How distracting are negative emotion words compared to semantically related words: Evidence from a translation recognition task

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Abstract

Translation tasks typically find interference effects for translation pairs that are semantically related or form-related. For other word types, such as concrete and abstract words, differences have been reported where participants are generally faster to recognize translation pairs that involve concrete words. Likewise, negative emotion words have been found to be processed differently but have not been investigated in the context of a translation recognition task. The main aim of this thesis was to investigate how the concepts of negative emotion words as distractors influence the performance on a translation recognition task compared to semantically related translation pairs. Secondly, it was explored how the English proficiency of Dutch-English bilinguals affected their performance. A backward L2-L1 translation recognition paradigm was used that involved correct and incorrect translation pairs. The participants were native speakers of Dutch who learned English as their L2. It was the participants' task to decide whether a translation pair was correct or incorrect. The incorrect translation pairs were of interest, because they consisted of semantically related translations or semantically unrelated translation with neutral valence, or negative emotion words. It was expected that the semantically related pairs and negative emotion pairs elicited interference of similar magnitude in the response times compared to the unrelated neutral translation pairs. The study's findings reveal that participants were in reality slower to reject semantically related translation pairs than unrelated pairs. The negative emotion translation pairs revealed no significant effect in comparison to translation pairs in the neutral control condition, so it can be concluded that a connection between two translations is more distracting than the emotionality of a word. It seems, however, that negative emotion words were processed slightly faster than neutral words, but more research is needed on this for a conclusive answer. The participants did not appear to differ in accuracy for the different translation pairs. The participants had varying English proficiency scores, which was expected to influence the translation performance. The results show that English language proficiency did not affect how fast or accurate the participants responded to certain translation pairs. Despite not finding many significant results, the current thesis could provide a good starting point for future studies combining a translation recognition task with emotional stimuli.

1. Introduction

There are 7,139 languages spoken around the world at present (Eberhard, Simons & Fennig, 2021). That is, the languages that are known and that still have active speakers. Only a small share of these languages is spoken by the majority of the world's population. It is not uncommon that people speak two or more languages. It is actually more uncommon to be monolingual. Some people grow up bilingually, while others grow up with one language but might choose to learn an additional language later in their life. In order to do so successfully, a lot of time and attention is required in contrast to acquiring a language as a child. Acquiring the first language (L1) is typically done more or less effortlessly. Second language (L2) learners go through hours of language instruction or immerse themselves in the language completely. They will find that some words are acquired easier than others. During the first stages of L2 learning, the learner will rely on their knowledge from the already established L1 by translating the words. Words that are similar in meaning and form are easier to learn. Take for example the English word *cat* and its Dutch translation *kat.* They are similar in terms of orthography and hold the exact same meaning. The similarity between the English word *key* and Dutch word *sleutel* may be less obvious, even though they refer to the same concept. And then there are words that look similar, but do not mean the same. For instance, the English word *brave* and the Dutch word *braaf*. Even more puzzling are words that are not directly translatable from one language into another, take the infamous Dutch word *gezellig*. Its meaning will then be more difficult to grasp for beginning L2 learners because they cannot relate it to an L1 equivalent (Pavlenko, 2008a).

The word *gezellig* has positive connotations for most people, because it signifies having a nice time. But the word *death* will most likely evoke a negative feeling. This is something that has to be acquired over time through language use and experience. It is thought that people will associate negative or positive feelings with words through personal experience (Pavlenko, 2008b). For example, the word *clown* evokes negative feelings for someone who has had an unpleasant encounter with a clown while someone else has only had pleasant memories involving clowns may instead have positive feelings when hearing the word. Emotional associations with words can thus differ from person to person based on their experiences.

The emotional associations with words are mostly established during childhood. For people who grow up monolingually, this will thus be established in their L1. When learning a new language, the learner has to acquire new emotional concepts that might not exist in their

L1 or partially overlap in meaning which complicates its acquisition (Pavlenko, 2008a). Emotional concepts that are not different in two languages are more easily acquired. Moreover, when an L2 is mainly learned in a classroom setting, the learners will not establish these affective connections as much or perceive their exact meaning correctly due to the unnaturalistic setting of a classroom (Pavlenko, 2012). With psycholinguistic paradigms, it has been researched how emotion words are processed by monolinguals and bilinguals. It appears that it often takes longer to process words that are considered negative emotion words in comparison to neutral words (Eilola, Havelka & Sharma, 2007; Sutton et al., 2007; Eilola & Havelka, 2011; Colbeck & Bowers, 2012; Kuperman et al., 2014). This effect is stronger for native speakers than for L2 speakers (Colbeck & Bowers, 2012).

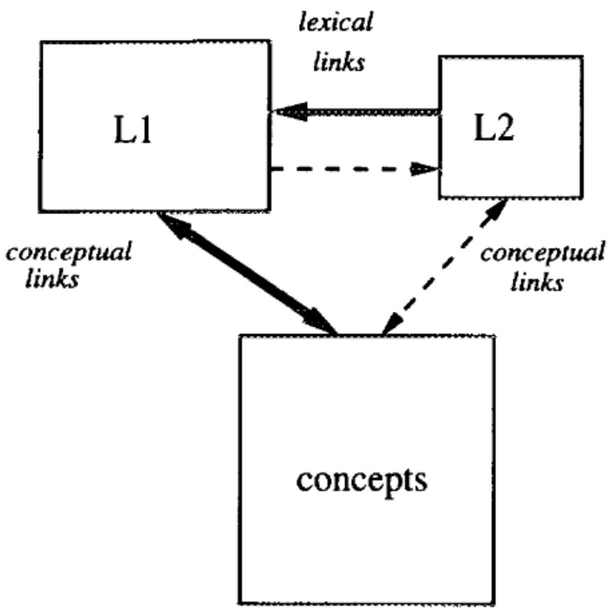
The processing of the translation of L2 words to the L1 by Dutch-English bilinguals will be explored in this thesis. Even though the Netherlands is generally a monolingual country, English is a popular language to be learned as an L2. Children are often introduced to their first English lessons in primary school. In secondary education, it is an obligatory part of the curriculum. The current study tests word translation abilities of Dutch native speakers who have learned or are still learning to speak English as their L2. More specifically, how sensitive they are to negative emotion distractors in their L1 when they are evaluating the correctness of translation pairs.

2. Previous literature

2.1 Second language learning

It is assumed that late bilinguals are faster in translating from L2 to the L1 than the other way around, this is called translation asymmetry. Based on this assumption, Kroll and Stewart (1994) put forward the Revised Hierarchical Model (RHM, see Figure 1). The RHM mainly accounts for how word learning in an L2 develops when the L1 is already fully acquired. It assumes that words are represented on two levels. Lexical representations accommodate information about word form, including information about orthography. The conceptual store contains information about word meaning. The lexical representations are separated for the different languages, whereas the conceptual store represents concepts for both languages. In Figure 1, the L1 lexicon is pictured larger than the lexicon of the L2 because the L2 learner has a larger lexicon in the L1 than the L2 in the beginning stages of language learning.

Figure 1. The Revised Hierarchical Model (Reprinted from Kroll and Stewart, 1994).



The two lexicons are connected through lexical links and both lexicons have conceptual links to the shared word meaning representations. During early stages of L2 learning, the L2 has not yet developed conceptual links and needs the L1 translation equivalent to access meaning (word association). The L2 lexicon is thus reliant on the strong lexical links to the L1, because the L1 has already established strong links to the conceptual store. As L2 proficiency increases, the conceptual links to the L2 will become stronger and the lexical links will become less necessary. The lexical links from the L1 to the L2 are weaker. The L1 has a strong link to the conceptual memory (concept mediation) and is not reliant on the L2 for translation. The translation asymmetry is thus due to the frequent use of lexical links from the L2 to the L1, while the lexical link from the L1 to the L2 is less frequently used in the beginning stages of language learning.

Kroll and Stewart (1994) found evidence for their model with a word naming and translation production task with categorized and randomized lists. The categorized lists consisted of nouns belonging to the same semantic category (e.g., clothing). The randomized list was made up of words from different semantic categories. The Dutch-English bilinguals performed each task in their L1 (Dutch) and their L2 (English) and the translation task was executed in both translation directions. The participants were able to name words faster in the L1 than the L2. In the translation task, they were faster to produce translations from the L2 to the L1 which confirmed the predictions of the RHM. The role of concept mediation was found in the L1 to L2 translation direction, but not in the L2 to L1 direction. Namely, the semantically related words in the categorized lists produced an interference effect in the L1 to L2 direction which means that the bilinguals were slower to name words in the categorized lists than in the randomized lists. They were affected by the semantic context of the categorized lists where all words belonged to the same semantic category and this effect was absent for the randomized lists. This implies that the words were conceptually mediated, hence the semantic interference effect. In the L2 to L1 translation direction, the bilinguals were not affected by the semantic context of the list. According to the researchers this was because their translation was accessed through lexical links and not (yet) through the conceptual links.

2.2 The translation recognition task

The assumptions of the RHM have been tested extensively with the translation recognition task. The translation recognition task involves two languages in which the first word (prime) is in another language than the second word (target). The task requires participants to decide whether the target word is the correct translation of the prime. This can be done with a forward (from the L1 to the L2) translation or a backward (from the L2 to the L1) translation. A task consists of correct and incorrect translation pairs. In the incorrect translation pairs, the targets are typically manipulated in a way that they are related to the correct translation. This can either be form-related (orthographically and/or phonologically) or semantically related. Behavioural data, such as response times and accuracy scores of the participants, are measured, and some studies have included additional event-related potential (ERP) measures.

The related conditions are then compared to unrelated conditions that serve as a control condition. It is often the case that semantically and form-related pairs are more difficult to process as participants take longer to reject them or wrongfully accept them. These are interpreted as interference effects.

Initially, word translation studies made use of translation production tasks rather than recognition tasks. In such a production task, the participants are presented with a word (the prime) for which they have to come up with the translation themselves. Generally, the participants show similar interference effects to word manipulations in a translation recognition task compared to a production task (de Groot & Comijs, 1995). However, more missing data and more errors were reported for the production task which is why the task is perceived as more difficult. A recognition task is more suitable for testing L2 learners as it requires passive knowledge whereas the production of words may be more difficult to achieve, especially for beginning learners (de Groot & Comijs, 1995).

Some translation recognition tasks have found evidence in favour of the RHM. Talamas, Kroll and Dufour (1999) created a task with correct translation pairs (e.g., 'garlic' – 'ajo'), and incorrect translation pairs for native English speakers learning Spanish. The bilinguals were divided into two groups: The less fluent learners and more fluent learners. They had to decide whether the pairs involved a correct translation or not. The incorrect pairs were either semantically related words (e.g., 'garlic' – 'cebolla' (onion)), form related pairs (e.g., 'garlic' – 'ojo' (eye)) or unrelated control words. The researchers found that L2-L1 translation was faster than L1-L2 translation, which is in line with the assumptions put forward by the RHM. An interesting finding was that the less proficient learners showed a larger interference effect on words that were form-related and the more proficient learners on words that were semantically related. The researchers argued that the more proficient learners had developed stronger links to the conceptual store, whereas the less proficient learners were reliant on the lexical link from the L2 to the L1 as an explanation for the different interference effects.

Afterwards, the semantically related words were rated on semantic distance. They were divided into 'more similar pairs' and 'less similar pairs'. The data of the translation task was analysed with this new division. The semantic interference for more fluent learners remained. Interestingly, a semantic interference effect appeared for the less fluent learners for the more similar pairs, albeit a smaller interference effect (89 ms) than the more fluent learners (107 ms) and smaller than the form interference effect (114 ms). This suggests that some words may be conceptually mediated even by L2 speakers at beginning stages of language learning.

Ferré, Sánchez-Casas and Guasch (2006) further examined the degree of semantic distance with an experimental design that included three incorrect conditions that were related to the correct translation. The target word was either very closely semantically related (e.g., ‘ruc’ (donkey) – ‘caballo’ (horse)), belonging to the same semantic category (e.g., ‘ruc’ – ‘oso’ (bear)), or related on form (e.g., ‘hilo’ (thread) – ‘hijo’ (son)). The task was conducted among three groups of Spanish-Catalan bilinguals: The early bilingual group who spoke both languages from an early age on, the late proficient bilingual group who were highly balanced bilinguals and the late nonproficient bilinguals who had recently started learning Catalan. They were tested in the L2 (Catalan)-L1 (Spanish) direction. The early and late proficient bilinguals showed a significant interference effect for very close semantically related and form-related words. The nonproficient group showed an interference effect for form-related words only. The error rates were higher for form-related and very close semantically related translation pairs.

This study and its results (Ferré et al., 2006) were replicated by Guasch et al. (2008) with the same stimuli but a longer stimulus onset asynchrony (SOA; from 500 ms to 750 ms) to accommodate beginning learners. The results support the view that highly proficient learners conceptually mediate words and novice learners are reliant on word association (Kroll & Stewart, 1994). However, it cannot account for the interference effect on form-related words for the highly proficient bilinguals.

Other studies have found larger inconsistencies with the predictions of the RHM. Altarriba and Mathis (1997) performed a translation recognition task with a group of English-speaking monolinguals and a group of English-Spanish bilinguals. Prior to the task, the monolinguals learned common Spanish nouns that would occur in the translation task. The task was only conducted from the L2 (Spanish) to the L1 (English). Both groups were slower to reject form-related translation pairs and meaning-related translation pairs than unrelated pairs. The novice L2 learners did thus experience some semantic interference, even after one language lesson. This is similar to the previously discussed post-hoc analysis of more and less similar words where the less proficient learners displayed a semantic interference in Talamas et al. (1999). According to the RHM, this should not be possible as early learners solely rely on lexical connections (Kroll & Stewart, 1994).

Furthermore, Sunderman and Kroll (2006) investigated less and more proficient learners of Spanish with a Spanish (L2)-English (L1) backward translation recognition task.

