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The effect of rhyme and cohort priming on spoken word recognition

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Abstract
In this experiment, we examined the effect of phonological priming by means of an auditory lexical decision task. There is evidence for competition at word activation level during spoken word recognition. Two spoken word recognition models will be discussed and compared: the Cohort model (Marslen-Wilson & Tyler, 1980) and the TRACE model (McClelland & Elman, 1986). Both argue that bottom-up activation occurs, which means that phonemes activate lexical access. However, the TRACE model accounts for top-down expectations and the non-linear direction of activation. We will test both models by means of Dutch stimuli that are either matching in rhyme (pin-zin), matching in cohort (zit-zin) or unrelated (tas-deur). We obtained a significant difference between the response time to cohort- and rhyme-related targets. Participants responded on average 48 ms faster (SE = 15 ms) to rhyme-related targets than to cohort-related targets. The conclusion is, therefore, that the results support the TRACE model because this model allows for continuous mapping. Contrarily, a stronger rhyme priming effect is not explained by the Cohort model.

1. Introduction

1.1 Aging and cognitive decline
To understand spoken language, listeners have to segment words from continuous speech. However, people do not make full breaks after each spoken word and articulation is influenced by a lot of processes like co-articulation, assimilation and phoneme-deletion. Therefore, the acoustic information in speech is quite diverse. Nevertheless, our brains receive the acoustic information via our ears, process it and recognize words. How this process of word recognition exactly works is still unknown and more research is required to collect more pieces to this puzzle. One way of doing this is by monitoring the effects that different priming conditions have on the speed of spoken word recognition. As quite some research has been done on this subject, it is interesting to compare the possible differences phonological priming may have depending on the language of the listener. The current paper examines the effects of rhyme priming and cohort priming on spoken word recognition of monosyllabic Dutch words in a lexical decision task.

2. Theoretical background

2.1 Spoken word recognition
The core of research on spoken word recognition is finding out how strings of sounds get mapped onto meanings. In other words, a string of sounds, like /dɔːɡ/ for example, reaches one’s ears, then the sounds are processed and one’s brain finds an entry in the lexicon that
matches the sounds of the string. However, research has found that not just this particular entry, dog, will be activated, but that words similar to dog will be co-activated as well (e.g. Neely, 1977). There is evidence that words are recognized faster if the word pairs are phonologically or semantically related (e.g. Neely, 1977). So, /dɔːɡ/ also activates cat (semantically) and fog (phonologically) for instance. This very phenomenon can tell us more about what happens during word recognition and is often utilized in experiments through priming. One direct way of testing the speech recognition speed is via an auditory lexical decision task, which is the method used in the current study. The task of the participants is to decide whether the second word of each pair is an existing word or not. The first word of the pair, also referred to as the prime word, can have effects on the speed of recognition of the second word of the pair, the target word. For example, if the two words of a pair are semantically related, response time to the second word will be faster than if the words were semantically unrelated (e.g. Ferrand & New, 2003). To illustrate this, the pair dog - cat will give faster response times than the pair dog - key.

Using the data gathered from research, multiple attempts to describe the process of spoken word recognition using models have been made (e.g Marslen-Wilson & Tyler, 1980; McClelland & Elman, 1986). As this paper will focus on phonetic priming, we will compare two models that specifically attempt to explain (co)activation of a word in chunks based on phonological input: the Cohort model and the TRACE model.

2.2 COHORT MODEL

According to the Cohort model (Marslen-Wilson & Tyler, 1980), the brain makes selections of possible words, named cohorts, while it receives auditory input. First, the initial phoneme of a word is received and processed. Based on the phonemes that are processed through time, a set of words (also referred to as cohort) is activated. For example, the phoneme cluster /kæn/ activates candle, can, cancel and other words starting with the same phonemes. Then, the following phoneme /d/ inhibits the activation of can and cancel. Out of these three word candidates, candle remains.

