

# Can gestures lend a hand when learning placement event descriptions in L2 Dutch?

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## **ABSTRACT**

Second language learners face many challenges. One of these is linking the novel word forms of their second/additional language (L2) to the meaning concepts of their first/native language (L1). This is especially hard when the L1 meanings do not properly fit the L2 forms, either because the L1 meaning is too specific or too general for the L2 form. Such cases of L2 forms require the semantic reorganisation of L1 meanings. One domain where this frequently occurs is that of placement event descriptions, since languages vary in their size of placement verb inventory. It can thus be hard for learners to acquire form and meaning of L2 placement verbs. Research has, however, shown that gestures can be helpful in L2 vocabulary acquisition. The current study aims to investigate if gestures can also facilitate the learning of placement event descriptions in L2 Dutch. Participants took part in an experimental training session, preceded by a pre-test and followed by a post-test to compare the difference in test scores. The training session involved an explanation video, either with or without the use of gestures. Participants in the gesture condition were expected to perform relatively better than the ones in the no-gesture condition, depending on the placement verb system in their L1. However, no support was found for this hypothesis in the statistical analyses, as the scores of the participants in the gesture condition did not differ significantly from those of the participants in the no-gesture condition. The results therefore suggest that it does not matter whether one uses gestures or not to explain placement verbs in L2 Dutch.

## **INTRODUCTION**

### *L2 vocabulary acquisition*

There are different theories on how second language learners acquire new words in their L2. According to some (psycho)linguistic models of L2 lexical acquisition, novel L2 forms are initially linked to old meaning representations of the L1 (via translation), and it is not until a later stage that these L2 forms have the L2 semantic and syntactic information integrated into them (e.g., Jiang, 2000; also see Revised Hierarchical Model for bilingual lexical processing in Kroll & Stewart, 1994; Kroll & Sunderman, 2003). When learning a language as a child, one has to learn not only the meaning concept of a word, but also its form and other linguistic properties such as syntactic and morphological information. When learning a second language as an adult, the meaning representations already exist in the L1, so the novel L2 forms are linked to these concepts that are already present. In other words, the novel L2 form does not get its own lemma, but is attached to that of the L1 translation form. This means that the L2 learners will use the novel L2 word form in the same way as they would use its L1 translation. In a later stage, the L2 learner will become familiar with the actual linguistic properties of the L2 word via contextualized input and integrate the true semantic, syntactic, and morphological properties into the lexical L2 form. Many L2 forms, however, fossilise before reaching this integration

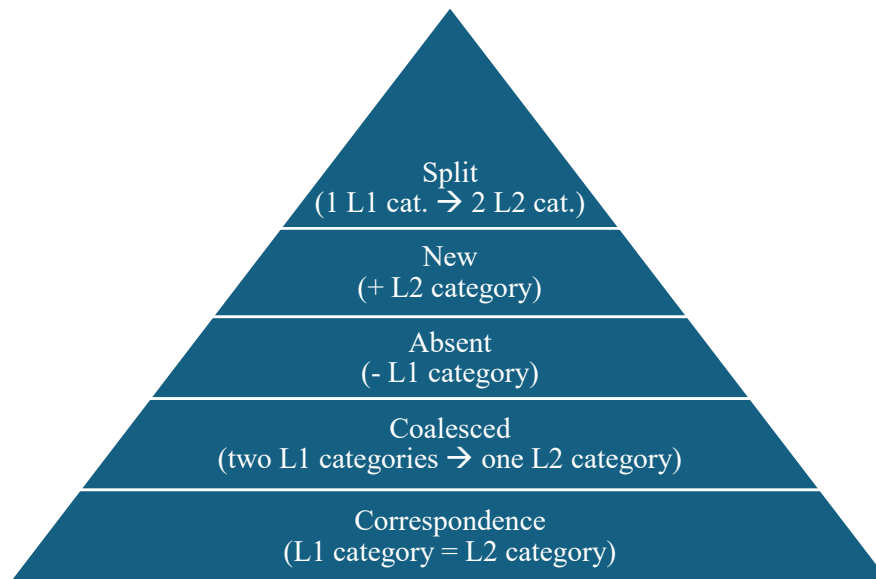
stage (Jiang, 2000), meaning the L2 form remains to be used similarly as the L1 concept it is linked to. This can result in errors related to word choice or morphology. For example, a native Dutch speaker learning English might link the L2 form *photo* with the L1 meaning and linguistic properties for *foto* and therefore incorrectly ask someone *to make a photo of them* rather than *to take a photo of them*, as it is *een foto maken* (literally *to make a photo*) in their L1.

Even though this linguistic fossilisation is a known problem, little research has been done to investigate how the initial L1-based meanings linked to L2 forms develop into L2-based meanings following the reorganisation of meaning concepts during the integration stage. Such reorganisation is necessary because concepts can have different semantic boundaries in various languages. One concept can have a broader use or semantic meaning in one language than it does in another one. For example, the Dutch word *lekker* can be used in numerous contexts to describe something as good or pleasant (food, weather, activities), whereas the German word *lecker* is only used for tasty food and beverages. Some studies have shown that L2 learners struggle with both the comprehension and production of such L2 words, suggesting that the semantic reorganisation to L2-based meanings is a difficult process, even when L1 and L2 forms are similar (Gullberg, 2009a).

Ellis (1994) devised a hierarchy of semantic reorganisation difficulty. From easiest to most difficult this hierarchy goes as follows: correspondence, meaning equivalence between L1 and L2 semantic categories; coalesced, meaning two (specific) L1 categories fusing into one (general) L2 category; absent, meaning the abandonment of an L1 category; new, meaning the creation of an L2 category; and, finally, split, meaning the splitting of one (general) L1 category into two (specific) L2 categories (see Figure 1 for a visualisation; also see Ellis, 1994, p. 307). To explain the levels of this hierarchy, think about personal pronouns. Some languages, like Tagalog, have two forms of ‘we’ rather than just one; an inclusive ‘we’ (*tayo*), meaning both the speaker and the hearer, and an exclusive ‘we’ (*kami*), meaning the speaker and one or more other people but not the hearer (see <https://www.tagalog.com/>). An example for the correspondence level could be when both the L1 and the L2 only have one form of ‘we’. The coalesced level could be the L1 having the inclusive and exclusive ‘we’, but the L2 having only one form of ‘we’. The split level would be the opposite of this, so the L1 has one form of ‘we’ and the L2 has the inclusive and the exclusive form. For the absent and new level, think about languages with dual forms, like Slovene. A dual form is a separate number form used when talking about two people doing something, e.g., *midva greva* (= we two are going) versus *mi gremo* (= we are going) (see <https://sloveniagrammar.com/>). If the L1 has a dual form but the L2 does not, this would fall under the absent level. If the L1 would not have a dual form but the L2 would, this would be an example belonging to the new level.

**Figure 1**

*Visualisation of Ellis' (1994) semantic reorganisation difficulty hierarchy*



*Note.* Correspondence (bottom) is considered the easiest process and split (top) the hardest, with the processes in between becoming increasingly more difficult from bottom to top.

Even though all these processes require semantic reorganisation, the splitting of one (general) L1 category into two or more (specific) L2 categories is seen as the hardest one because it asks for a shift of semantic boundaries of existing L1 categories and for a restructuring of the semantic representations (Gullberg, 2009b). One linguistic domain where this difficulty becomes apparent is that of placement events.

### *Placement events*

Placement events are caused motion events that involve an agent moving a figure object to an end location, also called ground (Gullberg, 2009b, 2011). Usually the agent will maintain (manual) control over the object until this end location is reached (Talmy, 1985; Gullberg, 2009a; Kopecka & Narasimhan, 2012). An example would be: *he put the bottle on the table*, or *she put the book on the shelf*. Languages differ in the way they describe these kinds of events and in their degree of semantic specificity of the verb (Kopecka & Narasimhan, 2012; Hoetjes, 2018). Placement verb inventories can range from a single verb (e.g., English 'put', and French *mettre* 'put'), to a small set of posture verbs (e.g., the Dutch *zetten* 'set' and *leggen* 'lay', or the Swedish *sätta* 'set', *ställa* 'stand', and *lägga* 'lay'), to even large sets of classificatory verbs (e.g., Tzeltal verb roots like *pajchan* 'place it bowl-shaped sitting' or 'put'; Brown, 2012) (Gullberg, 2009a, 2009b).

The crosslinguistic differences in placement verb inventories can cause difficulties for L2 learners, especially when their L1 has a single-verb system and their L2 uses a set of multiple verbs. This is the splitting Ellis (1994) refers to in the semantic reorganisation difficulty hierarchy. Other research has

also shown evidence for this learner difficulty. For example, Viberg (1985) looked at how well Spanish, Polish, and Finnish learners of L2 Swedish had acquired the Swedish posture verbs (*sätta/ställa/lägga*). The results showed that they all struggled with acquiring these specific posture verbs and that their L2 Swedish verb choice was likely influenced by the placement verb inventory of the L1 (Viberg, 1985). Contrary to Swedish, both Spanish and Finnish do not make orientation distinctions. Polish does have verbs that roughly translate to ‘stand’ and ‘lay’, which explains why Polish participants used *ställa* and *lägga* quite appropriately, but they still struggled with *sätta* (Viberg, 1985).