The form-related pairs were either related to the Spanish prime (e.g., ‘cara’ (face) – ‘card’) or to the English translation (e.g., ‘cara’ – ‘fact’). The former elicited an interference effect for both groups, but the latter only for the less proficient group which suggests that the less proficient group activates the L1 translation equivalent. For meaning-related translation pairs, both groups were slower to respond. The interference effects were of similar magnitudes. Both less and more proficient L2 speakers made use of conceptual links during the task. The predictions of the RHM in this study were only found for activation of the L1 by the less proficient learners but the sensitivity to meaning by both groups goes against the model (Kroll & Stewart, 1994).

The majority of translation recognition studies investigate word processing with adults, from novice L2 learners to highly proficient bilingual speakers. The study by Poarch, van Hell and Kroll (2015) was designed for children who are at beginning stages of L2 learning. The children performed a translation recognition and production task. In the translation recognition task, they viewed English (L2) words with either a correct translation or a semantically related translation in Dutch (L1). The children were slower to reject semantically related stimuli than unrelated stimuli, which means that they accessed conceptual information from the L2. This is in line with other studies that found similar interference effects for beginning L2 learners (Altarriba & Mathis, 1997; Sunderman & Kroll, 2006). In the translation production task, the children were asked to produce translations from the L1 to the L2 (forward) and from the L2 to the L1 (backward). Overall, they were faster to produce the backward translations and produced more errors in forward translations which is in accordance with the translation asymmetry predicted by the RHM.

Besides behavioural measures, a number of electrophysiological studies have been executed to measure ERPs in a translation recognition task (e.g., Palmer, Van Hooff & Havelka, 2010; Guo et al., 2012; Ma et al., 2017). In linguistics, ERPs are on-line measures that convey information about the latency and magnitude of neural activity during word or sentence processing. The P200 and N400 are instances of ERP components. The P200 is a peak that is often related to early lexical processing, for instance, phonological and orthographical processing and accessing L1 word forms (Guo et al., 2012). The N400 is a peak related to semantic information and when this information is incongruent with the linguistic context, the N400 is typically enhanced. A reduced N400 reflects reduced semantic processing costs.

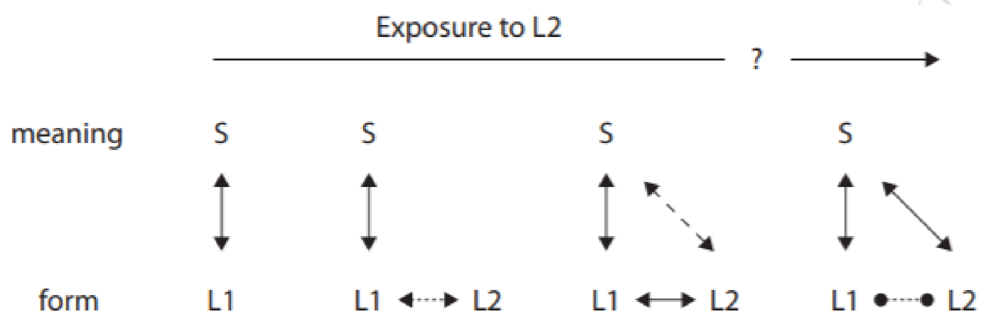
Palmer et al. (2010) tested RHM’s predictions on translation asymmetry with highly fluent Spanish-English bilinguals and English-Spanish bilinguals. They performed a translation recognition task with abstract and concrete nouns in both translation directions. On the one hand, the behavioural data demonstrated a concreteness effect in all conditions, meaning that concrete words were recognized faster than abstract words. The Spanish-English bilinguals did not show significant differences in recognizing translation from the L1 to the L2 (forward) and from the L2 to the L1 (backward). The English-Spanish bilinguals were faster in responding to translations from the L2 to the L1 (backward) than from the L1 to the L2 (forward). On the other hand, the ERP results showed an enlarged N400 for the backward translation direction for both groups of bilinguals. The reason this was absent from forward translation, the researchers argue, is that concepts are readily available for translation from the L1 to the L2 and do not require enhanced processing costs. The ERP findings are in line with assumptions made about translation asymmetry by the RHM (Kroll & Stewart, 1994). It assumes that forward translation happens via concept mediation and backward translation through word association.

With ERP studies, the effect of SOA on processing semantic interference has been examined (Guo et al., 2012; Ma et al., 2017). The study by Guo et al. (2012) included Chinese-English bilinguals who were immersed in their L2 English. The study conducted by Ma et al. (2017) involved native speakers of English who were learning Spanish. A backward translation recognition task with semantically related and form-related distractors was conducted where the target stimulus either appeared at 750 ms (long SOA) or 300 ms (short SOA) after the prime. The two SOA conditions were presented in separate experiments. The behavioural results from both studies show meaning and form interference effects. At a long SOA, a P200 effect was present while this effect was absent at the short SOA. The P200 is thought to stand for initial processing of word form. Both studies concluded that when the participants are given sufficient time (long SOA) to translate, they will access the L1 translation equivalent. When there is not enough time (short SOA) to do so, the bilinguals will not access the L1 translation first. Instead, they will directly conceptually mediate the word. The implications of these results show that L2 speakers are able to directly access meaning even when they might also translate to the L1.

The RHM has been successful for interpreting translation asymmetry among others, but the model is not without shortcomings. Brysbaert and Duyck (2010) go so far to say that the time has come to abandon the RHM altogether. They indicate that there is little evidence that each language has its own separate lexicon and that there may be partial overlap possible between lexicons. Cross-linguistic influences provide evidence for their argument (e.g., Thierry & Wu, 2007). As counter argument, Kroll et al. (2010) claim that language selectivity was not the main focus of the RHM. Brysbaert and Duyck, furthermore, argue that semantics play a larger role in beginning stages of L2 learning than the RHM accounts for. Initially, according to the RHM, it is not possible that L2 learners access the conceptual store in L2 processing, but several studies have found evidence that contradicts this (Altarriba & Mathis, 1997; Sunderman & Kroll, 2006; Guo et al., 2012; Poarch et al., 2015; Ma et al., 2017). Moreover, the RHM does not provide information about connection networks between different words and how words are activated.

Although the RHM was designed to account for the developmental aspect of L2, the model has additionally been criticized for being static (Grainger, Midgley & Holcomb, 2010). Instead, a more dynamic approach for L2 development that merges the RHM and the bilingual interactive-activation (BIA; see Van Heuven, Dijkstra & Grainger, 1998) model was designed (see Figure 2): The developmental bilingual interactive-activation (BIA-d) model. The model portrays different stages of late L2 development whereas for the RHM the stages have to be interpreted.

Figure 2. The developmental bilingual interactive-activation model (Reprinted from Grainger, Midgley & Holcomb, 2010).



Initially, the learner only has proficiency in the L1 and this lexicon has strong routes to the conceptual store. As the L2 learner gains proficiency in the L2, the connections between the languages and semantic representations (‘S’ in Figure 2) strengthen. In an early stage, however, the L2 is reliant on the L1 for concept mediation through translation. The link between the two lexicons is bidirectional and weak. L2 learning is initially mediated by a teacher who typically provides the L1 translation for L2 words which according to BIA-d activates the L2 lexical link. The L1 translation equivalent is activated along with the conceptual knowledge. Then, as the learner is increasingly exposed to the L2, the lexical link between the two languages becomes stronger and a weak conceptual link to and from the L2 develops. This is where the model differs from the RHM. The RHM posits that the lexical link from the L1 to the L2 remains weak, while the lexical link from the L2 to the L1 is immediately strong. In the last stage, the learner has strengthened the conceptual link through L2 exposure. The learning is no longer supervised by an instructor and more semantic information is involved. The L2 conceptual link is now comparable to that of the L1 and therefore, the lexical link between the L1 and L2 is becoming unnecessary hence the dotted line. The two circles at both ends of the lexical link represent inhibitory control, the ability to suppress one language when engaging in another which is a central aspect of interactive-activation models.

In this section, an introduction to the translation recognition task has been given. The task has most commonly been used to investigate the effects of semantically related and form-related translation pairs. It is clear that these translation pairs are able to elicit an interference effect. There is, however, no consensus in translation recognition studies on whether the RHM can be confirmed or rejected definitively but it seems that the model cannot account for all findings. The BIA-d may provide a more detailed and more accurate description of L2 learning.

2.3 Different word types

Several translation recognition studies have shown that bilinguals are sensitive to word meaning and word form at varying levels of proficiency. Evidence for this was found for novice L2 learners to highly fluent bilinguals. Most of these studies have used nouns as stimuli for the task. However, there is evidence that representations in the bilingual lexicon are different for distinct word types (de Groot, 1992). The most prominent word types that have been researched in this regard with translation tasks are concrete and abstract words (e.g., Laxén & Lavaur, 2010; Palmer et al., 2010; Basnight-Brown & Altarriba, 2016). Furthermore, verbs have also been proven a useful type of stimuli in translation tasks (Kelder, 2018).

The study by Laxén and Lavaur (2010) investigated what role semantics play in a translation recognition task. In the first of three experiments, they compared words with one translation to words that have more than one translation from French (L1) to English (L2). There was a total of four conditions: Translation pairs with one translation (e.g., ‘cheval’ – ‘horse’), translation pairs with more than one translation where the dominant translation was used (e.g., ‘bateau’ – ‘boat’), translation pairs with more than one translation where the non-dominant translation was used (e.g., ‘bateau’ – ‘ship’) and non-translation pairs. The non-translation condition was the only condition that involved incorrect translations and was not included in the analysis. Half of the words were concrete words and the other half were abstract words. Their participants were L1 French speakers studying English. Words with one translation were recognized faster than words with multiple translations by the participants. Within words with multiple translations, dominant translations were recognized faster than non-dominant translations. The researchers also found a concreteness effect similar to Palmer et al. (2010) where concrete words were responded to faster than abstract words. In the second experiment, both translation directions were tested. The same results were found as in Experiment 1, but in addition to that it was found the translation direction L1-L2 was faster than L2-L1. These results go against the predictions made by the RHM (Kroll & Stewart, 1994). A concreteness effect was found for the L1-L2 direction. In the third experiment, the differences between words with one or with more translations remained robust. The translation asymmetry in reaction times disappeared although more errors were made in the L1-L2 direction. Furthermore, the semantic relation between translations of words with more than one translation was examined. The response times were faster when two translations were semantically related than when they were unrelated, and the error rate was also lower for the semantically related translation. A semantic facilitation effect thus appeared. This finding is deviant from other translation recognition studies.

The differences between concrete and abstract words, and words with one or with multiple translations were further examined by Basnight-Brown and Altarriba (2016). They conducted a translation production task among L1 Spanish-L2 English bilinguals, who were dominant in the L2. The bilinguals were presented with a Spanish or English prime for which they had to name a translation. In the first experiment concrete and abstract words with one or more translations were investigated. The bilinguals were faster to translate from the L2 to the L1, which the authors argue is in accordance with the RHM (Kroll & Stewart, 1994), although it should be noted that these were highly proficient bilinguals dominant in the L2. Words with one translation were produced faster than words with multiple translations. A concreteness effect emerged only in the direction from L2 to the L1.

The second experiment involved an extra condition: Emotion-label words with more than one translation (e.g., ‘angry’). Both positive and negative emotion-label words were included. The concrete and abstract words served as neutral stimuli. The goal of this manipulation was to investigate if the presence of emotional stimuli affects the processing of neutral words. The results were similar concerning abstract and concrete words and language direction. However, a more robust concreteness effect was found for both directions in the presence of emotional content. Moreover, the emotional stimuli were processed distinctly in the two languages. In the L1-L2 direction, the translation speed was similar for abstract and emotion words. The concrete words were produced faster. When translating from the L2 to the L1, concrete and emotion words were produced at a similar speed and faster than abstract words. This finding suggests that the emotion words are represented differently in the L1 in comparison to the L2. Emotion words in the L1 have more semantic information available which interferes with the translation process. According to the researchers, "less overlap between emotional concepts in two languages causes bilinguals to have greater difficulty translating emotion words (resulting in a larger number of translations being mapped onto these words)" (p. 1,239). This was especially difficult for the bilinguals in the L1-L2 translation direction.

The RHM does not provide information about different word types. Instead, it takes the lexicon as a whole. The Distributed Feature Model (DFM) as proposed by de Groot (1992) and van Hell, and de Groot (1998) mainly focuses on word types (see Figure 3 and 4). The starting point of the model is based on observed differences in the processing of concrete and abstract nouns. Evidence that is often found in translation tasks is that concrete words are processed faster than abstract words, a so-called concreteness effect (e.g., De Groot, 1992; Laxén & Lavaur, 2010; Palmer et al., 2010; Basnight-Brown & Altarriba, 2016). Different words are interconnected based on conceptual and lexical knowledge that they have in common. Words that are semantically related or form-related share nodes. The DFM holds that the more shared nodes present between words, the easier it becomes to retrieve conceptual information and consequently, the word can be translated faster. So, when a word is activated, this activates a network of corresponding lexical and conceptual information. Concrete words thus have more overlap in nodes than abstract words since they are processed faster. It is argued that the definitions of concrete words are more clearly defined. An example can be found in Figure 3, where the two words refer to the same concept. The Dutch word *vader* and the English word *father* both refer to the concept of a male parent and so the conceptual nodes completely overlap. This would then facilitate the translation. The meaning of abstract words leaves more room for interpretation, refers to broader concepts and is more reliant on context and therefore corresponding nodes may be harder to find. Figure 4 gives an example of abstract words that do not exactly refer to the same concept, but nevertheless overlap in meaning to some extent. The Dutch word *idee* can refer to a plan, a concept or an opinion. The English word *idea* could also refer to this but might also signify the aim or purpose of something. The words *idee* and *idea* refer to broad concepts that are not as well-defined as *vader* and *father.* Some of the conceptual information is overlapping, but not all of it. Van Hell and de Groot (1998) pointed out that for a word association task, associations given for concrete words in two different languages were often direct translations while for abstract words this was not the case. The effect is not only found within languages but also between languages. Moreover, the DFM is not limited to concrete and abstract nouns, but has looked at cognates, non-cognates and verbs as well. Consequently, the model may extend to other word types such as emotion words.