In short, the three stages of this model are Access, Selection and Integration. First, during the Access stage, the auditory input of phonemes reaches the ear of the hearer. Then secondly, depending on the phonemes the hearer has heard, the mental lexicon gives a cohort of candidates that start with the same phonemes. The more phonemes one hears of a word, the smaller this cohort becomes. This is called the selection stage. Finally, when one has heard the entire word, only one word option remains. The semantic and syntactic properties of this word are then integrated into the high-level representation of the context.

Marslen-Wilson and Zwitserlood (1989) performed a Dutch cross-modal lexical decision task in which visual target words were primed by auditory stimuli. All prime words were similar in rhymes with words that were semantically associated with the visual targets. For example, the participants heard woning (house) before seeing the word bij (bee), which is semantically related to honing (honey). So there is a phonological association between the auditory word and the semantically associated word to the visual target. In another
study by Marlsen-Wilson, Brown and Zwitserlood (1989, in Marlsen-Wilson & Zwitserlood, 1989) the same experiment was done with prime words that were similar in word onsets; participants heard kapitein (captain) before seeing the word geld (money), which is semantically related to kapitaal (capital). They found that words with the same onset were effective cross-modal primes. Marlsen-Wilson and Zwitserlood compared their results with the results of that study. They found that word rhymes did not result in faster recognition of the visual probes. Therefore, they conclude that word onsets have a special status in word recognition, which is in favor of the Cohort model.

2.3 TRACE model
Contrary to the Cohort model, the TRACE model (McClelland & Elman, 1986) does not look for exact matches of phonemes specifically in a forward sequence. It allows continuous mapping and tries to account for variability of phoneme quality. In the TRACE model, multiple words are activated depending on similarity and frequency and activated words compete for recognition, similar to the Cohort model. The TRACE model has three layers of speech, namely the feature, phoneme and word layers. These layers pass information between each other and, within each layer, units compete for recognition.

Figure 1 shows a diagram of the TRACE model. First, acoustic input of a spoken word enters the feature layer and is processed. Second, the acoustic information is passed to the phoneme layer, in which the phoneme is amongst competitors. Third, when a phoneme is recognized, the phoneme information is passed onto the word layer. In this layer, possible words compete for recognition. This manner of initial activation is called bottom-up or feedforward activation. In addition, the TRACE model also contains a top-down or feedback manner of activation. For instance, due to interference from background noise, it is possible to miss the first phonemes of a spoken word, but the word can still be understood due to the context of the word. The Cohort model does not include this top-down activation and, therefore, has no explanation for recognition by final phonemes.

Evidence for continuous mapping was given by Allopenna, Magnuson and Tanenhaus (1998) through an eye-tracking experiment in a spoken-word recognition task. The participants heard a word, while they were looking at pictures. The authors found that the participants made a considerable number of fixations on phonological competitors (cohort and rhyme) of the target image. This revealed that not only cohort-related but also rhyming words provide interference. Bottom-up information from the visual cues interacts, thus, with top-down information from the auditory word, which is in line with the TRACE model.

Those results are supported by Norris, McQueen and Cutler (2002), who did a series of four experiments on the facilitation effect related to rhyming words. They argue that the advantage of rhyming primes and targets on cohort-related pairs in an auditory task is due to a mechanism of pre-lexical activation. It is generally assumed, according to Norris and colleagues, that spoken word recognition happens in two phases: first, the raw phonological information is extracted to allow lexical access and second, the competition between all candidates happens. The automatic process linked to a rhyming relation between both
items is a manifestation of the first stage (pre-lexical activation). If the activation of the first word resonates until the start of the second word, the reactivation of the features will reach a critical level of activation faster, which is visible in words as well as in non-words (Norris et al., 2002). Although this effect also occurs in cohort-related stimuli pairs, it is compensated for by the inhibitory effect of lexical competition occurring earlier. At the beginning of word recognition, the second word in a cohort-related stimuli pair could be the same as the first word. For instance, the prime word leg and the target word let both start with /lɛ/. However, when it becomes clear that these two are not the same word, the activation of the prime word has to be inhibited. Since it is already clear in a rhyme-related pair that the second word is not the same as the first word (e.g. lake and take), this inhibitory effect does not occur as rhyme-based co-activation only happens when the rhyme is processed (i.e. at the end of the word in question). As a result, co-activation through rhyme priming would bring less inhibition of competition than co-activation from cohort priming, allowing faster recognition.