More recent research has replicated these findings. Cadierno et al. (2016) had speakers of L2 Danish and L2 Spanish describe placement events shown in video clips and found that the learner difficulties surrounding semantic reorganisation remain even at intermediate proficiency. Notably, they found that this goes for both learners with a small L1 placement verb inventory moving to a larger L2 placement verb inventory and vice versa. Hijazo-Gascón et al. (2016) also looked at these languages and found similar results and, hence, argue that learners struggle to adapt their semantic L1 categories to new L2 categories. Additionally, similar findings have been found for other languages. For example, Lewandowski and Özçalışkan (2021) looked at L1 Polish speakers with either German or Spanish as their L2 and also found evidence for the semantic reorganisation struggle that L2 learners face. Moreover, their results showed that learners with a small L1 placement verb inventory moving to a bigger L2 placement verb inventory struggled more to attune to the L2 categories than the other way around (Lewandowski & Özçalışkan, 2021). This is in line with the hierarchy of semantic reorganisation difficulty by Ellis (1994). This suggests that the relative complexity of the placement verb inventories in the L1 and L2 plays a crucial role in how easily L2 learners can attain the L2 categories.

L2 learners thus struggle to accurately describe placement events in their target language. If the L2 has a larger placement verb inventory than their L1, they might not realise this and overuse a specific placement verb. And even if they are aware of the multiple placement verbs, they could still mix them up. For example, an L2 Dutch speaker might say: “*Ik leg het flesje op de tafel.*” (‘I put/lay the bottle on the table’), even when they mean to indicate that the bottle is standing upright and they should have used the verb *zetten* (‘to put’ or ‘to set’). In order to make L2 Dutch learners understand when to use which verb, it is necessary to elaborate on the spatial aspect (i.e., the orientation and shape of the object). Things like orientation and spatial information are sometimes hard to explain or express verbally and may be more easily expressed with the use of gestures.

### *Gestures*

Gestures are often defined as symbolic movements of the body related to the discourse or communicative intention (e.g., Kendon, 2004). Examples of gestures are: referencing something by

pointing at it; using your hands to mimic what something looks like (such as shape or size); illustrating an abstract idea by suggesting a form, object, or process; clarifying your intention via bodily action (e.g., indicating agreement or showing doubt); and using visible actions instead of spoken words (e.g., waving goodbye). People can gesture both during speech as well as outside of it, but the movements are always related to the discourse or communicative intention. Gestures can also add information, e.g., spatial information, that is hard to express via speech (Gullberg, 2011).

Fidgeting or nervous movements (e.g., playing with your hair, self-grooming, scratching yourself, and adjusting your clothes) and other non-verbal communicative actions that do not have anything to do with the discourse are generally not seen as gestures. Gestures have also been shown to be distinguishable from such movements and are usually disregarded in ordinary interaction, or seen as habitual or involuntary (Kendon, 2004). Gestures, thus, have a deliberate and intentional aspect to them. If a movement lacks this, people tend to treat it as background information and disregard it. Moreover, people are consistent in distinguishing between what they treat as background information and foreground action; movements that lack the deliberate aspect are perceived as serving a practical aim, whereas movements that do feature the deliberate aspect are perceived as controlled actions (Kendon, 2004). It should be noted though that the way an action is perceived (incidental or intentional) depends on the context.

For the movements that are considered to be gestures, various ways of grouping these exist (for an overview see: Kendon, 2004). Although there are different approaches, the most common recognized categories follow the categorisation by McNeill (1992): iconics, which are closely related to the semantic content of speech as they often characterise or even imitate/enact an object or action (e.g., making an upward movement when talking about climbing something); metaphoric, which present an image of an abstract concept (e.g., making a sideways movement to mimic the idea of finishing a topic and putting it away); deictics, which are pointing movements used to refer to something (e.g., pointing to an object, a person, or a place); and beats, which are the only non-representational gestures as they do not present a discernible meaning (e.g., a flick of a hand rhythmically aligned with speech).

Another classification system worth mentioning is that of Ekman and Friesen (1969). They propose a system with five categories: emblems, which are defined as non-verbal acts with a direct verbal translation; illustrators, defined as movements that illustrate what is verbally said; affect displays, defined as (mainly) facial expressions of emotion; regulators, defined as acts that regulate the interaction and turn-taking; and adaptors, defined as movements that satisfy some kind of self or bodily need. Kendon (2004) criticizes this system stating that it is confusing and that the categories overlap, but does note that the terms *emblem* and *illustrator* are commonly accepted.

Kendon (2004) also makes two important notes about categorisation systems for gestures in general. Firstly, he notes that there is no good or bad categorisation system, but that the system one should use

depends on the purpose of categorising the gestures. Different systems are useful under different circumstances and for different purposes. Secondly, he also argues that a typological approach with set categories might not be completely accurate, and that a dimensional system or the use of one or multiple continua might be more fit to compare different gestures (for proposed continua see McNeill, 1992; Gullberg, 1998).

### *Gestures and language*

Regardless of classification, the link to the discourse is a critical aspect within the definition of gestures. Research has shown that language, speech and gestures are tightly linked (e.g., Kendon, 1980; McNeill, 1985, 1992, 2005; Wagner et al., 2014; Abner et al., 2015). Some observations that are mentioned by McNeill (1985) to support this theory are: gestures occur during speech, meaning when speech stops so do gestures; gestures and speech often express similar semantic or pragmatic information; gestures and speech are coordinated in terms of timing and pace/rhythm; gestures and speech develop and progress together in children; and gestures and speech are likewise affected by aphasia. Moreover, neural evidence has been found for the link between speech and gestures (for an overview, see Willems & Hagoort, 2007).

This link between language and gestures explains why cross-cultural differences between gestures exist. Kita (2009) states that such variation can be driven by four things: by culture-specific conventions for form-meaning associations; by culture-specific conceptualisations of spatial information; by differences in the pragmatics of communication; and by linguistic differences. This last one indicates that speakers of different languages may vary in things like their timing of gestures or in the shape of the gestures. In fact, gesture patterns have been found to mirror the linguistic encoding patterns that are detectable in speech (e.g., Hoetjes, 2008a, 2008b; Gullberg, 2011). This means that gestures vary cross-linguistically because languages differ in what meaning elements are taken into account during linguistic encoding, and this is reflected in the gestures. This theory is also supported by the finding that even within a language gestures differ depending on the structures used by the speaker (Özyürek et al., 2005).

One linguistic domain where this link between gestures and language becomes apparent is that of placement events. Previous research looked at how people gesture about placement events in their L1. For example, Gullberg (2011) studied speakers of French and Dutch and how they talk and gesture about placement events. French has a placement verb inventory that only consists of a single verb, *mettre* 'put', but the Dutch inventory consists of more specific placement verbs, like *zetten* 'set', *leggen* 'lay', and *hangen* 'hang'. What verb to use in Dutch depends on (the shape of) the object and its orientation: *zetten* is mainly used when an object is placed vertically and has little contact with the surface underneath (small base), *leggen* is mainly used when an object is placed horizontally and has a lot of contact with the surface underneath (large base), and *hangen* is mainly used when an object is

hung over something. During Gullberg's experiment, participants took part in a director-matcher task in which the director looked at short videos consisting of placement events (i.e., the moving of items) and then had to describe (from memory) what they saw in the video to the matcher. Both the speech and gesture data of the directors was analysed and the results showed that crosslinguistic differences could be spotted not only in their speech, but also in their gesture productions: the speakers of French focused on the movement and merely gestured the path (with no clear handshapes), but the speakers of Dutch focused on the figure object itself and gestured with specific object-holding handshapes, thus mimicking what it would look like when one actually holds or moves the object in question (Gullberg, 2011). Crucially, this crosslinguistic difference in gesture production is related to crosslinguistic differences in the verb semantics; speakers of Dutch need to be concerned with the figure object to determine what specific verb to use, which is reflected by their gestures illustrating the object shape, but the French do not need to be concerned with this and can therefore focus their gesture production on something else (i.e., the path). This reflective pattern of gestures mimicking linguistic encoding patterns was also found for English, with native speakers using the general placement verb 'put' and showing no clear handshapes in their gestures (Hoetjes, 2008a, 2008b). Both findings are also in line with the well-established idea that gestures and speech have a close semantic and temporal relationship.

#### *Gestures and language: L1 and L2*

Since gestures are linked to language and speech, research has been done to find out if gestures can facilitate language learning. Various studies have found that gestures can indeed be helpful in this process. For example, starting at child language acquisition, Iverson and Goldin-Meadow (2005) examined the relation between gestures and language development by analysing the speech and gestures of children of English-speaking families. They found that the children initially used gestures for words that later also became part of their verbal lexicon. Furthermore, the onset of gesture-plus-word combinations enabled predictions for the onset of two-word combinations. The results thus showed that gestures not only precede language development but that they are also tightly related to it (Iverson & Goldin-Meadow, 2005).

Other research looked into the role that gestures play in adult (L1) language comprehension. For example, Kelly et al. (1999) conducted four experiments in which adult participants had to look at videos and answer communication-related questions. The results demonstrated that when speech is combined with the production of (iconic) gestures people are better able to grasp detailed information from that utterance (Kelly et al., 1999). This suggests that speech and gestures likely interact to create meaning together, again pointing to a strong link between the two.

Seeing how gestures are helpful in both child language acquisition and adult L1 language comprehension, the question comes up if gestures might also be helpful when learning a new language

(L2). Tellier (2008) investigated this by having French kids learn (novel) English words, either with pictures or gestures that illustrate them. In both conditions the children had to repeat the words, but in the gesture condition they also had to reproduce the gestures. The results showed that (reproducing) gestures led to a better memorisation of the novel L2 words (Tellier, 2008). This finding is also in line with the Dual Coding Theory (Clark & Paivio, 1991), according to which multi-modal learning (i.e., both visual and motor) is more effective than learning via a single modality (i.e., merely visual).