Figure 3. The Distributed Features Model with two words with the same meaning (Reprinted from de Groot, 1992)

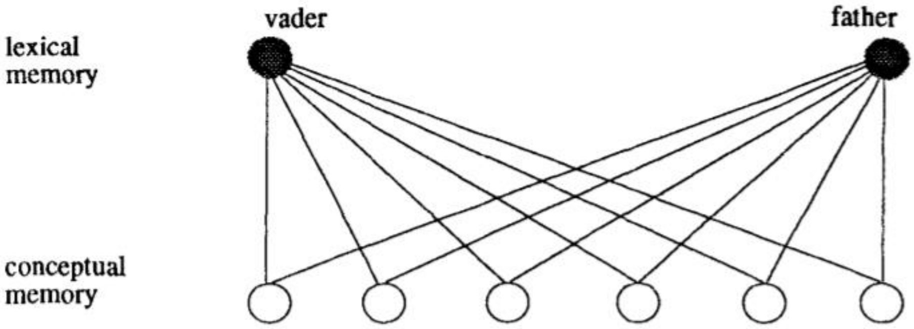
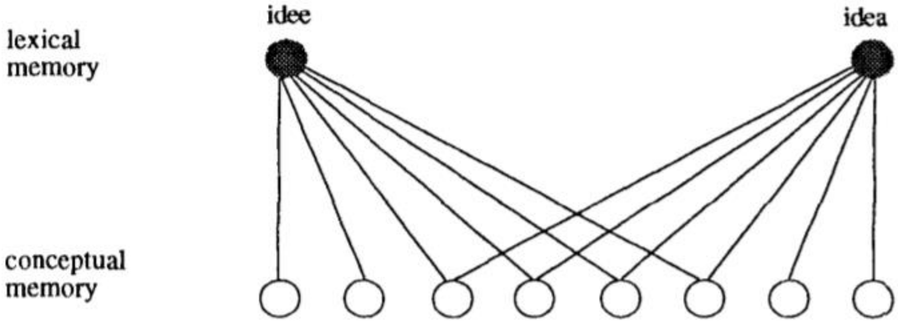


Figure 4. The Distributed Features Model where the two words partially overlap in meaning (Reprinted from de Groot, 1992)



2.4 Emotional word processing

In their study, Basnight-Brown and Altarriba (2016) found evidence that emotion-label words are represented differently from concrete and abstract nouns, and also differently in the L1 and L2. These findings tie in with two popular claims in emotion literature: (1) emotion words are processed differently from neutral words and (2) the L1 is more emotional than the L2. These will be further explored in this section.

It is important to first define what an emotion word is. According to Pavlenko (2008b), there are two different types of emotion words: Emotion words and emotion-laden words. Emotion words comprise emotion-label and emotion-related words. Emotion-label words are words that are used to describe or express feelings (e.g., ‘sad’ or ‘happy’). Emotion-related (e.g., ‘tears’) words are words that refer to behaviour that is related to emotion. The second type of emotion words is emotion-laden words (e.g., ‘loser’ or ‘cancer’). They do not describe feelings or emotion-related behaviour but are rather used to express or elicit emotions. Taboo and swearwords, reprimands and endearments among others fall into this category. Pavlenko (2008b) further argues that these should be viewed as a distinct word type from concrete and abstract words. Arousal and valence are the most prominent feature of emotion words, and this is what distinguishes them from concrete and abstract words. Arousal is the extent to which stimuli can be exciting (e.g., ‘furious’) or calming (e.g., ‘quiet’). Valence says something about whether a word is positive (e.g., ‘holidays’), negative (e.g., ‘abuse’) or neutral (e.g., ‘statue’). Both characteristics can be determined for every word. This is typically done through rating studies.

The research conducted by Kuperman et al. (2014) looked into the influence of valence and arousal on word recognition studies (i.e., lexical decision tasks and word naming tasks). For this they analysed existing response and naming latencies for 12,658 words. What they found was that overall, negatively valenced words elicited slower latencies than neutral words. Neutral words were processed slower than positive words. The more exciting a word was in terms of arousal, the slower it was processed. Valence and arousal both influence word processing and do this independently of each other. The influence of valence, however, was found to be stronger than that of arousal. Negatively valenced emotion words, and especially taboo and swear words, have been found more often to result in higher processing costs (Eilola, Havelka & Sharma, 2007; Sutton et al., 2007; Pavlenko, 2008b; Eilola & Havelka, 2011; Pavlenko, 2012).

Likewise, Emotional Stroop tasks have been used to study affective word processing. During such a task the participants name (or respond with button presses) the colour of the printed word. The stimuli then consist of emotion words. Sutton et al. (2007) conducted a Stroop task with neutral (e.g., ‘seat’/‘asiento’) and negative emotion-label words (e.g., ‘afraid’/‘temeroso’) among Spanish-English bilinguals who were dominant in their L2 English. The response times were faster for the L2 than the L1 in both neutral and negative conditions. A Stroop effect emerged in both languages. This means that the bilinguals took longer to respond to negative words than neutral words. This interference effect was larger in the L2 which was the dominant language of the bilinguals. A similar interference effect was found for highly balanced Finnish-English bilinguals (Eilola et al., 2007). The researchers tested neutral, positive, negative and taboo words in an Emotional Stroop task with Finnish and English. Unlike the Spanish-English bilinguals, the Finnish-English bilinguals did not show any between-language differences in their response times. The taboo and negative conditions elicited a Stroop effect, while the positive conditions did not.

Differences in the processing of emotional versus neutral stimuli may, however, not necessarily result in slower response times. In lexical decision tasks with neutral, negative and positive stimuli by Kousta, Vinson and Vigliocco (2009) and Ponari et al. (2015), the opposite effect was found. Both studies used the same stimuli and research paradigm. In the study by Kousta et al. (2009), only L1 English speakers were tested. Ponari et al. (2015) tested participants that were either L1 speakers, early L2 learners or late L2 learners of English. The stimuli were only presented in English. It took longer for participants to respond to neutral words than to negatively and positively valenced words. There were no differences in word processing between the different proficiency groups. Unlike Sutton et al. (2007) and Eilola et al. (2007), no interference effect was found for emotional stimuli, but rather a facilitation effect. These conflicting findings nonetheless suggest that emotional stimuli are processed differently from neutral words.

Altarriba and Basnight-Brown (2011) investigated the processing of emotion-label (e.g., 'happy') and emotion-laden words (e.g., 'shark) in an Affective Simon Task (AST). The participants were instructed to classify whether words were positive or negative or whether the colour of the word was blue or green. When the word was printed in white, the pleasantness had to be rated and when the word was printed in either blue or green, the colour had to be named. There was no condition with neutral words to compare the effects of the emotion words to. A Simon effect means that incongruent stimuli were responded to slower than congruent stimuli. An incongruent trial is when the preceding stimuli were of another valence than the current target. The experiments were done with English monolinguals and Spanish-English bilinguals, who were dominant in their L2 English. The results show that both groups showed a Simon effect for positive and negative stimuli in English. In general, the bilinguals were slower to respond to the Spanish words. They also showed no Simon effect in this language for positive emotion-label words. Another finding from this study revealed that emotion-laden elicited stronger Simon effects than emotion-label words. The results, moreover, suggest that the L2 might be more emotional when this is the dominant language of the bilingual.

The effect of different emotion word types was further examined by Kazanas and Altarriba (2015) for which they used a primed lexical decision task. This meant that the participants saw a prime word (e.g., 'anxious') followed by the target (e.g., 'tense') belonging to the same word type. Their task was to decide whether the target was a word or a non-word. In some cases, the words were semantically related and others were unrelated. The related words were responded to faster. In a similar manner, positive words were responded to faster in comparison to negative words. And unlike Altarriba and Basnight-Brown (2011) emotion-laden words elicited faster response times (RTs) than emotion-label words. Taken together, the studies do imply that distinct emotion word types are processed differently which is in accordance with the ideas of Pavlenko (2008b).

Simcox et al. (2012) investigated the reactions to reading aloud taboo words and neutral words with skin conductance responses (SCR). SCR measures the physiological responses to stimuli. Simultaneous English-Spanish bilinguals comprised the participant sample. They were dominant in English. More efficient word processing was reported for the English words in comparison to the Spanish words. Similarly, taboo words were processed more efficiently in English than the neutral words. For Spanish words, no differences were found between the word types. Even though, the SCR arousal was greater for Spanish words than for English words, there were no significant differences between the Spanish taboo and neutral words. The English taboo words elicited greater SCRs than the neutral words. From this study, it can be concluded that language dominance is an important factor in perceiving emotional force of words. Nothing can be said about the role of the L1 or the L2 as the bilinguals were exposed to both languages from a young age onwards and there was no mention of this distinction.

Eilola and Havelka (2011) investigated SCR in combination with an emotional Stroop task. Their study involved native English monolinguals and highly proficient Greek-English bilinguals who were dominant in their L1. The task included neutral, positive, negative and taboo words in English. Both groups demonstrated interference effects for the negative and taboo words, although slightly stronger for taboo words. Between the native and non-native English speakers, there were no differences in the magnitude of the interference effect. Interestingly, the bilinguals did not show heightened SCRs for the different conditions while the native English speakers did for the negative and taboo condition. These findings imply that the L2 speakers of English are able to access the word meaning equally fast as the L1 speakers, but higher levels of arousal were only reported for the native speakers.

A study by Colbeck and Bowers (2012) investigated the effect of taboo words in a Rapid Serial Visual Presentation (RSVP) task. The participants were presented with a stream of words that appeared consecutively on the middle of a screen. They were instructed to identify the colour words (e.g., 'green') in each stream and to ignore the other words. The colour targets were preceded either by a taboo word (e.g., 'bitch') or a neutral word (e.g., 'butter'). The participants were Chinese-English bilinguals and their performance was compared to that of a native English control group. The neutral condition elicited more correct responses for both groups. However, the native English speakers performed worse on the taboo condition than the bilinguals. This suggests that the L1 speakers were more influenced by the taboo words than the L2 speakers.

The results of Colbeck and Bowers (2012) are in accordance with the claim is that the L1 is more emotional than the L2. In a large-scale questionnaire, Dewaele (2004) investigated the perceived emotionality of swear and taboo words across languages. The participants, all speakers of two or more languages, reported a higher perceived emotional force for swear and taboo words in the L1 than any later learned language. Learners that learned the L2 in a classroom setting rated the perceived intensity of the swear words lower than those who learned an L2 in an immersion setting. Swearwords are often learned outside the classroom and as a result the corresponding conceptual knowledge might differ from that of native speakers, which is why L2 speakers often interpret them differently and in many cases as more neutral (Dewaele, 2004; 2016).

All in all, the findings of the beforementioned studies tie in with the findings of Basnight-Brown & Altarriba (2016) who found that emotional words were translated faster when they were presented in the L2 than when they appeared in the L1, because the affective interference was lower for the L2 words. Secondly, the emotion words in the translation production task were not processed in a similar manner as the concrete and abstract neutral words. This is confirmed by the studies on emotion word processing, even though an interference effect due to emotional stimuli has been reported in the majority of the studies, a facilitation effect has been found too. What can be concluded from this is that emotion words can be seen as a distinct word type that is processed differently compared to neutral words.

2.5 The current study

The aim of the current study is to investigate the role of semantics during word translation. In specific, how the processing of negative emotion distractors behaves in comparison to that of semantically related translation pairs. Negative words have been found to be processed differently from non-emotion words, although there is no consensus on whether this is done slower or faster. In previous studies on emotional processing, the emotional stimuli of the task were not used as distractor words. In the current study design this is the case. The secondary aim of the study is to investigate the usefulness of a translation recognition task for emotional word processing studies thereby bringing two different fields of study together: Translation studies and affective processing studies. The usefulness of a translation recognition task for emotional processing studies is not yet known because emotion words have not yet been studied in the context of a translation recognition task. In one particular translation study, emotion-label words were used as stimuli in a production task alongside concrete and abstract words (Basnight-Brown & Altarriba, 2016). The study's findings, among others, imply that emotional stimuli in a translation production task elicit slower naming latencies but also different latencies from concrete and abstract words.

The study will answer the following research questions: *How do negative emotion words as distractor translations influence translation processing in comparison to semantically related translation pairs in a translation recognition task?* And *To what extent does English proficiency influence the performance of the translation recognition task?* In order to answer these research questions, the study presented in this paper conducts a translation recognition task with native speakers of Dutch, who are L2 speakers of English. The participants will first see the prime in their L2 English and the target in their L1 Dutch (backward translation). Dutch was chosen as the target language because the bilinguals are dominant in this language and should, therefore, not have trouble retrieving the Dutch words. Moreover, the L1 is often referred to as the language with the most emotional force (Dewaele, 2004; Pavlenko, 2008b; Colbeck & Bowers, 2012) or in some cases, the dominant language is more emotional (Altarriba & Basnight-Brown, 2011; Simcox et al., 2012). If the negative emotional stimuli should affect the word processing of the participants, it would be more pronounced in the L1 than the L2. Negatively valenced emotion words, and especially taboo and swear words, have been found more often to result in higher processing costs (Eilola et al., 2007; Sutton et al., 2007; Pavlenko, 2008b; Eilola & Havelka, 2011; Pavlenko, 2012). For this reason, the current study only focuses on negative emotion words as distractors rather than positive words. The task consists of correct and incorrect translation pairs of which the latter are of particular interest for the current study. The incorrect targets are semantically related to the prime words or they are negative emotion words. As a control condition, semantically unrelated neutral words were included.

It is hypothesized that the semantically related words produce an interference effect in comparison to the words that are semantically unrelated as this is a robust finding in translation recognition tasks and secondly, that they evoke more errors (Altarriba & Mathis, 1997; Talamas et al., 1999; Ferré et al., 2006; Sunderman & Kroll, 2006; Guasch et al., 2008; Guo et al., 2012; Poarch et al., 2015; Ma et al., 2017). In translation tasks, bilinguals commonly experience interference effects when semantically related or form-related distractors are used. When two words that are related in meaning interfere with the translation process. Form-related translation pairs were not included, as the research focuses on the role of semantics during translation. A comparison with form-related words was therefore valued as less relevant.

