Instruction</i></p> <p>In the next video you will see the Slovak instructor pronouncing the Slovak words twice, after which you will have 15 seconds to write down the Dutch translation on your answer sheet. The words will not be in the same order as in the teaching part. When the test is over, please raise your hand. Good luck!</p>	<p><i>Pre-Test Instruction</i></p> <p>In the next video you will see the Slovak instructor pronouncing the Slovak words twice, after which you will have 15 seconds to write down the Dutch translation on your answer sheet. The words will not be in the same order as in the teaching part. When the test is over, please raise your hand. Good luck!</p>

<p><i>Test</i></p> <p>- Slovak instructor will pronounce the Slovak words twice</p> <p>- One second screen in which is the number of the word being taught next (1,2,3...)</p>	<p><i>Test</i></p> <p>- Slovak instructor will pronounce the Slovak words twice</p> <p>- One second screen in which is the number of the word being taught next (1,2,3...)</p>	<p><i>Test</i></p> <p>- Slovak instructor will pronounce the Slovak words twice</p> <p>- One second screen in which is the number of the word being taught next (1,2,3...)</p>
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Video group 1 (Viewing Gestures)

Instructions: *In deze video ga je 14 Slowaakse woorden leren. Je krijgt twee instructeurs te zien: één Nederlandse en één Slowaakse. Eerst zal de Nederlandse instructeur een Nederlands woord uitspreken. Daarna zal de Slowaakse instructeur twee maal de Slowaakse vertaling van het woord geven. Onthoud de woorden goed, want nadat alle woorden zijn geweest zal er een test komen. In deze test wordt verwacht dat je aan de hand van de Slowaakse woorden de Nederlandse vertaling opschrijft. Dit wordt later verder uitgelegd. Voor nu, succes met leren!*

Duration: 00:03:02

Video group 2 (Producing Gestures)

Instructions: *In deze video ga je 14 Slowaakse woorden leren. Je krijgt twee instructeurs te zien: één Nederlandse en één Slowaakse. Eerst zal de Nederlandse instructeur een Nederlands woord uitspreken. Daarna zal de Slowaakse instructeur twee maal de Slowaakse vertaling van het woord geven. Onthoud de woorden goed, want nadat alle woorden zijn geweest zal er een test komen. In deze test wordt verwacht dat je aan de hand van de*

Slowaakse woorden de Nederlandse vertaling opschrijft. Dit wordt later verder uitgelegd. Ook zullen de instructeurs handgebaren gebruiken. Probeer deze, tijdens het leren van de woorden, zo nauwkeurig mogelijk na te doen. Voor nu, succes met leren!

Duration: 00:03:02

Video group 3 (No Gestures)

Instructions: In deze video ga je 14 Slowaakse woorden leren. Je krijgt twee instructeurs te zien: één Nederlandse en één Slowaakse. Eerst zal de Nederlandse instructeur een Nederlands woord uitspreken. Daarna zal de Slowaakse instructeur twee maal de Slowaakse vertaling van het woord geven. Onthoud de woorden goed, want nadat alle woorden zijn geweest zal er een test komen. In deze test wordt verwacht dat je aan de hand van de Slowaakse woorden de Nederlandse vertaling opschrijft. Dit wordt later verder uitgelegd. Voor nu, succes met leren!

Duration: 00:02:39

Video testing phase

Instructions: Nu je de woorden hebt geleerd, gaan we testen hoeveel woorden je hebt onthouden. In deze video zal de Slowaakse instructeur alle woorden twee keer zeggen. Na elk woord heb je 15 seconden om de Nederlandse vertaling op je antwoordenblad te schrijven. De woorden staan in een andere volgorde dan in de vorige video. Succes!

Duration: 00:04:49

Answers test:

1. vliegtuig
2. komen
3. handdoek
4. schieten
5. liften
6. kam
7. praten

8. bloem
9. gordijn
10. hardlopen
11. schaatsen
12. appel
13. varken
14. mengen

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: Iris Kattar

Student number: s1040741

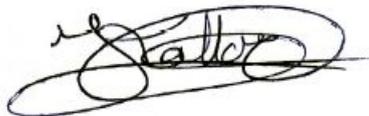
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DECLARATION:

a. I hereby declare that I am familiar with the faculty manual (<http://www.ru.nl/stip/english/rules-regulations/fraud-plagiarism/>) and with Article 16 "Fraud and plagiarism" in the Education and Examination Regulations for the Bachelor's programme of Communication and Information Studies.

b. I also declare that I have only submitted text written in my own words

c. I certify that this thesis is my own work and that I have acknowledged all material and sources used in its preparation, whether they be books, articles, reports, lecture notes, and any other kind of document, electronic or personal communication.



Signature:

Place and date: Nijmegen, 12 June 2020