Moreover, gestures have also been found to facilitate L2 vocabulary acquisition in adults. Kelly et al. (2009), for example, conducted two experiments to investigate the role of iconic gestures in L2 vocabulary acquisition. In their experiments, they presented novel Japanese verbs either with or without gestures to native English speaking adults. The results of the first experiment suggested that gestures facilitate L2 vocabulary acquisition because of the semantic overlap rather than by merely drawing attention to the novel words, and that presenting novel words once in a multi-modal way (i.e., verbally and with gestures) is more effective than presenting them twice solely through speech. The second experiment used event-related potentials (ERP) and replicated the results from the first experiment by finding neural changes associated with L2 vocabulary acquisition using gestures (Kelly et al., 2009). Gesture may thus be a helpful tool in L2 vocabulary acquisition by having novel words and their meaning be grounded in transparent bodily representations (i.e., multi-modal learning).

#### *Gestures and L2 placement event descriptions*

As stated above, gestures have been found to reflect the linguistic encodings of placement events; speakers of languages with several posture verbs often indicate object shape in their gesturing, whereas speakers of languages with a single-verb placement inventory often focus on other things, such as path (Hoetjes, 2008a; Gullberg, 2011). This brings up the question of what speakers do in an L2 with a differently sized placement verb inventory than their L1. Do they adapt their gestures to the linguistic encoding patterns of the L2 or do their gestures show transfer from the L1?

One study that investigated this is that by Gullberg (2009b), who looked at speech and gesture data from English speakers of L2 Dutch using the data from Hoetjes (2008a). The participants took part in a director-matcher task (same as in Gullberg, 2011). The results showed that they overused *zetten* 'set', barely used *leggen* 'lay', but did use dummy verbs like *gaan* 'go' and *doen* 'do', as well as intransitive posture verbs like *zitten* 'sit', *liggen* 'lie', and *staan* 'stand'. This shows that they struggled with describing placement events, even though some participants had a higher proficiency or had been living in the Netherlands for a long time (>10 years). Furthermore, their gestures focused on the path of the movement both when speaking English, but also when speaking Dutch. This means that the gestures in their L2 showed transfer from their L1, giving the L2 learners a manual accent. However, L2 speakers that did use the target-like gestures were more likely to also use the correct verbs in speech (Gullberg, 2009b).

Similar evidence for L1-transfer was found by Hoetjes (2018) for Dutch speakers of L2 English. Participants in that study also performed in a director-matcher task (same as Gullberg, 2009b, 2011) and both their speech and gestures were analysed. The participants were found to sound native-like (mainly used *put*), but their gestures were found to be focused on object form (typical for their L1/Dutch) rather than on path (typical for the L2/English). In other words, regardless of how native-like the speech sounded, the participants in both studies showed L1-transfer in their gesture use. Similar results of such L1-transfer have been found in gesture research on referents or anaphoric linkage (Gullberg, 2003, 2006), ground (Yoshioka & Kellerman, 2006) and path in motion events (Kellerman & van Hoof, 2003; Stam, 2006).

L2 learners thus struggle with learning placement events descriptions, both in speech and in gesture. However, the use of gestures has been found to be helpful in learning L2 vocabulary acquisition (Tellier, 2008; Kelly et al., 2009) because of its close link to language and its multi-modal aspect. Furthermore, L2 speakers that do use the right gestures when describing placement events have been found more likely to use the right verbs (Gullberg, 2009b), so perhaps gestures can lend a hand in overcoming this learning struggle. This is what the current study aims to investigate.

#### *The present study*

The present study combines the fields of gesture study, placement events, and second language acquisition in order to investigate whether gestures can offer a way to facilitate learning how to describe placement event descriptions in an L2. The study focuses on Dutch as an L2 and aims to answer the question to what extent the use of gestures can help learners describe placement events in L2 Dutch. This was investigated using a pre-test-post-test design, separated by a training session. This training session consisted of an explanation video on placement verbs in Dutch, either with or without the use of gestures.

The main hypothesis is that gestures can help learners of L2 Dutch improve their use of placement verbs, depending on the placement verb inventory size of their L1. This main hypothesis will be tested via three sub-hypotheses:

- H1. Participants with a multi-verb L1 system for placement events score significantly higher on the pre-test than participants with a single-verb L1 system;
- H2. Participants with a single-verb L1 system for placement events have a significantly larger score difference between the pre-test and post-test than participants with a multi-verb L1 system;
- H3. Participants with a single-verb L1 system for placement events in the gesture condition increase their score significantly more than those in the no-gesture condition.

According to the hierarchy by Ellis (1994), L2 learners struggle more with learning the correct use of placement verbs in L2 Dutch when their L1 has a smaller placement verb inventory (e.g., as in English or French) than when their L1 has a larger or similar placement verb inventory (e.g., as in German or Swedish). The hierarchy namely states that splitting is more difficult than coalescing and corresponding when it comes to semantic reorganisation processes (Ellis, 1994). Seeing that participants with a multi-verb L1 system will have less trouble adapting to the Dutch L2 system, they will likely already score better before the training than those with a single-verb L1 system (H1). This would mean that the training will be more helpful for participants with a single-verb L1 system and that they will improve their test scores relatively more than those with a multi-verb L1 system (H2). Similar results have previously been found by Lewandowski and Özçalışkan (2021).

Previous studies have also shown that multi-modal learning is more effective than learning via a single modality (Tellier, 2008), and that gestures can be helpful in L2 vocabulary acquisition (Kelly et al., 2009), so the training with gestures (both verbal and visual/motor modality) is expected to be more helpful than the training without gesture (merely verbal modality). However, seeing that people with a multi-verb L1 system might already do better at describing placement events in the pre-test and that they might therefore not need the training as much, the degree to which gestures are helpful in this process will likely be influenced by this. Therefore, it is only expected that the gesture training leads to significantly better scores than the no-gesture training for participants with a single-verb L1 system (H3).

## **METHOD**

### *Participants*

In total, 21 participants took part in the current study. Five of those, however, were excluded for the analyses because their scores were very high on the pre-test (and post-test), leaving little room for improvement after the training. Additionally, one more participant was excluded because they seemed to have misunderstood some questions (indicated their native language was also their second language) and scored very low compared to others but commented “*Makkelijk*” (easy) at the end of the survey. The remaining fifteen participants (male=10, female=5) had a mean age of 32 (range 19-58) and were all adult L2 learners of Dutch, with a proficiency around A1 or A2 level (CEFR; Council of Europe, 2020). The participants had various L1s: Arabic, Kurdish, Persian, Latvian, Spanish, and Tamil. Eight participants indicated to have finished high school (9-14 years of education), but three indicated to have only had primary education (1-8 years of education), and four said to have completed or to currently be enrolled in higher education (more than 14 years of education). A summary of the participants’ demographics is given in Table 9. Participants were recruited via language schools (e.g., ROC Nijmegen and Radboud In’to Languages) or via word of mouth. All

participants consented to having their data gathered and anonymously analysed prior to taking part in the experiment.

### *Study design*

The study consisted of a pre-test, training session, and a post-test. Participants also completed a demographic survey at the end. It was a between-subjects design with two conditions: a gesture-condition (G) and a no-gesture condition (NG). The condition is related to the training session, which consisted of an explanation video on placement verbs in Dutch. This video either did contain gestures (G) or it did not (NG).

The dependent variable was the learning score, measured in the (relative) difference in test scores (post-test minus pre-test). The independent variables were the type of training (gesture/no-gesture conditions) and the type of L1 of the participants (single-verb versus multi-verb system for placement event descriptions).

### *Materials and instruments*

For the pre-test and post-test, 34 short videos were created (20 test items, 11 fillers, 3 practice items). Each video consisted of a man performing a placement event (e.g., *he put the books on the table*). The videos were inspired by those of Gullberg (2009a; 2009b; 2011). However, whereas the videos in Gullberg's study had a logical order to them (a messy room gradually becoming cleaner), the current videos were created so that they could be presented randomly. For the test items, objects were placed in such a way that one would have to use either '*zetten*' or '*leggen*' to describe the placement event in Dutch. For the fillers, items were placed in such a way that one would have to use either '*hangen*' or '*stoppen*' to describe the placement event in Dutch. For each of these videos a multiple-choice question was shown asking which sentence best describes the video. All three answer options contained the exact same sentence except for the placement verb. This was either *zetten*, *leggen* or *hangen/stoppen*. For example, for test item Xradio, the video showed a guy putting a radio on a table, and the answer options were: (A) *hij **zet** de radio op de tafel* (he puts/sets the radio on the table; correct option); (B) *hij **legt** de radio op de tafel* (he puts/lays the radio on the table; incorrect option one); and (C) *hij **stopt** de radio op de tafel* (he puts/puts\_into the radio on the table; incorrect option two). The placement verbs were shown in bold font in the experiment as well. A pre-test with fourteen native speakers of Dutch confirmed that the expected correct answers (based on object shape and orientation) were in line with the intuitions of native speakers of Dutch. All test items and fillers were used for both the experimental pre-test and post-test and were presented in a random order. The pre-test was preceded by three practice items. A list of all items and their corresponding placement events shown in the videos can be found in Appendix A, along with screenshots of one of the videos.

For the training session, two additional videos were created, one for each experimental condition. Both videos are about three minutes long and consist of an explanation of placement verbs in Dutch, including some example sentences, provided by an NT2-teacher/the experimenter. To work out the setup of the grammatical explanation in the videos, there was a brainstorm session with several NT2-teachers. One of the explanation videos contained gestures, the other did not. For the one that did contain gestures, fifteen gestures were produced when using a placement verb in a sentence (e.g., *ik zet het glas op de tafel*) or when talking about an orientation (e.g., *plaats je een object horizontaal?*). The placement event gestures showed both the handshape and orientation of the object in question, conforming standard gesturing during placement event description in Dutch (Gullberg, 2009a; 2011). When no gestures were being made, the hands rested folded in front of the speaker. For the video without gestures, this position of the hands was maintained during the entire video. The script for the training video with indications for gestures can be found in Appendix B, as well as a screenshot of both training videos.