The expectation is that the negative emotion words will be processed differently from the neutral words. More specifically, the negative words are expected to produce an interference effect meaning that they might elicit slower response times than neutral words. Research on emotional processing has shown that negative emotion words can produce an interference effect in a lexical decision task (Kuperman et al., 2014; Kazanas & Altarriba, 2015), an Emotional Stroop task (Eilola et al., 2007; Sutton et al., 2007; Eilola & Havelka, 2011), an AST (Altarriba & Basnight-Brown, 2011) and an RSVP task (Colbeck & Bowers, 2012) when compared to neutral words. The participants are exposed to the emotion word in their L1, which is generally perceived as the most emotionally intense language (Dewaele, 2004) and so it is thought that this will slow down the processing of the negative words. It is hypothesized that the negative emotion distractors will produce a similar amount of interference as the semantically related translation pairs. In terms of accuracy scores, it is expected that the negative emotion distractors will affect the accuracy scores in a way that is in accordance with the hypothesized RT interference effect. So, the participants will make more errors in the negative emotion condition when compared to the unrelated neutral condition because they are distracted by the negative valence of the words.

It could, however, be the case that the negative words do not produce an interference effect, but rather a facilitation effect. A facilitation effect would mean that the negative emotion words are processed faster than the words in the unrelated condition. It is not unthinkable that such an effect might be present in this study, as there are also studies reporting faster or more efficient processing of negative emotional stimuli (Kousta et al., 2009; Simcox et al., 2012; Ponari et al. 2015).

Finally, the English language proficiency of the participants is expected to influence their performance on the translation recognition task. The more fluent L2 speaker will be faster at and more accurate in deciding whether something is a correct Dutch translation of an English word because they have a larger L2 lexicon than a less fluent L2 speaker, or they have encountered the words more often and therefore, process words more automatically. According to assumptions made by the RHM, beginning L2 learners rely more on word association from the L2 to the L1 than more proficient learners and are less sensitive to word meaning (Kroll & Stewart, 1994).

3. Method

3.1 Participants

11 native speakers of Dutch participated in this study, of whom 7 were female and 4 male. All participants had English as an L2. Additional languages that were spoken by the participants were Frisian (*n* = 5), German (*n* = 4) and French (*n* = 2). The participants were all dominant in their L1 Dutch at the moment of testing. The age of the participants ranged from 18 years to 32 years (*M* = 22.3; *SD* = 3.39). The educational level of the participants was rather diverse at the moment of testing. Some were pursuing a university degree (*n* = 5) or a degree in higher professional education (*n* = 3). Some participants were not enrolled in education and graduated either from secondary vocational education (*n* = 2) or secondary education (*n* = 1). The English proficiency scores as measured by a LexTALE proficiency task ranged from 47.50% to 97.50% (*M* = 70.23%; *SD* = 15.25%).

3,2 Materials

The current study involved a backward translation recognition paradigm. Each English prime was paired with four Dutch targets, so that there were four conditions. Table 1 below provides an overview of the different conditions and the different characteristics per word. One condition was a correct translation (e.g., ‘sugar’ – ‘suiker’) and the other three were incorrect translations. One of the incorrect conditions was semantically related to the correct Dutch translation and English prime (e.g., ‘sugar’ – ‘koffie’ (coffee)), the other was semantically unrelated to the correct translation (e.g., ‘sugar’ – ‘herfst’ (autumn)) and the last condition consisted of negatively valenced emotion words (e.g., ‘sugar’ – ‘oorlog’ (war)).

A total of 216 word pairs were included in the present study (see Appendix A for a full overview of the stimuli). Of those, 48 were correct translation pairs, 48 semantically related words, 48 semantically unrelated words and 48 negative emotion words. They were equally distributed among four different lists, so that there were 48 targets per list. To balance the amount of correct and incorrect pairs, 24 filler translation pairs were added to each list. These were all neutrally valenced words, to make sure that no accidental effect of emotionality could appear. Each list consisted of 12 correct translation pairs, 12 semantically related words, 12 unrelated words, 12 negative emotion words and 24 filler translation pairs. Each participant thus saw a total of 72 translation pairs. The stimuli were pseudo-randomly assigned a position in each list with no more than three of the same condition following each other. For every list, four different versions were made with two different orders and different response buttons.

Table 1.

Mean word characteristics per condition

Condition	**Word length**	**Valence**	**Arousal**	**Word frequency**	**Semantic relatedness**
English prime	5.50	5.97*	3.79*	3.09	-
Correct translation	5.83	4.49	3.71	3.02	-
Semantically related	5.75	4.35	3.66	2.96	0.59
Unrelated	5.96	4.31	3.72	2.80	0.88
Negative emotion	6.10	2.26	4.42	2.98	0.88

Note. * The valence and arousal scores of the English prime words are measured on a different scale (1-9) than that of the Dutch words (1-7).

The Dutch stimuli were taken from a database for Dutch affective word norms that includes 4,300 words (Moorts et al., 2013). The words have been rated for valence (pleasantness) on a 7-point Likert scale, where 1 represents the value for the most negative words and 7 the most positive words. Words with a valence between 1 and 2.5 were selected for the negative stimuli in this current study. The majority of the negatively valenced words were emotion-laden words (e.g., ‘koorts’ (fever)) and a minority of the negative words were emotion-label words (e.g., ‘jaloers’ (jealous)). Words with a valence between 3 and 5 were used as neutral stimuli. The correct translation, the semantically related targets and the semantically unrelated targets were all neutral words in terms of valence. There was a significant difference in valence between the different conditions as determined by a one-way ANOVA, $F(3, 188) = 249.15$, $p < 0.001$. A Tukey post-hoc comparison revealed that the mean valence score of the negative emotion condition ($M = 2.26$, $SD = 0.37$) was statistically different from the correct translation condition ($M = 4.49$, $SD = 0.56$), semantically related condition ($M = 4.35$, $SD = 0.50$) and the unrelated condition ($M = 4.31$, $SD = 0.41$) and were significant at $p < 0.001$. The mean arousal ratings were taken from the same database (Moorts et al., 2013) and added for completeness. They were not taken into account during the matching of the stimuli.

For the English primes, the valence and arousal scores were taken from an extended version of the Affective Norms for English Words (ANEW) database (Warriner, Kuperman & Brysbaert, 2013). It is important to note that these scores are not directly comparable with the scores of the Dutch words, since the English words were rated on a 9-point Likert scale instead of a 7-point scale. The English primes had a valence score of 5.97, which was taken to represent a neutral value.

The semantic relatedness of word pairs was assessed with Snaut (Mandera, Keuleers & Brysbaert, 2017). This was done for all translation pairs in the incorrect conditions. Snaut produces a score that refers to the semantic relatedness between two words. The lower the score, the more semantically related the two words are. There was a significant difference in semantic relatedness between the different conditions as determined by a one-way ANOVA, $F(2, 141) = 128.30$, $p < 0.001$. A Tukey post-hoc comparison revealed that the mean semantic relatedness of the semantically related condition ($M = 0.59$, $SD = 0.14$) was different from the unrelated condition ($M = 0.88$, $SD = 0.08$) and the negative emotion condition ($M = 0.88$, $SD = 0.08$) and were significant at $p < 0.001$.

The stimuli were matched on word length and frequency. The frequency of the Dutch words was taken from the SUBTLEX-NL database (Keuleers, Brysbaert & New, 2010) and the English frequency scores were taken from SUTBLEX-US (Brysbaert, New & Keuleers, 2012). It was made sure that all frequency scores were at least higher than 1 for individual words. Words with fewer than 4 letters and more than 10 letters were also not included in the study. A one-way ANOVA revealed that there were no significant differences between the five word conditions for word length $F(4, 235) = 1.297$, $p = 0.272$, and for word frequency $F(4, 235) = 1.678$, $p = 0.156$. Finally, it was ensured that there was as little phonological and orthographical (form) overlap as possible between the translation pairs words.

3.3 Procedure

The participants were tested individually. An e-mail with instructions was send to the participants, so they could conduct the experiment by themselves (see Appendix B and C). The instructions were adapted from Roelofs (2020). It was chosen due to COVID-19 social distancing measures to let the participants conduct the experiment on their own. The participants were instructed to do the experiment on a laptop or computer in a surrounding with minimal distractions. The participants were asked to complete three tasks in a fixed order: The language background questionnaire, the translation recognition task and the LexTALE task. Additionally, they received a participant code to fill in in each of the tasks, so the data could be linked anonymously. The first task was to complete a small questionnaire that consisted of 6 questions about personal and language information (see Appendix D). This is also where the participants gave their consent to participate in the study, which is why the questionnaire was put in the beginning of the procedure.

After they finished this, they moved on to OpenSesame for the translation recognition task. The participants were randomly given one of 16 versions of the task to download. For each one of the four lists (which different in the items they included), four different versions were created. The order of the stimuli was different for two of the versions within a list and the button assignment alternated for every other list. Since there were 11 participants in this study, not all versions were actually done. Every list was done at least twice.

The experiment started with an instruction screen. The participants were instructed that they would first see an English word followed by a Dutch word and that their task would be to determine whether the Dutch word was a correct translation of the English word. They were instructed to do so as fast and accurate as possible. To respond, the participants had to press either ‘C’ or ‘N’ on their keyboard. For half of the versions, ‘C’ was for correct trials and ‘N’ for incorrect trials and for the other half of the versions ‘N’ was for correct trials and ‘C’ was for incorrect trials. The participants first did a practice round with five trials to get acquainted with the task. Each trial began with a fixation point in the middle of the screen for 1000 ms, followed by a blank screen for 200 ms, then an English prime for 300 ms, a blank screen for 200 ms and lastly a Dutch target which disappeared with a keypress. The words and fixation marks were white and were put against a black background. The English prime appeared in capital letters, so it would stand out from the target words, as it appeared for a short amount of time. The Dutch target words were in lowercase letters. After the practice round, the actual experiment started. The procedure remained the same. There were two blocks of 36 trials. The participants had the possibility to take a break in between both blocks. Ultimately, the output file had to be sent back to the researcher.

The final task was the LexTALE task, which is a task designed to measure language proficiency based on vocabulary knowledge (Lemhöfer & Broersma, 2012). The task consists of 60 items for which the participants have to decide whether a string of letters is an existing word in English or not. This was deliberately put at the end of the procedure, so the participants would not be primed with English words before the translation task and their feelings about the score would not influence their further performance. A percentage score is calculated by the programme and appeared on screen at the end of the task. The participants had to send this to the researcher, along with their participant number.

3.4 Design and analysis

Response times (in milliseconds) and accuracy scores (in %) of the participants were measured from the translation task. For the analysis of response times, incorrect answers were removed. Response times that were shorter than 200 ms and longer than 1100 ms were labelled as outliers and removed from analysis. This was determined by plotting all of the RTs in a boxplot, where the outliers could be seen. The lower end of the first quartile and the upper end of the fourth quartile were then taken as the cut-off score. In addition to this, response times that were more than 2.5 standard deviations above and below the mean score of an individual participant were removed. A total of 15,3% of the data was removed.

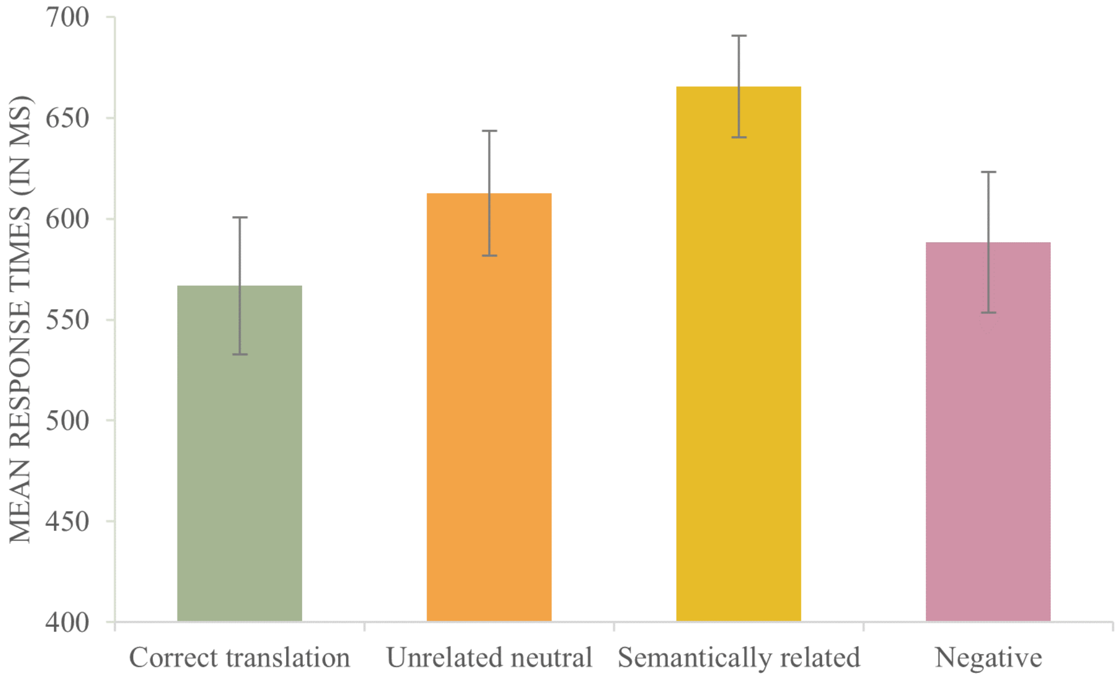
The independent variable in this experiment is the English proficiency score as measured by the LexTALE. The dependent variables are the RTs and the accuracy scores. The data were analysed using the software package IBM SPSS Statistics (version 27). A repeated measures analysis of variance (ANOVA) was carried out to test the differences in mean response times and accuracy scores between the different conditions and also whether English proficiency scores would influence the RTs of the participants. There were three levels in the within-subjects ANOVA: The semantically related condition, the unrelated condition and the negative emotion condition. This was both for the analysis of the RTs and the accuracy scores. In an exploratory manner which was due to the small sample size, the English proficiency scores were afterwards added as a co-variate in the analysis of the RTs and accuracy scores for a between-subjects comparison. The English proficiency scores were treated as continuous variables.