![TRACE Diagram](image)

**Figure 1.** A scheme of the TRACE from Strauss, Harris and Magnuson (2007). The arrows show bottom-up and top-down interactions between the three layers. Units within each layer show inhibition and compete with each other.
3. CURRENT STUDY

The current study aims to examine the priming effect of cohorts and rhymes in a lexical decision task. There is around the fact that continuous mapping models, such as TRACE, are better suited for describing the brain activation processes during word recognition. TRACE indeed accounts for top-down activation as well as bottom-up, including the impact of the context. The Cohort model, however, does not include top-down feedback. In support of this model, the study by Marlsen-Wilson and Zwitserlood (1989) did not find a priming effect for word rhymes; only for word onsets.

The current study largely replicates the study by Marlsen-Wilson and Zwitserlood (1989) in terms of comparing the priming effects of onsets and rhymes, with the difference that only auditory phonologically related targets are used to examine whether similar results can be found. We intend to test both models by means of rhyming and cohort-related monosyllabic Dutch stimuli pairs and look at the alleged effects of activation and inhibition mentioned by Norris et al. (2002). Our research question is how spoken words are processed by the brain: in a forward sequence (Cohort) or with feedback (TRACE)? In addition, the subquestion of this paper is whether priming with a matching rhyme (rhyme prime) results in faster response times to the target word than priming with a matching onset and nucleus (cohort prime).

The results of the study by Marlsen-Wilson and Zwitserlood (1989) suggest that word onsets have a stronger priming effect than word rhymes. However, the study by Norris et al. (2002) found an inhibitory effect in word pairs that have the same onset, but not in word pairs with the same rhyme. It could be that this inhibitory effect does not occur in a cross-modal priming task, as was used in the study by Marlsen-Wilson and Zwitserlood (1989). Therefore, in the current study an auditive priming task is used to see whether similar or different results will be found. In addition, the TRACE model is more backed-up by research than the cohort model. Therefore, our hypothesis is that the TRACE model gives a better account of online lexical processing and we expect, thus, a delay in the response time to cohort-related targets compared to rhyme-related targets. In other words, we expect that a rhyme has a stronger priming effect than the cohort. If we indeed find this outcome, this would contradict the findings of Marlsen-Wilson and Zwitserlood (1989), which would suggest that cross-modal priming could lead to different effects than uni-modal priming. Therefore, this result would contribute to the field of psycholinguistics by providing evidence that different modality combinations could lead to different priming effects.

4. METHOD

4.1 PARTICIPANTS

A total of 29 participants were recruited from family members and friends of the experimenters aged between 19 and 59 years old (17 females, 12 males, M = 31.6, SD = 14). They were all native Dutch speakers, all but one were right-handed and none of them had reported being dyslexic. There was no for participating in the study. The procedure was approved by the UiL-OTS Ethical Committee (ETCL).

Dutch is chosen as experimental language, because the experiment was run in the UiL-OTS lab in Utrecht, the Netherlands. It was, therefore, most convenient to recruit native
Dutch participants. In addition, this study largely replicates Marslen-Wilson and Zwitserlood (1989) which contained Dutch stimuli and tested Dutch native speakers as well.