Lastly, a demographic survey was created, loosely inspired by Gullberg and Indefrey (2003). The survey contained questions about standard demographic information (e.g., age and gender), as well as information on the participants' linguistic knowledge (e.g., their L1s and L2s). A list of the survey questions can be found in Appendix C.

### *Procedure*

First, the participants received information about the experiment and they got three practice items. Then, they completed the pre-test to assess their current knowledge and use of placement verbs in L2 Dutch. After this, the participants watched the explanation video on placement events in Dutch (training session). Once they watched the video, either containing gestures or not, participants had to complete the post-test, which was exactly the same as the pre-test, only with the items presented in a different order (to account for order effects). This way, the results of the pre-test and post-test could be compared to see if participants had improved after the training session. Lastly, participants had to fill out the demographic survey. At the end of the survey, participants were asked about their previous knowledge on placement verbs in Dutch (if any) and what type of system they think their L1 has to describe placement events (single-verb or multi-verb L1). The survey also included a question to see what the participants thought the experiment was about (to check if they knew it was about the role of gestures; none of them guessed this) and an option for any comments about the survey. All of this was done as an online experiment, which on average took about 40 minutes in total ( $M=40.57$ ,  $SD=9.39$ ).

### *Analysis*

The scores on the pre-test and post-test were analysed to compare relative improvements. Relative score improvements were used because some participants were expected to already be better at describing placement events in Dutch (and thus score better) than others before the training session. To

test the hypotheses, the relative improvement scores of participants in the gesture condition were compared with those of the participants in the no-gesture condition, and an interaction was added for the type of L1 (single-verb or multi-verb). This was done using linear regression (TestDifference ~ TrainingType \* L1Type). Furthermore, a closer look was taken at the descriptives, both to investigate if this could shed more light on the relationship between the test scores, gestures, and type of L1, and because of the relatively small sample size.

## RESULTS

For the analyses, the fifteen participants were grouped according to condition and type of L1 (single-verb versus multi-verb placement event system<sup>1</sup>) in order to test the hypotheses.

### *Statistical analysis: t-tests and linear regression model*

The main hypothesis stated that gestures can help learners of L2 Dutch improve their descriptions of placement events, depending on the size of their L1's placement verb inventory (single-verb versus multi-verb system). This main hypothesis was split up into three sub-hypotheses. The first sub-hypothesis (H1) stated that participants with a multi-verb L1 system are expected to score higher on the pre-test than the participants with a single-verb L1 system. An independent two-tailed *t*-test was conducted, but no significant difference was found ( $t_{(8,3549)} = 1.2668, p = 0.2394$ )<sup>2</sup>. Table 1 shows the mean scores on the pre-test, post-test, and the mean of the difference between the two. As can be seen in this table, the test scores for the pre-test barely differ between the two groups. In fact, contrary to what was expected, it was the participants with a single-verb L1 system who had the higher scores, instead of the expected group with a multi-verb L1 system (single-verb:  $M = 23.43, SD = 4.39$ ; multi-verb:  $M = 21.13, SD = 2.10$ ), although this difference was not found to be significant.

**Table 1**

*Means of the test scores per type of L1*

		Pre-test	Post-test	Test difference
Type of L1	<i>n</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Single-verb	7	23.43 (4.39)	24.29 (5.28)	0.86 (4.56)
Multi-verb	8	21.13 (2.10)	21.88 (5.22)	0.75 (3.92)

<sup>1</sup> Based on self-reports gathered via the demographics survey (see Appendix C, question 12).

<sup>2</sup> The degrees of freedom are not an integer because R automatically implements Welch's adjustment to correct for unequal variances.

Table 1 also shows the mean of the difference between the scores on the pre-test and post-test. The second sub-hypothesis (H2) stated that participants with a single-verb L1 system were expected to have a larger test score difference than the participants with a multi-verb L1 system. Although the test difference mean of the single-verb participants ( $M=0.86$ ,  $SD=4.56$ ) is indeed slightly higher than that of the multi-verb participants ( $M=0.75$ ,  $SD=3.92$ ), this difference is not significant (independent two-tailed  $t$ -test:  $t_{(11.972)}=0.04844$ ,  $p=0.9622$ ), meaning H2 is not supported by the results.

The third sub-hypothesis (H3) zooms in on the participants with a single-verb L1 system and states that those in the gesture condition improved their scores more than those in the no-gesture condition. For the participants with a multi-verb L1 system, no such difference was expected. So, to test H3, a linear regression model with interaction was fitted onto the data:  $\text{TestDifference} \sim \text{TrainingType} * \text{L1Type}$ . The results of this model are presented in Table 2. As can be seen in Table 2, no significant results were found, meaning no support was found for H3. The mean scores on the tests and the test difference, with the participants grouped per type of L1 and condition, are also shown in Table 3. Notably, although not significant, the test difference scores of the single-verb participants in the gesture condition ( $M=1.75$ ,  $SD=5.68$ ) were higher than those in the no-gesture condition ( $M=-0.33$ ,  $SD=3.21$ ), which is in line with the expectation. As for the multi-verb participants, also no significant difference was found, even though the means of their test scores difference were further apart (gesture:  $M=-1.75$ ,  $SD=2.75$ ; no-gesture:  $M=3.25$ ,  $SD=3.40$ ).

**Table 2**

*Results linear regression model ( $\text{TestDifference} \sim \text{TrainingType} * \text{L1Type}$ )*

Formula	Coefficient	Estimate (b)	Std. Error	t-value	p-value	Adjusted R <sup>2</sup>
TestDifference	Intercept	1.75	1.99	0.878	.399	0.04208
~	conditieNG	-2.08	3.05	-0.684	.508	
TrainingType	L1multi	-3.50	2.82	-1.241	.240	
* L1Type	conditieNG:	7.08	4.15	1.707	.116	
	L1multi					

*Note.* L1Type was self-reported (single-verb versus multi-verb system).

**Table 3**

*Means of the test scores per type of L1 per condition*

Condition	Type of L1	n	Pre-test	Post-test	Test difference
			M (SD)	M (SD)	M (SD)
G	Single-verb	4	22.00 (5.60)	23.75 (7.09)	1.75 (5.68)
NG	Single-verb	3	25.33 (1.15)	25.00 (2.65)	-0.33 (3.21)
G	Multi-verb	4	20.75 (3.10)	19.00 (5.35)	-1.75 (2.75)

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NG	Multi-verb	4	21.50 (0.58)	24.75 (3.59)	3.25 (3.40)
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One important thing to note is that the type of L1 is based on self-reports. In the demographics survey, participants were asked to compare their native language to Dutch and indicate if the placement verb system was of similar size (i.e., containing multiple verbs, like German and Swedish) or only consisted of one verb (like English and French). Looking at the results, however, it seems that participants likely misunderstood the question or were unable to answer it, since several people with the same L1 provided different answers (also see Table 9). For example, seven people indicated to have Arabic as their L1, but some said it was similar to Dutch in terms of placement verb inventory size, and others said it differed. The same goes for Kurdish, which four people reported as their L1. Based on linguistic sources, (variants of) both Arabic and Kurdish can be classified as languages with a single-verb placement event system (e.g., see Nouaouri, 2012, for Moroccan Arabic<sup>3</sup>; and Karimipour & Rezai, 2019, for Ilami Kurdish<sup>4</sup>). However, classifying the participants with Arabic and Kurdish as having a single-verb L1 system would mean that (at least) eleven out of the fifteen participants belong to the same group in terms of the type of L1. In other words, grouping according to the type of L1 based on linguistic sources rather than self-reports will give unbalanced groups within the current data.

Given this unbalance, no proper comparison can be made when grouping the participants according to both the (linguistic-based) type of L1 and training condition. It is, however, still possible to make a comparison when solely grouping the participants by training condition. H3 stated that a significant difference was expected between the two conditions for the single-verb participants. If one takes the participants with Arabic and Kurdish as their L1 and classifies them as single-verb participants, one can verify whether or not single-verb participants performed significantly better in the gesture condition than in the no-gesture condition. To test this, a linear regression model was fitted onto the data of this group:  $\text{TestDifference} \sim \text{TrainingType}$ . The results are presented in Table 4. As can be seen in Table 4, again no significant results were found. Moreover, the negative adjusted R-squared value indicates that the model is not better at explaining the variation in the TestDifference variable than simply using the mean of the TestDifference variable would be.

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<sup>3</sup> In Moroccan Arabic, *h2et2t2* is the general placement verb, and no distinction is made based on shape and orientation of the object being placed. Other placement verbs do exist, but they do not seem to be used as frequently.

<sup>4</sup> In Ilami Kurdish, *najən* is the general placement verb. Other placement verbs exist but are not used as frequently, similarly to how other verbs exist in English but 'to put' is mainly used.

**Table 4**

*Results linear regression model L1 Arabic/Kurdish speakers (TestDifference ~ TrainingType)*

Formula	Coefficient	Estimate (b)	Std. Error	t-value	p-value	Adjusted R <sup>2</sup>
TestDifference ~	Intercept	0.33	1.73	0.192	.852	-0.111
TrainingType	conditieNG	0.07	2.57	0.026	.980	

Another remark that should be made, is that the sample size was rather small, bringing up the question if any significant results could have been found at all. Therefore, additional descriptive analyses were performed to look for patterns amongst participants. For these analyses, the participants were merely grouped by condition. These findings will be discussed in the section below.