4. Results

4.1 Response times

The mean RTs for the four different conditions are presented in Figure 5 below. The mean response times for correct translation were only included for completeness. Overall, there are differences between the RTs of conditions. The largest RTs were found for the semantically related condition, whereas the smallest RTs were found in the correct translation condition (*M* = 567, *SD* = 118.3). The negative emotion words were responded to somewhat slower than the correct translation pairs, but faster than the unrelated neutral words.

Figure 5. Mean response time (in ms) and standard error per condition.



Note. The correct translation condition was not taken into account for the analysis.

To test the differences in means of the semantically related and negative condition to the mean of the unrelated conditions, a within-subjects ANOVA was performed. There was a significant main effect for condition, $F(2, 20) = 8.404$, $p = 0.002$, $\eta^2_p = 0.457$. Bonferroni paired comparisons indicated that the mean RTs for the semantically related condition (*M* = 665, *SD* = 87.8) was statistically different from the unrelated neutral condition (*M* = 612, *SD* = 107.4) and was significant at $p = 0.035$. However, the negative condition (*M* = 588, *SD* = 121.1) did not significantly differ from the unrelated neutral condition at $p = 0.926$. Taken together, the results suggest that semantically related words interfere with the translation process of words when compared to unrelated words. The magnitude of the mean semantic interference effect is 53 ms. Such an interference effect was not found for the negative words. More specifically, the negative emotion words were recognized faster than the unrelated neutral words which could be seen as facilitation effect (-24 ms) rather than an interference effect, although this was not significant.

In an exploratory manner, the proficiency scores for the English LexTALE were added as extra between-subjects factor in the ANOVA afterwards to investigate whether proficiency played a role during the translation recognition task. This also changed the outcome of the within-subjects analysis, even though the conditions did not change. There was no longer a significant main effect of condition, $F(2, 18) = 0.328$, $p = 0.725$, $\eta^2_p = 0.035$. There was no significant interaction effect for condition and English proficiency, $F(2, 18) = 1.166$, $p = 0.334$, $\eta^2_p = 0.115$. This implies that the English proficiency, based on the scores of the LexTALE, did not affect the participants' speed with which they recognized the translation pairs.

Because of the small sample, it was decided to also zoom in on individual performance. Table 2 below gives an overview of each participant's mean semantic and emotion effect and displays their English proficiency scores. The mean semantic effect was calculated by subtracting the mean RTs for the unrelated condition from the mean RTs from the semantically related condition. The effects show how much longer or shorter on average a participant took to respond to the semantically related condition or the negative emotion condition in comparison to the unrelated neutral condition. A positive score signifies an interference effect, meaning that a semantically related or emotion word took longer to reject than an unrelated word. A negative value implies an overall faster response to the semantically related words or emotion words when compared to the unrelated words, which can be interpreted as a facilitation effect.

From Table 2, it can be deduced that not every participant responded in a similar manner to the stimuli. There was one participant who showed a semantic facilitation effect (participant 3), while the other participants all took longer to respond to semantically related words when compared to unrelated words. While for the emotional stimuli, most participants showed a facilitation effect except for participants 1, 2 and 5. When comparing both effects, the participants were in general faster the respond to negative emotional stimuli than to semantically related stimuli. The only exception is participant 2. Furthermore, from participant 6 onwards a pattern emerges in the data. These participants all show a semantic

Table 2.

English proficiency scores (LexTALE) and the semantic and emotion effect per participant.

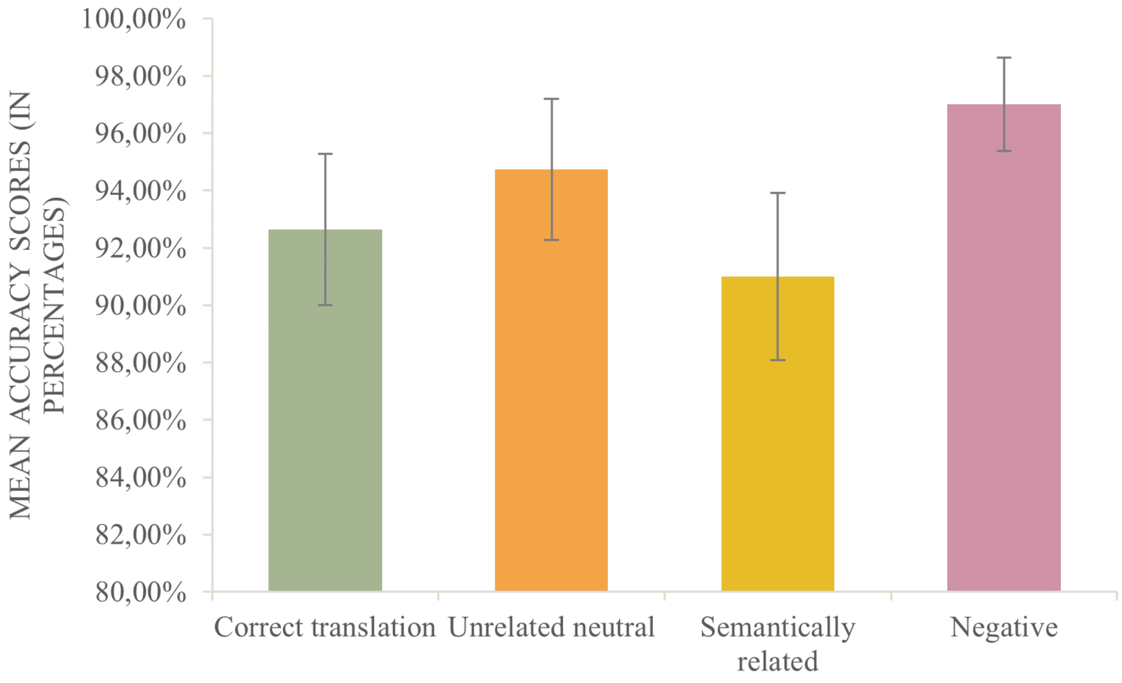
Participant	English proficiency score	Semantic effect	Emotion effect
1	47.50%	42.78	26.22
2	50.00%	66.37	130.62
3	60.00%	-67.80	-168.06
4	60.00%	2.45	-80.30
5	63.75%	150.75	35.15
6	67.50%	84.20	-24.98
7	76.25%	76.78	-14.50
8	77.50%	28.84	-56.66
9	82.50%	107.81	-51.82
10	90.00%	37.82	-33.41
11	97.50%	51.97	-28.28

interference effect ranging from 29 ms to 108 ms and they show an emotional facilitation effect ranging from -57 ms to -15 ms,

4. 2 Accuracy scores

The mean accuracy scores per condition for all the participants are presented in Figure 6 below. For completeness, the correct translation condition was included here. Overall, the mean accuracy was high (*M* = 93.8%. *SD* = 0.25%). The highest accuracy score was found in the negative emotion word condition (*M* = 97%. *SD* = 5.38%). Slightly lower were the accuracy scores for the unrelated neutral condition (*M* = 94.7%. *SD* = 8.18%). the correct translation condition (*M* = 92.6%. *SD* = 8.76%) and the lowest for the semantically related condition (*M* = 91%. *SD* = 9.69%).

Figure 6. Mean accuracy scores (in percentages) and standard error per condition.



Note. The correct translation condition was not taken into account for the analysis.

A repeated measures ANOVA showed that there were no significant differences in mean accuracy scores of the semantically related condition or the negative emotion condition when compared to the unrelated condition, $F(2, 9) = 2.704$, $p = 0.120$, $\eta^2_p = 0.375$. These results suggest that whether the condition type was a semantically related translation, an unrelated neutral translation or a negative translation does not influence the accuracy of the participants' response.

English proficiency was added as a co-variate to test to what extent proficiency plays a role in the accuracy with which the participants responded to the translations. Again, the main effect of the condition was different but still not significant, $F(2, 18) = 1.878$, $p = 0.182$, $\eta^2_p = 0.173$. There was no significant interaction effect of condition and English proficiency, $F(2, 18) = 0.926$, $p = 0.414$, $\eta^2_p = 0.093$. These results suggest that proficiency did not play a role in how accurate the participants' responses of the translations were.

5. Discussion

The aim of the current study was to examine how semantics influence word translation for Dutch-English bilinguals. In specific, how negative emotional stimuli affect the processing of a translation in comparison to semantically related translation pairs. The L1 is typically perceived as the language of emotions while the L2 is more perceived as the language of emotional distance, so a backward translation task was used to test this. The participants had to decide whether the L1 Dutch word was a correct translation of the preceding L2 English word. The translation pairs involved either a correct translation or an incorrect translation. The incorrect translation pairs were a semantically related translation, a negatively valenced word or a semantically unrelated, neutral word. The participants varied in their English proficiency. As an additional factor, English language proficiency was investigated to investigate its influence on the performance of a translation task.

The mean RTs and mean accuracy scores were collected for the three condition types: a semantically related condition (e.g., ‘sugar’ – ‘koffie’), a negative emotion condition (e.g., ‘sugar’ – ‘oorlog’) and an unrelated neutral condition (e.g., ‘sugar’ – ‘herfst’). The unrelated neutral condition served as a control condition for the semantically related and negative emotion conditions. The results demonstrated that for RTs statistically significant differences were found between the semantically related and the unrelated condition. Participants were overall slower to reject semantically related translation pairs. Between the negative condition and the unrelated neutral condition, no statistically significant differences were found. Numerically, however, an interesting difference occurred between the two conditions. It seems that the words in the negative emotion condition were recognized faster than the words in the unrelated neutral condition. This finding could suggest that the negative stimuli elicited a facilitation effect rather than an interference effect. There was no significant interaction between the English proficiency scores of the participants and the mean RTs implying that English proficiency did not influence the speed with which the participants recognized translations. The addition of the English proficiency to the analysis caused the earlier found significant effect to become insignificant. This might have been due to the small sample size of this study.

The mean accuracy scores showed no statistically significant differences between the three conditions which implies that the participants were not influenced by the condition type to accurately or inaccurately reject translation pairs. However, numerically there was an interesting difference between the three conditions. The participants made overall the most errors in the semantically related condition and the least in the negative emotion condition.

Moreover, no statistically significant interaction was found between the English proficiency scores of the participants and the mean accuracy scores. The English proficiency score changed the statistical analysis for the accuracy scores as well, although these were in both instances insignificant. These findings suggest that the correctness of the participants did not differ between conditions and proficiency had no influence on this.

5.1 Semantically related translations

This section focuses on semantically related words, in order to establish the comparison in the research question: *How do negative emotion words as distractor translations influence translation processing in comparison to semantically related translation pairs in a translation recognition task?* It was hypothesized that an interference effect would arise for translation pairs that were related in meaning. A significant semantic interference effect (53 ms) was found that confirms the hypothesis. The bilinguals were slower to reject translation pairs when they were semantically related which is in accordance with previous findings from translation recognition tasks (Altarriba & Mathis, 1997; Talamas et al., 1999; Ferré et al., 2006; Sunderman & Kroll, 2006; Guasch et al., 2008; Guo et al., 2012; Poarch et al., 2015; Ma et al., 2017). It shows that the bilinguals are sensitive to word meaning. The two words are related in meaning so there is a connection between the two, making it harder for the participants to decide whether or not it involved a correct translation. This results in higher processing costs and slower response latencies than words that are semantically unrelated. An interference effect in accuracy scores was absent, which goes against the hypothesis. However, more errors for semantically related translation pairs would have been in line with the interference effect found in the RT data.

5.2 Negative emotion translations

This section discusses the results of the negative emotion condition, to give a definitive answer to the research question: *How do negative emotion words as distractor translations influence translation processing in comparison to semantically related translation pairs in a translation recognition task?* For the negatively valenced words, it was hypothesized that they would be processed differently from the neutrally valenced words. An interference effect of similar magnitude as the semantic interference effect was expected to be most likely because of the emotional intensity of words in the L1, but the results instead tentatively seem to imply faster processing of the negative emotion translation pairs compared to the unrelated neutral translation pairs. It was expected that the participants would make more errors in the negative emotion condition compared to the unrelated neutral condition. For accuracy scores, no significant effects were found despite there being interesting numerical differences that would contradict the hypothesis. The negative emotion translation pairs seem to elicit the least number of errors of all conditions, which might mean that it was not more difficult for the participants to respond to the negative stimuli correctly but that it was obvious that the two words were not related in any way.

In the previous section, the RT data of the semantically related translation pairs were discussed that showed a significant interference effect. In comparison to this, the negative emotion words did not demonstrate a significant interference effect. In fact, it seems that the negative emotion words facilitated word translation because a facilitation effect (-24 ms) was found although this was not significant. It seems that it was easier to reject translation pairs that involved a negative emotion word than neutral words. When comparing this to the semantically related translation pairs, this finding suggests that there was no overlap between the words that interfered with the translation process. This was something that was controlled for by taking into account the semantic distance scores for each of the translation pairs. However, the semantic distance between the word pairs was equal for the unrelated neutral condition (0.88) and the negative emotion condition (0.88). Yet it seems that the negative emotion translation pairs were recognized faster overall than the unrelated neutral pairs, so the lack of semantic overlap might only partially explain why no interference effect was found for the negative emotion pairs.

The other main difference between the translation pairs that might explain the tentative facilitation effect is valence. Valence is used to identify the pleasantness of a word and thus whether it is considered negative, neutral or positive. In this study, positive words were not included. The findings of this study are not in line with the majority of emotional processing studies that have reported slower response latencies for negatively valenced words compared to neutrally valenced words in a lexical decision task (Kuperman et al., 2014; Kazanas & Altarriba, 2015), an Emotional Stroop task (Eilola et al., 2007; Sutton et al., 2007; Eilola & Havelka, 2011), an AST (Altarriba & Basnight-Brown, 2011) and an RSVP task (Colbeck & Bowers, 2012). Negative emotion words often interfere during word processing tasks, but this was not the case for this study.