*Descriptive analyses – ‘zetten’ versus ‘leggen’*

The first thing a closer look was taken at is how the participants performed for the different placement verbs ‘zetten’ and ‘leggen’. Previous research has shown that learners of L2 Dutch often overuse the verb ‘zetten’ (e.g., Gullberg, 2009a). To see if participants in the current study also overused one of the verbs, one needs to not only check how often participants answered correctly, but also look at what answer participants gave when answering incorrectly. Tables 5-7 show the distributions of correct and incorrect answers for the three groups of items. Table 5 shows the distributions for only the *zetten* items, meaning those items where ‘zetten’ was the correct verb to be used in the descriptive sentence. Table 6 shows the distributions for only the *leggen* items, meaning those items where ‘leggen’ was the correct verb to be used in the descriptive sentence. Table 7 shows the distributions for only the filler items, meaning those items where ‘hangen’ or ‘stoppen’ was the correct verb to be used in the descriptive sentence. There were a total of twelve *zetten* items, nine *leggen* items, and ten filler items. The bottom rows of each table show the distribution for all participants grouped together.

**Table 5**

*Zetten items: scores per condition*

Condition	n	Test	Distribution of	Distribution of	Distribution of
			correct answers for <i>zetten</i> items	incorrect answers ‘leggen’ for <i>zetten</i> items	incorrect answers ‘hangen/stoppen’ for <i>zetten</i> items
			<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
G	8	Pre	0.781 (0.231)	0.125 (0.189)	0.094 (0.121)
		Post	0.708 (0.315)	0.125 (0.236)	0.167 (0.244)
NG	7	Pre	0.774 (0.185)	0.143 (0.150)	0.083 (0.096)

		Post	0.810 (0.142)	0.036 (0.066)	0.155 (0.131)
All participants	15	Pre	0.778 (0.203)	0.133 (0.166)	0.089 (0.107)
		Post	0.756 (0.247)	0.083 (0.178)	0.161 (0.192)

**Table 6**

*Leggen items: scores per condition*

Condition	n	Test	Distribution of correct answers for <i>leggen</i> items	Distribution of incorrect answers 'zetten' for <i>leggen</i> items	Distribution of incorrect answers 'hangen/stoppen' for <i>leggen</i> items
			<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
G	8	Pre	0.694 (0.228)	0.292 (0.237)	0.014 (0.039)
		Post	0.750 (0.236)	0.236 (0.241)	0.014 (0.039)
NG	7	Pre	0.794 (0.119)	0.175 (0.108)	0.032 (0.054)
		Post	0.794 (0.077)	0.095 (0.077)	0.111 (0.111)
All participants	15	Pre	0.741 (0.186)	0.237 (0.192)	0.022 (0.046)
		Post	0.770 (0.176)	0.170 (0.192)	0.059 (0.093)

**Table 7**

*Filler items (hangen/stoppen): scores per condition*

Condition	n	Test	Distribution of correct answers for filler items	Distribution of incorrect answers 'zetten' for filler items	Distribution of incorrect answers 'leggen' for filler items
			<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
G	8	Pre	0.575 (0.260)	0.325 (0.315)	0.1 (0.120)
		Post	0.613 (0.340)	0.275 (0.320)	0.113 (0.173)
NG	7	Pre	0.671 (0.160)	0.229 (0.189)	0.1 (0.141)
		Post	0.800 (0.153)	0.086 (0.157)	0.114 (0.146)
All participants	15	Pre	0.62 (0.218)	0.28 (0.260)	0.1 (0.125)
		Post	0.7 (0.278)	0.187 (0.267)	0.113 (0.155)

Looking at the bottom rows it can be seen that, overall, participants scored similarly well on the *zetten* and *leggen* items (distributions of correct answers), but looking at the various distributions of incorrect answers, a difference can be seen. The distributions of ‘*zetten*’ being incorrectly answered to both *leggen* and filler items is higher than the distribution of the other verbs being incorrectly answered. In other words, *zetten* was overused the most. This was, however, more so the case in the pre-test than in the post-test, meaning that after the training participants stopped overusing *zetten* as much.

Zooming in on the scores per condition, it becomes clear that both groups stopped (over)using *zetten* as much, as the distribution of incorrectly answering *zetten* for *leggen* items and fillers decreased (lower on the post-test than on the pre-test). The participants in the gesture condition even decreased their scores of correctly answered *zetten* items, with an increased percentage of incorrectly answering *hangen/stoppen* for those items. Although the participants in the no-gesture condition slightly increased their percentage of correctly answered *zetten* items, they also incorrectly chose *hangen/stoppen* more in the post-test, both for the *zetten* and *leggen* items. It is good to keep in mind that both groups did already have quite a high score for the *zetten* items in the pre-test, making it harder to improve their score. It must also be noted that the two groups only scored similarly on the pre-test for the *zetten* items, but not for the *leggen* items and fillers. This means that differences on the post-test cannot be (fully) attributed to the two conditions, but that they are also influenced by the (difference in) pre-test scores.

#### *Descriptive analyses – individual cases*

Although the type of L1 and training condition were the variables of interest in the current study, the background survey also provides more detailed information on the demographics of the participants. Table 9 gives an overview of these demographics per participant, ordered from lowest improvement in test scores to highest. Looking at the demographic factors in this table, few patterns can be found. Age seems to be well-spread, with the youngest (participant 13) and oldest (participant 14) of the group having achieved the (shared) second-highest score improvements. The same goes for level of education and time in the Netherlands. As for gender, there does seem to be a pattern; the females are mainly on the higher end of the scale, whereas the males are on the lower end. In fact, the scores of half of all the males decreased or remained unchanged, and of the other five whose score did change, three only increased by 1. The only male that greatly increased his score (+6) was participant 14, who might be an exception. As for the females, only one had a decrease in test scores, while the score difference of the other five ranged from +2 to +8. A regression analysis with gender, however, reveals that the test scores do not differ significantly for gender (see Table 8).

**Table 8**

*Results linear regression model (TestDifference ~ gender)*

Formula	Coefficient	Estimate ( <i>b</i> )	Std. Error	<i>t</i> -value	<i>p</i> -value	Adjusted R <sup>2</sup>
TestDifference ~ gender	Intercept	-0.40	1.21	-0.332	.746	0.1233
	Female	3.60	2.09	1.72	.109	

Remarkably, when looking at the demographics of participants 1 and 15 in Table 9, one can see they have several things in common, even though the scores of participant 1 decreased the most (-6) and those of participant 15 increased the most (+8). Both are in their early twenties, have attended higher education, and are fluent in multiple languages. However, participant 1 is a male and indicated to have a single-verb L1, while participant 15 is a female and indicated to have a multi-verb L1. Furthermore, the L2s listed by participant 1 (English, Arabic, Persian) are also single-verb languages, whereas those listed by participant 15 (English, Russian) are, respectively, a single-verb and a multi-verb language (for English see Hoetjes, 2008a; for Moroccan Arabic see Nouaouri, 2012; for Persian see Kirkegaard, 2020; and for Russian see Russificate, 2024). Participant 15 was, thus, presumably already familiar with both types of placement event systems. She had quite a high score already on the pre-test and had an almost perfect score on the post-test. Because of her familiarity with both systems, the training in between might have confirmed for her that Dutch is a multi-verb language and the brief explanation enabled her to know how to choose the right verb. She also commented about this: “The explanation (video) in the middle gave more insights into answering the question afterwards.” As for participant 1, although he was fluent in multiple languages, he was likely unfamiliar with multi-verb systems and was therefore not able to process the information as easily as participant 15.

**Table 9**

*Individual cases: demographics*

<b>Ptcept.</b>	<b>Cond.</b>	<b>Score pre-test</b>	<b>Score post-test</b>	<b>Diff.</b>	<b>Age</b>	<b>Gender</b>	<b>Country of birth</b>	<b>L1</b>	<b>Type of L1</b>	<b>Education</b>	<b>Time in the Netherlands</b>	<b>L2s</b>
1	G	27	21	-6	21	Male	Iran	Kurdish	Single	Higher education / >14 years	5 years	EN, AR, PS
2	G	19	14	-5	29	Male	Kurdistan	Kurdish	Multi	High school / 9-14 years	3 years	/
3	NG	26	22	-4	40	Male	Syria	Arabic	Single	High school / 9-14 years	3 years	EN, TU
4	G	18	15	-3	26	Female	Sri-Lanka	Tamil	Multi	High school / 9-14 years	3 years	EN
5	NG	22	22	0	50	Male	Syria	Arabic	Multi	High school / 9-14 years	1,5 years	TU
6	G	25	25	0	26	Male	Syria	Kurdish	Multi	Primary school / 1-9 years	2,5 years	/
7	G	14	15	+1	36	Male	Managua	Spanish	Single	High school / 9-14 years	1 year	/
8	G	21	22	+1	45	Male	Syria	Arabic	Multi	Higher education / >14 years	3 years	/
9	NG	26	27	+1	20	Male	Syria	Arabic	Single	Primary school / 1-9 years	25 years	EN
10	NG	21	23	+2	25	Female	Afghanistan	Persian	Multi	High school / 9-14 years	2 years	/
11	NG	24	26	+2	27	Male	Saudi Arabia	Arabic	Single	High school / 9-14 years	1 year	/
12	NG	21	24	+3	35	Female	Iraq	Kurdish	Multi	Primary school / 1-9 years	9 years	AR
13	G	23	29	+6	19	Female	Syria	Arabic	Single	High school / 9-14 years	11 months	/
14	G	24	30	+6	58	Male	Syria	Arabic	Single	Higher education / >14 years	2 years	/
15	NG	22	30	+8	24	Female	Latvia	Latvian	Multi	Higher education / >14 years	3 years	EN, RU

*Note.* Ptcept.=participant; Cond.=condition (G=gesture, NG=no gesture); Diff.=difference test scores (post-pre); Type of L1=type of L1 based on placement verb system (self-reported); L2s=any language that the participant indicated to be proficient in besides their L1 (EN=English, AR=Arabic, PS=Persian, TU=Turkish, RU=Russian).