The results of the current study seem to be more in line with the findings from Kousta et al. (2009), Simcox et al. (2012) and Ponari et al. (2015). In their study, Simcox et al. (2012) found that the English-Spanish bilinguals were more efficient in processing taboo words than neutral words in English, their dominant language. For Spanish, no such differences were found. Kousta et al. (2009) and Ponari et al. (2015) investigated the effects of neutral, negative and positive stimuli with a lexical decision task with L1 and L2 speakers of English. Negative and positive words were responded to faster than neutral words suggesting a facilitation effect for emotion words. Taken together, these three studies imply that the processing of emotional words is faster and more efficient than neutral words.

There is a conflict between the findings of emotional processing studies where some studies find faster processing for negative emotion words, while other studies find an interference effect for the same type of stimuli. Despite these differences, it can be concluded that emotion words are processed differently from other word types. This is the rationale behind the idea put forward by Pavlenko (2008b) who claims that emotion words should be regarded as distinct word types in research, like concrete and abstract words are typically viewed. In their research, Basnight-Brown and Altarriba (2016) have indeed shown that emotion words are processed differently from concrete and abstract words with a translation production task. Although this differed for the L1 and the L2. When translating from the L1 to the L2, the participants were faster to translate concrete words than abstract and emotion words. Whereas in the L2-L1 direction, concrete and emotion words were translated faster than abstract words.

When focussing on the different kinds of tasks and what emotional effects they found, it appears that some tasks are more successful for finding interference effects. Emotional Stroop tasks typically find a Stroop interference effect with negative words and/or taboo words (Eilola et al., 2007; Sutton et al., 2007; Eilola & Havelka, 2011). Another task that has found longer response latencies for taboo words is an RSVP task (Colbeck & Bowers, 2012). However, for lexical decision tasks, the findings are rather mixed. On the one hand, Kousta et al. (2009) and Ponari et al. (2015) found that negative words were recognized faster than neutral words. And on the other hand, Kuperman et al. (2014) and Kazanas & Altarriba (2015) demonstrated slower response latencies for negative words than for neutral words. Furthermore, a word naming study by Simcox et al. (2012) found that taboo words were processed more efficiently than neutral words. It seems that tasks that test inhibition (i.e., Stroop and RSVP), where participants have to ignore task-irrelevant information, produce a robust emotional interference effect. Whereas word recognition studies (i.e., lexical decision tasks and word naming tasks), where participants generally attend to word meaning, have found mixed results. This suggests that participants are less successful at inhibiting emotional content when during an inhibition task than a word recognition task. The current translation recognition study fits within the category of word recognition studies which is in accordance with the mixed findings of these types of tasks.

There are no models that explain how emotion words are processed nor how the different emotion word types are processed. Emotional processing studies have used different emotion word types making it difficult to compare them. Some studies specifically included only emotion-label words (Sutton et al., 2007; Basnight-Brown & Altarriba, 2016), while most studies did not differentiate their stimuli according to the different stimulus types (Eilola et al., 2007; Kousta et al., 2009; Eilola & Havelka, 2011; Kuperman et al., 2014; Ponari et al., 2015). The studies by Altarriba and Basnight-Brown (2011) and Kazanas and Altarriba (2015) have looked at how emotion-label (e.g., 'anxious' or 'happy') versus emotion-laden words (e.g., 'shark' or 'butterfly') are processed but found conflicting results. On the one hand, Altarriba and Basnight-Brown (2011) found that emotion-laden words produced stronger Simon effects, so they were more interfering for the participants. For emotion-label words, there was not always an effect found and when there was an effect, it was less strong. On the other hand, the findings by Kazanas and Altarriba (2015) provide evidence that emotion-label words were more interfering than emotion-laden words during a primed lexical decision task.

Such information should be taken into consideration when creating a model for how emotionality influences word processing. First of all, the hypothetical model should distinguish between words with negative, positive and neutral valence. It should also be more clearly defined what valence is considered negative, positive or neutral. Another possibility is that the valence should be treated as on a continuum. Secondly, it should take into account how arousal, the extent to which a word is intense or not, because some words may evoke more feelings than others. Kuperman et al. (2014) reported that words with higher arousal were processed slower, although valence played a larger role during word processing. The interaction between valence and arousal might become a crucial aspect of the hypothetical model. For example, how words with negative valence and high arousal impact processing compared to words with positive valence and high arousal and so on. It should also take into account which type of emotion word is dealt with, an emotion-label or emotion-laden word. Finally, the language in which the words are presented matters for bilingual speakers. How emotionally intense words are perceived can also depend on language dominance, language proficiency and the age of acquisition of the different languages (Dewaele, 2004; Sutton et al., 2007; Simcox et al., 2012; Basnight-Brown & Altarriba, 2016).

It is generally found that taboo and swear words (e.g., 'bitch') elicit the strongest reactions by the participants when compared to positive, negative and neutral stimuli. They fall under the emotion-laden words (Pavlenko, 2008b) but have low valence and high arousal scores, meaning that they are perceived as unpleasant and intense words. Several studies have included taboo and swear words in their design. When both taboo and negative words were included in the research design, the taboo words elicited longer response latencies or stronger interference effects than the other stimuli (Eilola et al., 2007; Eilola & Havelka, 2011; Colbeck & Bowers, 2012) or even higher levels of SCR (Eilola & Havelka, 2011; Simcox et al. 2012). Perhaps the reason that this research did not find an interference effect is that the words were not emotionally intense enough like taboo and swear words. Taboo and swear words are more intense or insulting. For example, the word *gevangenis* (jail) has negative associations for most people because its valence was rated at 2.08. However, the word may become more emotionally laden for people that have experienced what it is like to have family members or that have been in jail themselves compared to people who do not have such experiences. This is in line with the ideas of Pavlenko (2008b) who says that emotions are attached to words through experience. This would be problematic for a hypothetical model about affective processing because it is impossible to consider every personal experience word. Instead, it would focus on the mean associations with that word.

In short, it can be said that the negative emotion translation pairs and the semantically related translation pairs were not processed similarly. The semantically related translations interfered with the translation process and no significant effect was found for the negative translation pairs. About the precise difference, nothing conclusive can be said because of the insignificant data but it tentatively seems that the negative emotion words facilitate the translation speed.

5.3 English language proficiency

The English proficiency scores of the participants were measured by a LexTALE task. This was added as an additional factor in the analysis to answer the second research question: *To what extent does English proficiency influence the performance of the translation recognition task?* The participants varied in their English proficiency (range: 47.50% - 97.50%). According to Lemhöfer and Broersma (2012), a score below 60% indicates proficiency Common European Framework (CEF) level B1 or lower, which is lower intermediate. A score between 60% and 80% refers to CEF level B2 which signifies upper intermediate level and a score above 80% refers to CEF levels C1 and C2 which are the most advanced.

It seems, however, that there is no influence of English proficiency on the mean RTs and accuracy scores of the different conditions. This is in agreement with the findings of Altarriba and Mathis (1997) and Poarch et al. (2015). Their studies found no differences in semantic interference between novice L2 learners and highly fluent bilinguals. Sunderman and Kroll (2006) similarly found no differences in the semantic interference effect of the bilinguals, but a form interference effect was only present for the less proficient English-Spanish bilinguals. Somewhat more conflicting results have also been found. The studies by Ferré et al.(2006) and Guasch et al. (2008) found evidence for form interference and semantic interference for early and late highly proficient bilinguals. The non-proficient bilinguals, who were beginning L2 learners, showed a form interference effect and no interference on semantically related pairs. Talamas et al. (1999) found semantic and form interference for both groups. Interestingly, the semantic interference was greater for the more proficient L2 learners whereas the form interference was greater for the less proficient L2 learners.

A significant interference effect was found for the semantically related condition. The participants differed in their English proficiency scores, but the interference effect shows that they were generally sensitive to word meaning. This was true for all participants except participant 3. According to the RHM (Kroll & Stewart, 1994), this is something that should only be possible for advanced L2 learners whereas some participants scored CEF B1 level which is labelled as lower intermediate level. The BIA-d (Grainger et al., 2010) provides a more detailed model of the L2 learning process. It is only at the beginning stages that learners do not conceptually mediate words and rely on translation to the L1. After some time and practice, the BIA-d holds that learners should be able to retrieve semantic information from L2 directly even though this may still be a weak link. The BIA-d is a more suitable approach in explaining the semantic effect that was found for the participants, from the less proficient to the more proficient L2 English speakers. It is unclear how long the participants in the present study have been learning English. Based on the English proficiency levels that were not below CEF level B1 and the fact that English is an obligatory part of the curriculum in secondary education in the Netherlands, it is probable that the participants started learning English at least at the age of 12. Consequently, this would mean that the youngest participant has at least been exposed to English for 6 years. They would at least be at the third stage where the conceptual links are present but might still be weak. The participants with a score above 80% might even be at the latest stage where conceptual mediation is strong. Additionally, more translation recognition studies have found evidence for semantic sensitivity for less fluent bilinguals (Sunderman & Kroll, 2006; Guo et al., 2012; Ma et al.,

2017) and even novel L2 learners (Altarriba & Mathis, 1997; Poarch et al., 2015). In a post-hoc comparison, Talamas et al. (1999) found that the less proficient group was sensitive to translation pairs that were closely related in meaning but not to less closely related pairs.

However, when looking at the individual mean semantic and emotion effects in combination with the proficiency scores in English (Table 2), an interesting pattern can be found in the data. From participant 6 till participant 11, the participants show a somewhat stable pattern in regard to the semantic and emotion effect. All of them show a semantic interference (from 29 ms to 108 ms) and an emotional facilitation effect (from -57 ms to -15 ms). This might suggest that the other participants paid less attention to the meaning of the words or were less sure about the meaning of some words. Although a translation recognition task should be suitable for beginning L2 learners because it requires no production abilities (de Groot & Comijs, 1995) and words were controlled on frequency. Besides that, all of the participants demonstrated a smaller emotion effect than semantic effect except for participant 2. So, they seemed to experience to some extent interference from words that are related in meaning compared to unrelated words.

In conclusion, there was no significant interaction effect of proficiency found with the RT and accuracy data. The study does show that lower intermediate L2 learners until advanced L2 learners can experience interference due to semantically related words. As for the emotion effects, no conclusions can be drawn despite the fact that the more advanced bilinguals did seem to show a somewhat stable pattern regarding emotional facilitation.

5.4 Limitations and suggestions for future research

The current study is one of the few studies on affective processing that did not find an interference effect for negative emotion words. However, its findings should be interpreted with caution as the majority of the results were mainly found to be insignificant, except for the semantic interference effect. This was due to the small sample size which also caused the results to differ per analysis. Research with a larger sample size is needed to validate these findings so stronger conclusions can be drawn in regard to how distracting negative emotion words are. Based on the findings, it cannot be concluded whether the translation recognition task is a useful method for affective processing studies. Nevertheless, it might be worth replicating this study as some interesting preliminary results were found.

Another limitation of the current study is that it did not include a forward translation direction where participants had to decide whether an English word involved a correct or an incorrect translation of a Dutch prime. Due to time constraints, the focus was solely on backward translation. Further research is needed on this in order to find evidence for or against translation asymmetry. The current study cannot say anything about the translation asymmetry as predicted by the RHM (Kroll & Stewart, 1994) or how the BIA-d (Grainger et al., 2010) might account for this. This would provide more information on how L2 learners process word translations and how sensitive they would be to distractor words in the L2 since now the distractors were manipulated in the L1 only.

In the case of a forward translation design, the L2 stimuli would be presented as the distracting information. This would provide more information about how negative emotion words are represented differently, if at all, in the L1 and the L2. The L1 is generally the language of emotional intensity while the L2 is perceived as a more emotionally distant language (Dewaele, 2004). Evidence for this was found by Colbeck and Bowers (2012) who found that native English speakers made more errors than L2 English speakers when attending to English taboo and neutral words in an RSVP task. In addition to this, Eilola and Havelka (2011) conducted an emotional Stroop task with native speakers of English and Greek-English bilinguals. Despite that the behavioural data did not reveal differences between the groups, it was only the native speakers who showed elevated SCRs to the taboo words. Basnight-Brown and Altarriba (2016) found that emotion words were processed differently when translating from the L1 to the L2 compared to translating from the L2 to the L1. L2 emotion words elicited faster translations than emotion words in the L1. However, from the results of the current study it seems that the negative emotion words speed up the recognition word translation. It would be interesting to see how L2 emotions words are processed in comparison to this. Perhaps the L2 words are processed like neutral words because in order to establish emotional associations with a word, it needs to be experienced in the L2 (Pavlenko, 2008b). If this would be true, this would confirm the idea that the L2 is the language of emotional distance.

Another possible direction for future research concerns the stimuli. First and foremost, taboo and swear words might serve as an interesting type to include in a translation recognition task as distractors. Less so in a production task, because many taboo or swear words do not directly translate into another language. Some research has also shown interference effects for positively valenced words (Altarriba & Basnight-Brown, 2011) or a facilitation effect (Kousta et al., 2009; Kuperman et al., 2014; Ponari et al., 2015). Secondly, a clear distinction in future research should be made between emotion-label and emotion-laden words to find out how they are processed differently.

6. Conclusion

The main aim of this thesis was to investigate how the semantics of negative emotion words as incorrect translations influence the performance on a translation recognition task compared to semantically related translation pairs. Secondly, it was explored how the English proficiency of the Dutch-English bilinguals affected their performance. A backward translation paradigm was conducted to test these topics. The study's findings show that participants were slower to reject semantically related translation pairs than unrelated pairs. For negative emotion translation pairs, there was no significant effect so it can be concluded that a connection between two translations is more interfering than the emotionality of a word. It seems, however, that negative emotion words were processed slightly faster than neutral words, but more research is needed on this for a definitive answer. The participants did not appear to differ in how correctly they responded to the different translation pairs. Finally, the results show that English language proficiency did not play a role in the speed or accuracy with which the participants responded to a task.

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Appendix A: Stimuli

English prime	Correct translation	Semantically related translation	Unrelated neutral translation	Negative emotion translation
curtain	gordijn	venster	schouder	ongeluk
sugar	suiker	koffie	herfst	oorlog
bottle	fles	glas	teen	rouw
paint	verf	schilder	voertuig	misbruik
notebook	schrift	papier	kikker	vijand
dark	donker	schaduw	tonijn	werkloos
brush	borstel	spons	pijp	ruzie
mirror	spiegel	gezicht	oogst	heimwee
breath	adem	long	zaal	spin
truth	waarheid	geheim	ladder	rommel
donkey	ezel	kameel	patroon	ontslag
awake	wakker	alert	simpel	lelijk
sensitive	gevoelig	verlegen	goedkoop	blind
lawyer	advocaat	kantoor	voorkeur	hoofdpijn
thumb	duim	nagel	toren	boete
attic	zolder	schuur	regel	koorts
clothes	kleding	schoen	vulkaan	schimmel
carrot	wortel	gember	knoop	wapen
distance	afstand	meter	fabriek	vuilnis
future	toekomst	morgen	tapijt	nadeel
language	taal	woord	golf	ramp
soft	zacht	stevig	normaal	eenzaam
wood	hout	zaag	noot	dief
stairs	trap	gebouw	masker	honger
writer	schrijver	bladzijde	televisie	gevangenis
evening	avond	ochtend	tijger	asiel
honest	eerlijk	trouw	steeds	failliet
city	stad	buurt	brein	griep
spoon	lepel	soep	fluit	moord

soccer	voetbal	basketbal	standbeeld	depressie
map	kaart	kompas	borrel	wraak
hill	heuvel	natuur	honing	paniek
spring	lente	seizoen	persoon	afscheid
knight	ridder	kasteel	wereld	orkaan
weather	weer	regen	kaars	schuld
key	sleutel	deur	kaas	schade
chair	stoel	tafel	kopie	kogel
stove	fornuis	keuken	monnik	probleem
bush	struik	boom	sjaal	traan
herbs	kruiden	peper	toestel	zielig
dentist	tandarts	beugel	vierkant	gevaar
month	maand	week	anker	gif
tail	staart	snavel	noord	wrak
chalk	krijt	stift	toets	stank
lawn	gazon	groen	krant	brand
pub	kroeg	bier	vijver	sigaret
blanket	deken	matras	vleugel	onkruid
cloud	wolk	lucht	adres	jaloers

Filler items

English prime	**Correct translation**
pig	varken
traffic	verkeer
small	klein
monastery	klooster
mood	humeur
ceiling	plafond
bucket	emmer
century	eeuw
suitcase	koffer
mountain	berg
country	land

innocent	onschuldig
rabbit	konijn
spicy	pittig
customer	klant
border	grens
farmer	boer
butcher	slager
closet	kast
lobster	kreeft
yellow	geel
locker	kluis
powerful	machtig
strange	vreemd

Appendix B: E-mail instructions

Beste deelnemer,

Leuk dat je mee wilt doen aan mijn scriptie onderzoek! Het zal niet meer dan een kwartier van je tijd in beslag nemen. Zorg ervoor dat je dit op een rustig moment doet wanneer je weinig afleiding hebt. Lees de volgende instructies goed door voordat je begint. Dit onderzoek bestaat uit drie verschillende onderdelen. Ik wil je vragen om ze ook in deze volgorde te doen:

(1) Voordat je aan het werkelijke experiment begint, wil ik nog wat achtergrondgegevens van je weten. De vragenlijst vind je hier: https://radboudletteren.eu.qualtrics.com/jfe/form/SV_djwPwDpNanIwpEi

(2) Deel twee is het experiment in OpenSesame. Dit is een vertaaltaakje met Engelse en Nederlandse woorden. Uitleg over hoe je OpenSesame download en gebruikt, vind je in het word document dat bij deze e-mail zit. Vergeet niet om de uiteindelijke output terug naar mij te sturen.

(3) Als laatste wil ik je vragen om een LexTale test te maken. De instructies van dit taakje vind je in hetzelfde word document. De LexTale vind je hier: http://www.lextale.com/takethetest.html

Hieronder staat jouw participantnummer. Dit gebruik ik om alle gegevens geanonimiseerd op te slaan, zodat ze niet te herleiden zijn naar jou. Het is belangrijk dat je deze bij elk van de drie onderdelen invult, omdat ik anders de data niet aan elkaar kan koppelen. Alle data worden opgeslagen op mijn laptop tot eind augustus in een beveiligde map.

Jouw participantnummer: **XXX**

Mocht je nog vragen hebben, kun je die gerust stellen. Alvast heel erg bedankt voor je deelname en veel succes!

Met vriendelijke groet,

Aniek Ebbinge

Appendix C: Attachment with instructions (adapted from Roelofs, 2020)

Hoe gebruik ik: OpenSesame

OpenSesame is een softwareprogramma waarmee het experiment wordt uitgevoerd. Het is de bedoeling dat je het programma gaat downloaden op je computer of laptop. Het downloaden van dit programma is (natuurlijk) legaal en kost geen geld. Na het uitvoeren van het experiment kan je het programma weer van je harde schijf verwijderen. Lees alle stappen goed door voordat je begint aan het experiment. Het downloaden van het programma kan even duren.

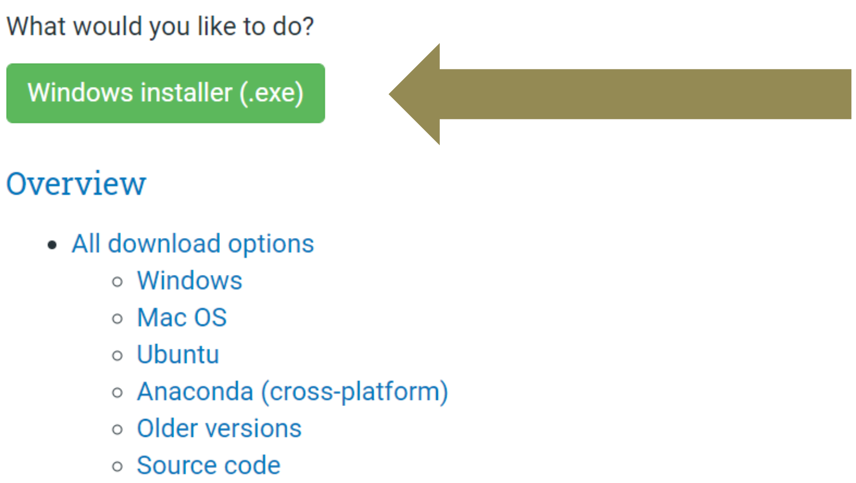
Stap 1……………………………………………………………………………………

Om OpenSesame te downloaden ga je naar de volgende website:
https://osdoc.cogsci.nl/3.2/download

Stap 2……………………………………………………………………………………

Je ziet dan een groene knop waarmee je het programma kunt downloaden.

Komt *'Your recommended download'* niet overeen met jouw type computer/laptop? Onder de groene knop zie je een overzicht van alle downloadopties:

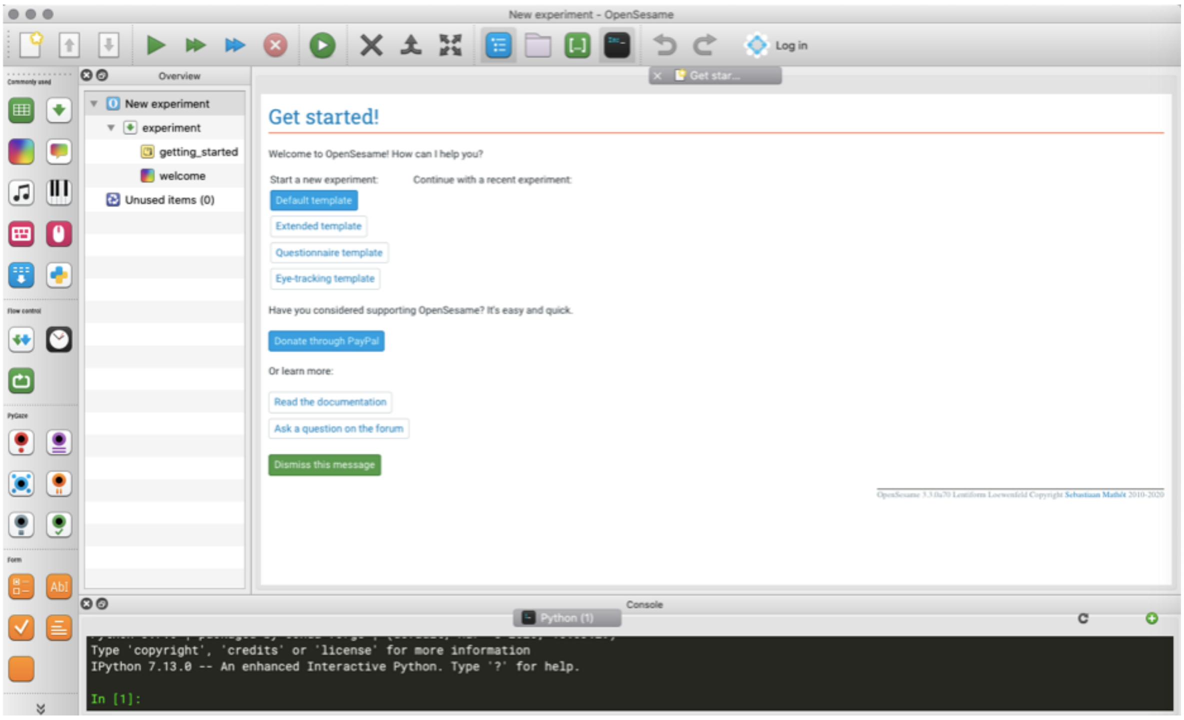


Stap 3……………………………………………………………………………………

Kies de juiste versie (aan de hand van jouw computer of laptop) en download het programma. Zorg ervoor dat je het programma opslaat op een plek waar je het later terug kunt vinden. Het programma is te herkennen aan het volgende logo.

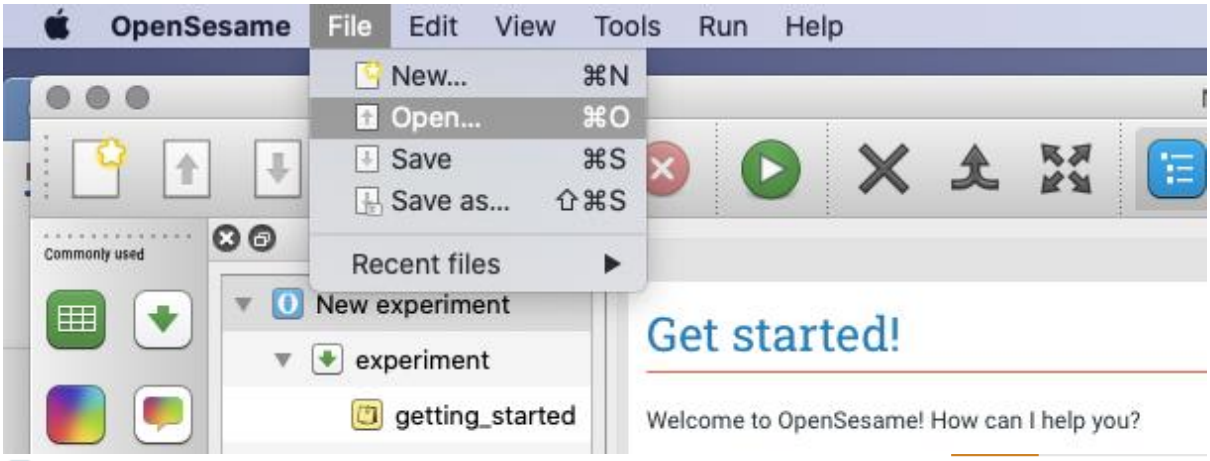
Stap 4………………………………………………………………………………………

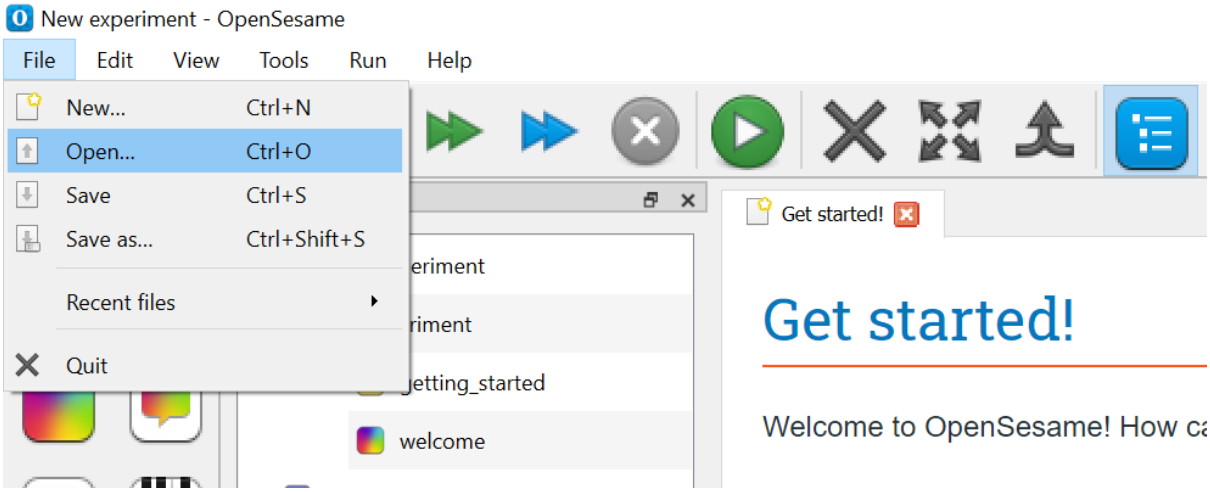
Open het programma door op het logo te klikken. Je krijgt dan het volgende scherm te zien:



Stap 5………………………………………………………………………………………

Van Aniek heb je al een OpenSesame-bestand ontvangen. Je zorgt er allereerst voor dat je deze opslaat op je computer of laptop, wederom op een plek waar je hem gemakkelijk terug kunt vinden. Het is nu de bedoeling dat je dit bestand in gaat lezen. Om dit te doen, klik je op de volgende knoppen: File, Open. Onderstaande afbeeldingen zijn gemaakt op een MacBook en een laptop met Windows.