## DISCUSSION

The aim of the current study was to research whether gestures can be helpful to learners of L2 Dutch when learning how to describe placement events. In order to investigate this, an experiment was conducted with a pre-test-post-test design, with a training session in between. Participants were separated based on the type of placement event system of their L1 (single-verb versus multi-verb; self-reported) and were equally distributed over the two conditions of the training session (gesture versus no-gesture condition). The expectation was that gestures would help learners improve their use of placement verbs in L2 Dutch, depending on the type of placement event system of their L1. Three sub-hypotheses were tested in order to investigate this.

### *Statistical analyses*

The first sub-hypothesis (H1) focused on the pre-test results and stated that participants with a multi-verb L1 system were expected to score higher than those with a single-verb L1 system, but no support was found for this hypothesis. The second sub-hypothesis (H2) looked at the difference in the two test scores (pre-test and post-test) and stated that participants with a single-verb L1 system were expected to have a larger score difference than those with a multi-verb L1 system. This hypothesis was also not supported by the results. For both of these hypotheses it is important to note that participants were grouped by the type of L1 based on self-reports, but a closer look at the individual responses made it clear that these self-reports were likely unreliable, as various people with the same L1 differed in their reports. In fact, linguistic sources would classify most of the participants as having a single-verb L1 system, meaning that grouping the participants according to their type of L1 based on linguistic sources would lead to unbalanced groups, making any further statistical comparison rather invalid.

The third and final sub-hypothesis (H3) focused on the participants with a single-verb L1 and stated that those in the gesture condition would improve their scores more than those in the no-gesture condition. A linear regression model with interaction was used to test this, but no support was found for the hypothesis. Since the self-reported data on type of L1 was found to be unreliable, a second regression analysis was performed with only Arabic or Kurdish L1 speakers to see if training type caused a significant difference in test scores within this group of single-verb L1 participants. However, no significant results were found to support this hypothesis.

There are several possible explanations for the null results. First of all, as mentioned before, the sample size was rather small, which might make it impossible to find any statistically significant results at all. Furthermore, it turned out that the sample size mainly consisted of participants with a single-verb L1 system (based on linguistic sources), so it can be argued that no proper comparison can be made between the two groups. Finding participants for this kind of study can, unfortunately, be quite challenging. The current study was aimed at learners of L2 Dutch who are still at beginner-level. Although these people can be found at many language schools, their language classes are often

scheduled in a specific way, making it hard to time their participation in the experiment right (i.e., align it with a specific theme and at the right time grammar-wise). Besides good effort, this led to the sample size being smaller than desired, likely interfering with the possibility to find any significant results at all.

Seeing as the sample size might have influenced the fact that no significant results were found, it is valuable to consider what it would have meant if the current findings had been significant. Table 4 shows that the participants in the no-gesture condition improved their scores slightly more than those in the gesture condition. A larger sample size with similar but significant findings would thus have contradicted the hypothesis, as it was expected that it would be the participants in the gesture condition that improved more, as opposed to those in the no-gesture condition. Although previous research has often shown support for gestures being helpful in language learning (e.g., Tellier, 2008; Kelly et al., 2009), there is also a study that found gestures to be hindering this process. Kelly and Lee (2012) investigated the role of gestures in a study where native English speakers learned Japanese word pairs that were either phonetically undemanding or more challenging. Although gestures were found to be helpful with the phonetically undemanding pairs, they actually inhibited the learning of the more phonetically challenging pairs. Kelly and Lee (2012) therefore argue that, although gestures can be helpful in vocabulary acquisition, they can also be too much when people already struggle grasping complex new information. It could be that this is also the case for placement verbs in L2 Dutch and that the training with gestures overcomplicated things, causing a decrease in test scores for the participants in the gesture condition. This would explain a potential significant finding of participants in the no-gesture condition improving their scores more than those in the gesture condition.

Another possible explanation for the current null results concerns the materials. Perhaps the training material could be improved upon to enable a more accurate measurement of the influence of gestures on learning placement verbs in L2 Dutch. It is quite common in gesture research related to vocabulary acquisition to ask participants to imitate the gestures themselves as well (e.g., Tellier, 2008; Kelly et al., 2014; Clark & Trofimovich, 2016; García-Gámez et al., 2021). This was not done in the current study, because it focused more on receptive skills. It would also have been hard to check if participants actually reproduced the gestures, since the experiment was done online. Moreover, some researchers argue that merely observing gestures is equally helpful in L2 vocabulary acquisition as it is to both observe and produce them (see, for example, Oppici et al., 2023). There are, however, also studies with contradicting findings that argue that it does matter whether gestures are only observed or also produced during training (e.g., Li et al., 2021). As participants only observed the gestures in the current study, this could explain why no significant effect was found for the type of training.

Additionally, it is possible that the null results had to do with the way the participants were tested. The pre-test and post-test of the current study only consisted of multiple choice questions. This was done to

make analysing the data more straight-forward, as open questions would require a proper grading rubric. This does, however, also mean that people can achieve a higher score more easily. After all, for every question there was a 33% chance that participants answered correctly. Perhaps this made it too easy for participants to ‘guess’ the right answer, regardless of which condition they were in, causing there to be null results.

Lastly, it could also be that the pre-test itself already functioned as a sort of training for the post-test. It could be that just seeing which different types of items (placement events in the videos) there are, could help one realise what distinction is made that causes either *zetten* or *leggen* to be the correct placement verb. This would increase the score on the post-test without the need for a training session. If this is the case, it might also explain why no differences were found between the two training conditions. To test if the pre-test might function as a sort of training for the post-test, the current study could be replicated with an additional third condition, in which participants receive no training session at all.

#### *Descriptive analyses – zetten versus leggen*

Besides the statistical analyses, more descriptive analyses were performed to further investigate the relationship between gestures and the learning of placement verbs in L2 Dutch. First, the verbs *zetten* and *leggen* were looked at more closely to see if patterns could be found in the verb choices. Participants were found to perform equally well on *zetten* and *leggen* items, in terms of their distribution of correct answers. However, when it comes to the distribution of incorrect answers, *zetten* is more often answered incorrectly than *leggen* (and more often than *hangen/stoppen*). In other words, participants overused *zetten* more than *leggen*. This is in line with previous research that found that *zetten* is often overused by learners of L2 Dutch (e.g., Gullberg, 2009a). This overuse of *zetten* likely also (partially) explains the high scores for those items in the pre-test.

After the training, participants overused *zetten* less, both in the gesture condition and in the no-gesture condition. Therefore, it seems like the explanation video helped the participants to better distinguish between the two verbs, although it does not seem to matter in which condition the participants were. However, both groups also incorrectly chose *hangen/stoppen* more after the training, so even though participants seemed to better understand that they have to use different verbs in different context after the training session (rather than using one general verb like in languages with a single-verb system), they still struggled slightly with choosing the right one.

#### *Descriptive analyses – individual cases*

A closer look was also taken at the demographics, to get a more detailed picture of the individual differences. This seemed to point to gender influencing the results, but this turned out not to be significant. Another thing that stood out in the demographics is the L2s. Various participants indicated

to be fluent in multiple languages, but their results differed quite a lot. Two participants that said to be fluent in multiple other languages besides their L1 were compared, with one showing a large decrease in their score (-6) and the other a large increase (+8). Taking a closer look at what might drive this, revealed that the one with a decrease was only fluent in languages with a single-verb system, while the one with an increase was fluent in both languages with a single-verb and a multi-verb system. Although these are only small numbers, this could still point to a familiarity with both types of systems being beneficial in this learning process. This theory is also in line with Ellis' (1994) hierarchy, because those familiar with both types of languages would fall under a lower difficulty level in the hierarchy (correspondence) than those only familiar with single-verb languages (split).

#### *Limitations and future research*

The current study had several limitations. First of all, as previously mentioned, the sample size was quite small, which made it hard to do any statistical analyses with enough power. Although multiple language schools were approached to gather participants, it was hard to find L2 learners with beginner-level proficiency in Dutch who would like to participate. At many language schools, class time is already quite sparse and thus very valuable, so teachers do not have a lot of time for things that fall outside of their regular class material. The current study was set up as an online experiment so language learners could also participate outside of class and in the hopes of getting as many participants as possible, but it is likely that not many were motivated enough to do so. It might not have seemed worth it to them, seeing as it would take quite some time and they would not get any reward (apart from a free explanation video). For future studies with similar target groups, it is advised to try and find a language school where you could do the experiment in class. Given enough time, one should be able to find a class where it can be done at an appropriate time, perhaps as an introduction to placement verbs. Furthermore, doing the experiment at one specific language school will ensure that the experimental setting is the same for everyone and it will enable you to control for participants getting help from someone else. This is not possible for online studies and this lack of control (in terms of setting, resources, etc.) is a big downside for online studies.

An added advantage to doing the experiment in class is that it will ensure that the group is quite homogenous, as language learners are often grouped based on their educational background and current level of Dutch. Having an at least somewhat homogenous group is especially helpful within linguistic research, as there are many factors that can influence language and language learning. People's linguistic backgrounds vary greatly and many people are fluent in at least one other language than their L1. Their environment can also strongly influence the amount and quality of linguistic input they get. Therefore, if you can ensure the participant group is homogenous in at least some aspects, this can facilitate finding patterns in factors that (potentially) influence language learning.

As stated above, another potential weakness of the study is its use of multiple choice questions in the pre-test and post-test. Although this made it easier to analyse the data, it could also have led to better scores because the participants had a higher chance to guess right. Open questions would have made this more difficult and might therefore give a more nuanced view on how the results were potentially influenced by the independent variables. However, it should be noted that this would also shift the focus more to testing productive skills rather than receptive skills. The current study looked at whether participants were able to recognise which of the three verb options would be appropriate in the given situation. It did not ask them to produce these verbs themselves, but this could be something to investigate in future research.