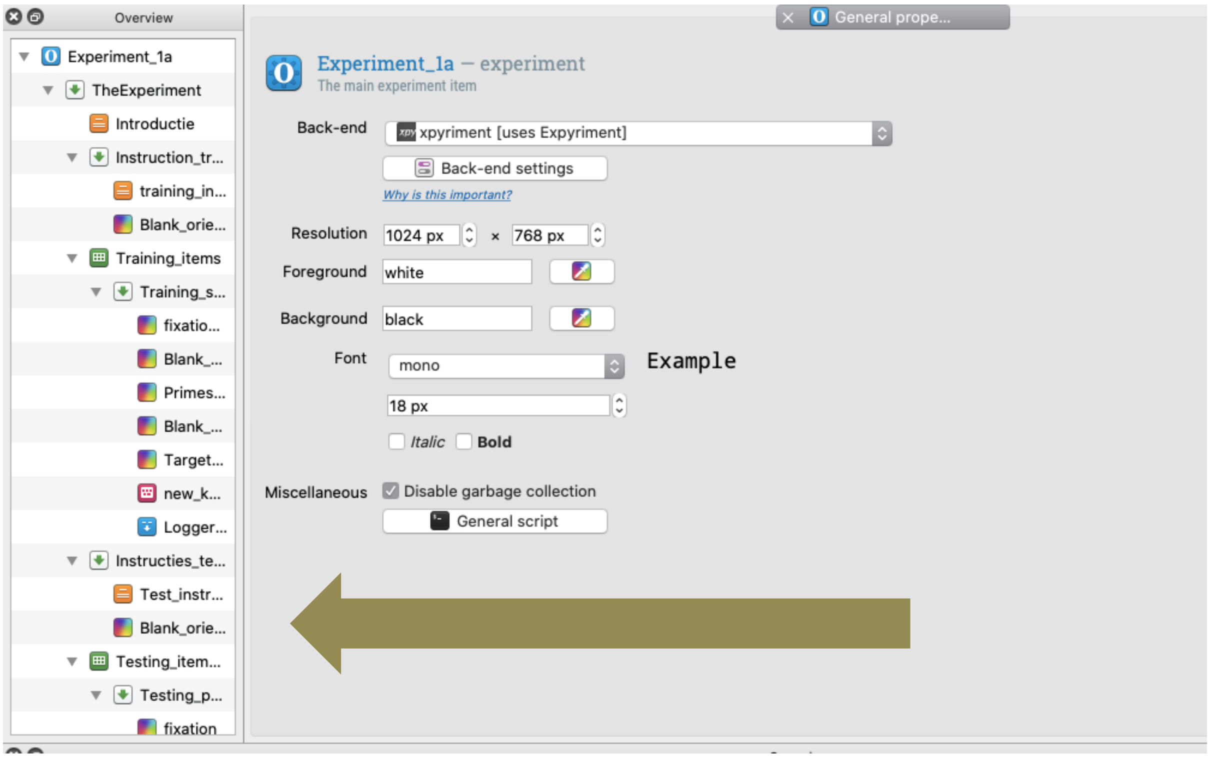
Nadat je op ‘Open’ hebt geklikt, krijg je een scherm waarin je het juiste bestand aan kunt klikken. Dit is het bestand wat je eerder van Aniek hebt ontvangen, met de volgende naam: Scriptie_Experiment_XX.

Selecteer het juiste bestand en klik op ‘Open’.

Stap 6……………………………………………………………………………………

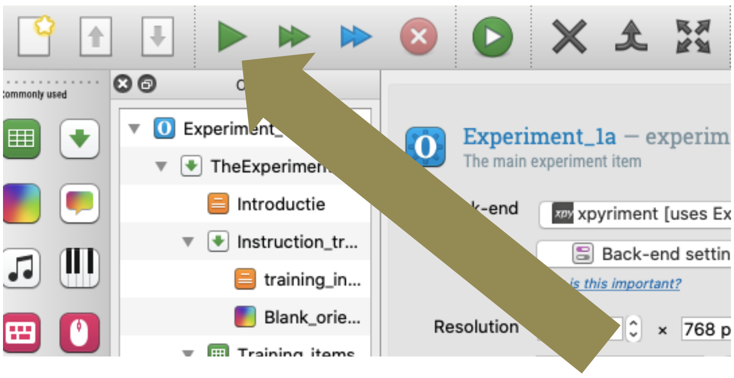
Het juiste bestand wordt nu ingeladen in OpenSesame. Als het goed is, veranderd de lay-out van de Overview van OpenSesame, en zie je allerlei icoontjes met bijbehorende namen aan de linkerkant van het scherm, zoals op onderstaande afbeelding.

LET OP! HET IS ENORM BELANGRIJK DAT JE **NIET** ZELFSTANDIG OP DEZE ONDERDELEN KLIKT. SCROL ER NIET DOORHEEN EN **BLIJF VAN DIT OVERZICHT AF.**



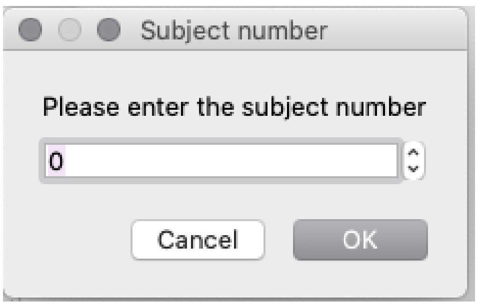
Stap 7…………………………………………………………………………………………

Klik op de groene startbutton aan de bovenkant van het programmascherm.



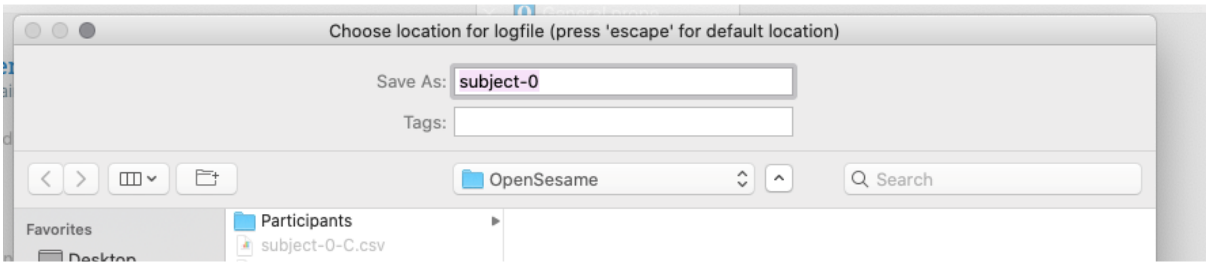
Je krijgt dan de volgende de vraag om een *subject number* in te vullen.

Let op! Vul NIET zelf een willekeurig nummer in. Van Aniek heb je een nummer gekregen. Deze vul je hier in.



Stap 8……………………………………………………………………………………

Vervolgens krijg je een scherm waar je aangeeft waar je de uiteindelijke output van het experiment opslaat. Let hierbij op het feit dat je de uiteindelijke output opslaat onder de volgende naam: subject-[jouwnummer]. Zorg er wederom voor dat je de output opslaat op een plek waar je het later makkelijk terug kunt vinden.

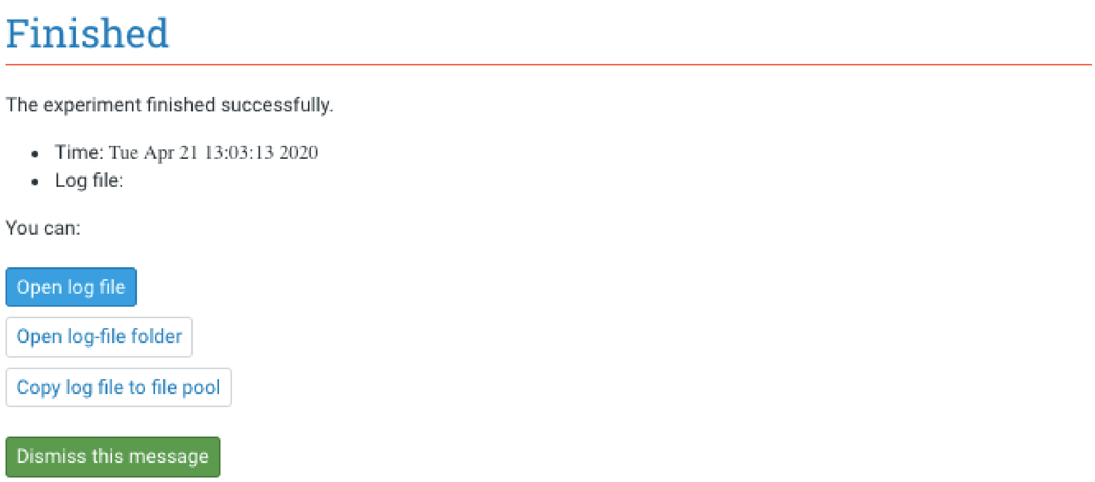


Stap 9……………………………………………………………………………………

Zodra je op 'Safe' of 'Opslaan' hebt geklikt, begint OpenSesame met de voorbereidingen van het starten van het experiment. Dit kan een paar seconden tot een minuut duren en het experiment start hierna automatisch. Wacht rustig tot het experiment wordt opgestart. Volg daarna de instructies op het scherm.

Stap 10……………………………………………………………………………………

Wanneer het experiment is afgelopen sluit het zich automatisch af en kom je terug naar het beginscherm van OpenSesame. Je ziet dan het volgende scherm voor je:



Klik op de knop 'Open log-file folder' zodat je kunt zien waar jouw output is opgeslagen. Het bestand met jouw output stuur je terug naar Aniek via het e-mailadres: aniek.ebbinge@student.ru.nl

Hoe gebruik ik: LexTale

LexTale is een korte test die aan de hand van korte vragen een score geeft van jouw taalniveau. Om een accuraat beeld te krijgen van jouw niveau van Engels, vraag ik je om dit testje uit te voeren. Onthoud hierbij dat het niet uitmaakt of jouw score 'hoog' of 'laag' is. Lees alle stappen goed door voordat je begint aan de LexTale test.

Stap 1……………………………………………………………………………………………

Ga naar http://www.lextale.com/takethetest.html en klik op *Start LexTALE*.

Stap 2……………………………………………………………………………………………

Vervolgens krijg je een keuzescherm. Kies voor: *English*.

Stap 3……………………………………………………………………………………………

Let op! Bij *Participant Name* vul je je **NIET** eigen naam in. Hier vul je 'Participant' gevolgd door het nummer in wat je van Aniek hebt ontvangen (dus geen willekeurig nummer). Bijvoorbeeld: Participant 085.

Bij *Email Address* vul je het volgende e-mailadres in: aniek.ebbinge@student.ru.nl

Indien je zelf ook benieuwd bent naar het resultaat, kan je hierna ook je eigen e-mailadres invullen.

Stap 4……………………………………………………………………………………………

Lees de instructies goed door voordat je aan de test begint. Als je de instructies begrijpt, klik je op *Start Test.* De LexTale taak zal dan beginnen zoals voorgeschreven in de instructies.

Heel erg bedankt voor het deelnemen aan het experiment!

Appendix D: Questionnaire

Je neemt deel aan een MA scriptie onderzoek over het vertalen van woorden van het Engels naar het Nederlands. Voordat je aan het echte experiment begint, is er eerst deze korte vragenlijst waarin je wordt gevraagd om wat achtergrond gegevens te delen. Je gegevens zullen alleen voor het onderzoek gebruikt worden en worden geanonimiseerd. De data zullen worden opgeslagen op een laptop in een beveiligde map tot eind augustus. Je kan op elk moment besluiten om met het onderzoek te stoppen, zonder een reden op te geven. Je gegevens zullen dan verwijderd worden. Mocht je nog vragen hebben, neem dan contact op met: *aniek.ebbinge@student.ru.nl*

Als je doorgaat, ga je akkoord met de volgende voorwaarden:
- Ik heb uitleg gekregen over het onderzoek.
- Ik kan vragen stellen over het onderzoek.
- Ik neem vrijwillig aan het onderzoek deel.
- Ik begrijp dat ik op elk moment tijdens het onderzoek mag stoppen als ik dat wil.
- Ik begrijp hoe de gegevens van het onderzoek bewaard zullen worden en waarvoor ze gebruikt zullen worden.
- Ik stem in met deelname aan het onderzoek zoals beschreven in de informatie die ik voorafgaand aan het onderzoek heb gekregen.

○ Ja, ik neem deel aan dit onderzoek
○ Nee, ik neem niet deel aan dit onderzoek

1. Wat is jouw participantnummer? Deze heb je gekregen in de mail met instructies.

____

2. Wat is je leeftijd?

____

3. Wat is je geslacht?

○ Man
○ Vrouw
○ Anders
○ Zeg ik liever niet

4. Wat is je hoogst genoten opleiding?

- ○ Basisschool
- ○ Middelbare school
- ○ MBO
- ○ HBO
- ○ WO

5. Wat is je meeste recente opleiding (dit mag ook de opleiding zijn die je nu volgt)?

- ○ Basisschool
- ○ Middelbare school
- ○ MBO
- ○ HBO
- ○ WO

6. Wat is/zijn je moederta(a)l(en)?

____

7. Welke talen spreek je nog meer?

____

8. In welke taal ben je op dit moment dominant? Dit betekent de taal die je het meest gebruikt in je dagelijks leven.

____