Lastly, the current study was restricted to a set timeframe and limited resources. Because of this, it was decided that it was best to only implement two conditions into the design, so it was more likely that enough participants could be gathered for the statistical analyses. Otherwise, a third condition might have been added where participants received no training, to see if the pre-test in itself functioned as a training for the post-test, as discussed above. Future research could also replicate the current study with an added delayed post-test (like in, for example, Porter, 2016) to shed more light on the role of gestures on long-term memory, although one could question if there would be significant differences then seeing as they were not found in the post-test of the current study.

## CONCLUSION

In conclusion, the current study investigated whether gestures can lend a hand in learning to describe placement events in L2 Dutch. Gestures were expected to improve the correct use of the Dutch placement verbs *zetten* and *leggen* depending on the size of the placement verb inventory present in the participants' L1s. No significant results were found in the statistical analyses, and no support was found for the hypotheses. The null results might, however, have been influenced by several factors: the small sample size, only having participants observe the gestures rather than also produce them, the guess-factor of the multiple choice questions, or the pre-test potentially functioning as a training in itself.

For future studies with similar target groups it is recommended to do their experiment during class. That way the sample size might increase and the sample is likely to be relatively homogenous. Replications of this study should check if similar results are found for larger sample sizes, and when using open questions or when having participants also produce the gestures themselves. If significant results are found in such replications, it could be valuable to see if the effects hold for long-term memory as well. Adding a delayed post-test could shed light on these potential long-term memory effects of gestures on learning placement verbs in L2 Dutch.

This study adds to the current knowledge about gestures, specifically those related to placement events. The results are of potential value to NT2-teachers in helping them make decisions in how to best teach and explain the topic of Dutch placement verbs. The current data supports previous findings that learners of L2 Dutch tend to overuse the verb *zetten*, so it is important to explain when this is incorrect and *leggen* should be used instead. The current study, however, did not find any support for the theory that gestures can be helpful when learning placement verbs in L2 Dutch. Although improved replications of this study are required to confirm this, the current findings suggest that it makes no difference whether one uses gestures to lend a hand in explaining placement verbs in L2 Dutch or not.

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**APPENDIX A – ITEM LIST (STIMULI)**

**Table A1**

*Item list for stimuli and answer options*

<b>Item</b>	<b>Status</b>	<b>Correct option</b>	<b>Incorrect option 1</b>	<b>Incorrect option 2</b>	<b>Correct sentence</b>
Laptop <i>Laptop</i>	Practice (horizontal)	Leggen	Zetten	Stoppen	Hij legt de laptop op de tafel. <i>He puts the laptop on the table.</i>
Mok <i>Mug</i>	Practice (vertical)	Zetten	Leggen	Stoppen	Hij zet de mok op de tafel. <i>He puts the mug on the table.</i>
Pen <i>Pen</i>	Practice (filler)	Stoppen	Zetten	Leggen	Hij stopt de pen in de etui. <i>He puts the pen in the pencil case.</i>
Alpaca <i>Alpaca</i>	Experimental (vertical)	Zetten	Leggen	Stoppen	Hij zet de alpaca op de tafel. <i>He puts the alpaca on the table.</i>
Boeken <i>Books</i>	Experimental (vertical)	Zetten	Leggen	Hangen	Hij zet de boeken op de tafel. <i>Hij puts the books on the table.</i>
Dvdbox <i>DVD box</i>	Experimental (vertical)	Zetten	Leggen	Hangen	Hij zet de dvd-box op de tafel. <i>He puts the DVD box on the table.</i>
Fles <i>Bottle</i>	Experimental (vertical)	Zetten	Leggen	Stoppen	Hij zet de fles op tafel. <i>He puts the bottle on the table.</i>
Giraf <i>Giraffe</i>	Experimental (vertical)	Zetten	Leggen	Hangen	Hij zet de giraf op de tafel. <i>He puts the giraffe on the table.</i>
Hoed <i>Hat</i>	Experimental (vertical)	Zetten	Leggen	Hangen	Hij zet de hoed op zijn hoofd. <i>He puts the hat on his head.</i>
Pinguïn <i>Penguin</i>	Experimental (vertical)	Zetten	Leggen	Hangen	Hij zet de pinguïn op de tafel. <i>He puts the penguin on the table.</i>
Prullenbak <i>Dustbin</i>	Experimental (vertical)	Zetten	Leggen	Stoppen	Hij zet de prullenbak naast de tafel. <i>He puts the dustbin next to the table.</i>
Radio <i>Radio</i>	Experimental (vertical)	Zetten	Leggen	Stoppen	Hij zet de radio op de tafel. <i>He puts the radio on the table.</i>
Schaal <i>Bowl</i>	Experimental (vertical)	Zetten	Leggen	Stoppen	Hij zet de schaal op de tafel. <i>He puts the bowl on the table.</i>
Stoel <i>Chair</i>	Experimental (vertical)	Zetten	Leggen	Stoppen	Hij zet de stoel onder de tafel. <i>He puts the chair under the table.</i>
Tas <i>Bag</i>	Experimental (vertical)	Zetten	Leggen	Hangen	Hij zet de tas op de tafel. <i>He puts the bag on the table.</i>
Avocado <i>Avocado</i>	Experimental (horizontal)	Leggen	Zetten	Stoppen	Hij legt de avocado op tafel. <i>He puts the avocado on the table.</i>
Bananen <i>Bananas</i>	Experimental (horizontal)	Leggen	Zetten	Stoppen	Hij legt de bananen in de schaal. <i>He puts the bananas in the bowl.</i>
Broek <i>Pants</i>	Experimental (horizontal)	Leggen	Zetten	Hangen	Hij legt de broek op de tafel. <i>He puts the pants on the table.</i>
Handdoek <i>Towel</i>	Experimental (horizontal)	Leggen	Zetten	Hangen	Hij legt de handdoek in de koffer. <i>He puts the towel in the suitcase.</i>
Shirt <i>Shirt</i>	Experimental (horizontal)	Leggen	Zetten	Hangen	Hij legt het shirt in de koffer. <i>He puts the shirt in the suitcase.</i>
Tafelkleed <i>Tablecloth</i>	Experimental (horizontal)	Leggen	Zetten	Stoppen	Hij legt het tafelkleed over de tafel. <i>He puts the tablecloth on the table.</i>
Telefoon <i>Phone</i>	Experimental (horizontal)	Leggen	Zetten	Hangen	Hij legt de telefoon op de tafel. <i>He puts the phone on the table.</i>
Tijdschriften <i>Magazines</i>	Experimental (horizontal)	Leggen	Zetten	Hangen	Hij legt de tijdschriften op de tafel. <i>He puts the magazines on the table.</i>

Wijnfles <i>Wine bottle</i>	Experimental (horizontal)	Leggen	Zetten	Stoppen	Hij legt de wijnfles op de tafel. <i>He puts the wine bottle on the table.</i>
Dvd <i>DVD</i>	Filler	Stoppen	Zetten	Leggen	Hij stopt de dvd in de dvd-box. <i>He puts the DVD in the box.</i>
Foto <i>Photo</i>	Filler	Hangen	Zetten	Leggen	Hij hangt de foto aan de muur. <i>He hangs the photo on the wall.</i>
Geld <i>Money</i>	Filler	Stoppen	Zetten	Leggen	Hij stopt het geld in de portemonnee. <i>He puts the money in the wallet.</i>
Ketting <i>Necklace</i>	Filler	Hangen	Zetten	Leggen	Hij hangt de ketting om zijn nek. <i>He hangs the necklace around his neck.</i>
Kledinghanger <i>Clothes hanger</i>	Filler	Hangen	Zetten	Leggen	Hij hangt de kledinghanger in de kast. <i>He hangs the clothes hanger in the closet.</i>
Portemonnee <i>Wallet</i>	Filler	Stoppen	Zetten	Leggen	Hij stopt de portemonnee in de tas. <i>He puts the wallet in the bag.</i>
Riem <i>Belt</i>	Filler	Hangen	Zetten	Leggen	Hij hangt de riem aan de muur. <i>He hangs the belt on the wall.</i>
Shirt <i>Shirt</i>	Filler	Hangen	Zetten	Leggen	Hij hangt het shirt aan de kledinghanger. <i>He hangs the shirt on the clothes hanger.</i>
Sleutels <i>Keys</i>	Filler	Stoppen	Zetten	Leggen	Hij stopt de sleutels in zijn broekzak. <i>He puts the keys in his pocket.</i>
Vest <i>Jacket</i>	Filler	Hangen	Zetten	Leggen	Hij hangt het vest over de stoel. <i>He hangs the jacket over the chair.</i>

### Figure A1

Example screenshots stimulus



(a) Start of the video.



(b) Placement event.

## APPENDIX B – SCRIPT EXPLANATION VIDEO

### DUTCH

“Ik **zet** het glas op de tafel.”

“Hij **legt** het papier op de tafel.”

“Zij **hangen** hun jassen aan de kapstok.”

Dit zijn voorbeelden van zinnen met plaatsingsverba. In deze video ga ik uitleggen welke plaatsingsverba we in het Nederlands hebben en wanneer je deze verba gebruikt.

We gebruiken plaatsingsverba als we een object ergens plaatsen. In het Nederlands gebruiken we vooral de plaatsingsverba *zetten* en *leggen*. Wanneer gebruik je *zeggen* en wanneer gebruik je *leggen*? Dat is afhankelijk van de vorm en de oriëntatie van het object. Plaats je het object **verticaal** en heeft het weinig contact met de ondergrond? Dan zeggen we *zetten*. Plaats je het object **horizontaal** en heeft het veel contact met de ondergrond? Dan zeggen we *leggen*.

We kijken weer naar de eerste twee voorbeelden:

- “Ik **zet** het glas op de tafel.” Een glas is hoog. Het heeft weinig contact met de tafel. Je plaatst het verticaal, dus we gebruiken *zetten*.
- “Hij **legt** het papier op de tafel.” Een blaadje papier is plat en laag. Het heeft veel contact met de tafel. Je plaatst het horizontaal, dus we gebruiken *leggen*.

Voor een glas en een blaadje papier zijn dit de logische oriëntaties, maar bij sommige objecten zijn beide oriëntaties logisch. Denk bijvoorbeeld aan een boek. Plaats je dit rechtop en **verticaal** in een kast? Dan **zet** je het boek in de kast. Maar plaats je dit plat en **horizontaal** op een tafel, dan **leg** je het boek op de tafel.

*Zetten* en *leggen* zijn dus belangrijke plaatsingsverba in het Nederlands. Meestal gebruiken we of *zetten* of *leggen*, maar soms is een ander verbum beter. Bijvoorbeeld *hangen* of *stoppen*. Wanneer gebruiken we *hangen/stoppen*? Heeft het object na het plaatsen geen ondergrond? Dan gebruiken we *hangen*. Bijvoorbeeld zij **hangen** hun jassen aan de kapstok. Heeft het object geen duidelijke oriëntatie? Dan gebruiken we *stoppen*. Bijvoorbeeld jij **stopt** de pasta in de pan.

Dus:

- Plaats je een object **verticaal**? Dan gebruiken we *zetten*.
- Plaats je een object **horizontaal**? Dan gebruiken we *leggen*.
- Is er geen ondergrond of geen duidelijke oriëntatie? Dan gebruiken we *hangen* of *stoppen*.

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### ENGLISH

“I **put<sub>set</sub>** the glass on the table.”

“He **puts<sub>lays</sub>** the paper on the table.”

“They **hang** their coats on the coatrack”

These are examples of sentences with placement verbs. In this video, I will explain which placement verbs exist in Dutch and when to use these verbs.

We use placement verbs when we place an object somewhere. In Dutch we mainly use the placement verbs *zetten* and *leggen*. When do you use *zetten* and when do you use *leggen*? This depends on the shape and orientation of the object. Do you place the object **vertically** and does it

have little contact with the underlying surface? Then we use *zetten*. Do you place the object **horizontally** and does it have a lot of contact with the underlying surface? Then we use *leggen*.

We will take another look at the first two examples:

- “I **put<sub>set</sub>** the glass on the table.” A glass is tall. It has little contact with the table. You are placing it vertically, so we use *zetten*.  
“He **put<sub>lays</sub>** the paper on the table.” A piece of paper is flat. It has a lot of contact with the table. You are placing it horizontally, so we use *leggen*.

*Zetten* and *leggen* are, thus, important placement verbs in Dutch. We often use either *zetten* or *leggen*, but sometimes another verb fits better. For example, *hangen* or *stoppen*. When do we use *hangen/stoppen*? Does the object have no underlying surface after being placed? Then we use *hangen*. For example, they **hang** their coats on the coatrack. Does the object not have a clear orientation? Then we use *stoppen*. For example, you **put** the pasta in the pan.

So:

- Are you placing an object **vertically**? Then we use *zetten*.
- Are you placing an object **horizontally**? Then we use *leggen*.
- Is there no underlying surface or no clear orientation? Then we use *hangen* or *stoppen*.

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### Figure B1

Example screenshots training videos



(a) Screenshot training video gesture condition.



(b) Screenshot training video no-gesture condition.

## APPENDIX C – DEMOGRAPHICS SURVEY

**Table C1**

*Question list of the demographics survey*

<b>Question</b>	<b>Answer options</b>
(1) Wat is uw leeftijd? <i>How old are you?</i>	(open question, numeric answers only)
(2) Wat is uw geslacht? <i>What is your gender?</i>	<ul style="list-style-type: none"> <li>• Man <i>Man</i></li> <li>• Vrouw <i>Woman</i></li> <li>• Non-binair <i>Non-binary</i></li> <li>• Anders <i>Other</i></li> <li>• Zeg ik liever niet <i>Prefer not to say</i></li> </ul>
(3) Wat is uw hoogst behaalde of huidige opleidingsniveau? <i>What is your highest or current level of education?</i>	<ul style="list-style-type: none"> <li>• Geen school (0 jaar) <i>No school (0 years of school)</i></li> <li>• Basisschool / 1-8 jaar <i>Primary school / 1-8 years of school</i></li> <li>• Middelbare school / 9-14 jaar <i>High school / 9-14 years of school</i></li> <li>• Hoger onderwijs zoals de universiteit / meer dan 14 jaar <i>Higher education like university / more than 14 years of school</i></li> </ul>
(3a) Ruimte voor toelichting (optioneel) <i>Space to elaborate (optional)</i>	(open question)
(4) Wat is uw geboorteland? <i>In what country were you born?</i>	(open question)
(5) Hoe lang bent u al in Nederland? <i>How long have you been in the Netherlands?</i>	<ul style="list-style-type: none"> <li>• Minder dan 1 jaar → 5a <i>Less than 1 year</i></li> <li>• Langer dan 1 jaar → 5b <i>More than 1 year</i></li> </ul>
(5a) Hoeveel maanden bent u al in Nederland? <i>How many months have you been in the Netherlands?</i>	(open question, numeric answers only)
(5b) Hoeveel jaar bent u al in Nederland? <i>How many years have you been in the Netherlands?</i>	(open question, numeric answers only)
(6) Heeft u lessen Nederlands gehad? <i>Did you take any classes to learn Dutch?</i>	<ul style="list-style-type: none"> <li>• Ja <i>Yes</i></li> <li>• Nee <i>No</i></li> </ul>
(7) Op welk niveau is uw Nederlands nu? <i>At what proficiency level is your Dutch now?</i>	<ul style="list-style-type: none"> <li>• 0-A1</li> <li>• A1</li> <li>• A1-A2</li> <li>• A2</li> </ul>

	<ul style="list-style-type: none"> <li>• A2-B1</li> <li>• B1</li> <li>• B1-B2</li> <li>• B2</li> <li>• C1/C2</li> <li>• Weet ik niet <i>I don't know</i></li> </ul>
(8) Wat is uw moedertaal? / Wat zijn uw moedertalen? <i>What is your native language? / What are your native languages?</i>	(open question)
(9) Beheerst u nog andere talen <b>goed</b> ? <i>Do you have a <b>high</b> proficiency in any other languages?</i>	<ul style="list-style-type: none"> <li>• Ja → 9a Yes</li> <li>• Nee → 10 No</li> </ul>
(9a) Hoeveel andere talen beheerst u nog goed? <i>How many other languages do you have a high proficiency in?</i>	(open question, numeric answers only) → 9b-9e are looped as many times as the number indicated here
(9b) Wat is de 1e andere taal die u goed beheerst? <i>What is the first other language you have a high proficiency in?</i>	(open question)
(9c) Op welke leeftijd begon u deze taal te leren? <i>At what age did you start learning this language?</i>	(open question, numeric answers only)
(9d) Hoe goed beheerst u deze taal? <i>How high would you score your proficiency in this language?</i>	<ul style="list-style-type: none"> <li>• 1 (niet goed) <i>1 (not good)</i></li> <li>• 2</li> <li>• 3</li> <li>• 4</li> <li>• 5 (heel goed) <i>5 (very good)</i></li> </ul>
(9e) Hoe vaak gebruikt u deze taal? <i>How often do you use this language?</i>	<ul style="list-style-type: none"> <li>• 1 (nooit) <i>1 (never)</i></li> <li>• 2</li> <li>• 3</li> <li>• 4</li> <li>• 5 (elke dag) <i>5 (every day)</i></li> </ul>
(10) Bent u dyslectisch? <i>Are you dyslectic?</i>	<ul style="list-style-type: none"> <li>• Ja Yes</li> <li>• Nee No</li> </ul>
(11) Wist u voor deze studie al iets over de verba zetten/leggen? <i>Did you have any prior knowledge about the verbs 'zetten' and 'leggen'?</i>	<ul style="list-style-type: none"> <li>• Ja → 11a Yes</li> <li>• Nee → 12 No</li> </ul>
(11a) Wat wist u al?	(open question)

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*What prior knowledge did you have?*

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(12) Vergelijk het Nederlands met uw moedertaal. Welke zin past het beste? *Compare Dutch to your native language. Which sentence is most accurate?*

- Het Nederlands gebruikt meerdere plaatsingsverba ('zetten/leggen'). Mijn moedertaal gebruikt één verbum (bijvoorbeeld 'to put' in het Engels, of 'mettre' in het Frans).  
*Dutch uses multiple placement verbs ('zetten/leggen'). My native language only uses one verb (for example 'to put' in English, or 'mettre' in French).*
- Het Nederlands gebruikt meerdere plaatsingsverba ('zetten/leggen'). Mijn moedertaal gebruikt ook meerdere verba (bijvoorbeeld 'stellen/legen/setzen' in het Duits).  
*Dutch uses multiple placement verbs ('zetten/leggen'). My native language also uses multiple verbs (for example 'stellen/legen/setzen' in German).*
- Anders:  
*Other:*

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(13) Wat denkt u dat het doel is van deze studie?

(open question)

*What goal do you think this study has?*

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(14) Wilt u nog iets kwijt over dit experiment?

(open question)

*Is there anything else you would like to say about this experiment?*

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*Note.* The arrows indicate the survey flow of the sub-questions.