4.2 MATERIAL

All the stimuli were monosyllables with a CVC structure that were recorded by an adult female Dutch speaker. The prime was always an existing word and the target was either a word or a non-word. Each participant received four practice pairs before the real trials began with 160 word pairs (320 words in total). There were three types of relations between the prime and the target: unrelated, cohort-related and rhyme-related. Cohort-related targets shared the CV structure (e.g. *hok - hol*) and rhyme-related targets shared the VC structure (e.g. *hok - mok*). No semantic relation occurred within the pairs and no non-word was an existing word in English. The words could come from different lexical categories and could be inflected verbs. Table 1 gives an overview of stimuli examples for each condition. The whole list of stimuli can be found in Appendix 1.

<table>
<thead>
<tr>
<th></th>
<th>Cohort related</th>
<th>Rhyme related</th>
<th>Unrelated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word</td>
<td>zit (sit) - zin (sentence)</td>
<td>pin (pin) - zin (sentence)</td>
<td>tas (bag) - deur (door)</td>
</tr>
<tr>
<td>Non-word</td>
<td>neer (down) - neek</td>
<td>deeg (dough) - beeg</td>
<td>room (cream) - wuus</td>
</tr>
</tbody>
</table>

All words were selected by the researchers themselves. From these words, the experimental stimuli were derived: 20 rhyme related words and 20 cohort related word pairs. There were 40 filler unrelated word targets. The filler non-words stimuli were derived from 20 cohort related non-words, 20 rhyme related non-words and 40 unrelated non-words. We used a Latin-square design to generate two different experimental stimuli lists presented to the participants, in such a way that the participants were either presented with the cohort-related prime or the rhyme-related prime of a target word. Because the target words were the same for all participants, there was no frequency effect of the target words. In addition to that, we used a pseudo-randomization for the order of the pairs, with a maximum of three subsequent non-filler items and two subsequent non-filler items of the same type. Per item the screen showed the question: "Is the second word an existing word in Dutch?" Two versions of the experimental screen were created with the position of the yes and no button inverted to counter-balance for an effect of a dominant-hand bias. The participants were distributed equally into each group and each version.

A fixation cross appeared one second before the start of each trial, and feedback appeared during one second after each response from the participants only during the practice trials. Each stimulus item onset was preceded by a 30 ms silence interval, the stimulus onset asynchrony was of 300 ms, and participants had three seconds to make a decision. The intertrial interval was of one second.

1 Appendices are included in this digital copy of LingUU.
4.3 Procedure

The stimuli were recorded in a soundproof booth using the version 2.0.0 of Audacity(R) audio recording and editing software. Participants were either tested in a soundproof booth or in a quiet room. The stimuli were presented to participants via loudspeakers in the former condition or via headphones in the latter condition. The reaction times were recorded from the onset of the target stimulus. Each session consisted of four practice trials after which participants could still ask questions, before the 160 experimental trials. They were instructed to decide as quickly as possible whether each second word of the pair they heard was an existing word in Dutch, and to press the button labelled yes on a button box if the item was a word and the button labelled no if it was a non-word. They had to use both hands, one per button.

4.4 Data Analysis

We used the lme4 package (Bates, Maechler, Bolker & Walker, 2015) in R (R Core Team, 2016) to perform a linear mixed effects analysis of the relation between response time, and cohort priming and rhyme priming. As fixed effects, we used priming type and trial number, without interaction term. Trial number is only part of the model, because more data is explained when this factor is part of the model. As random effects, we had intercepts for subjects and items, as well as by-subject and by-item random slopes for the effect of priming type. The model was performed on the data of the correct responses to the cohort and rhyme pairs.

A linear mixed effects analysis was performed to see the effect of word type (word versus non-word) on the response time. This was done to see whether the lexical decision task in this study leads to similar results as lexical decision tasks in the previous literature. There should, namely, be an effect of word type in a lexical decision task; existing words should have shorter response times than non-existing words. In other words, participants have to check their entire mental lexicon to be sure that a non-word does not exist in a mental lexicon, which takes time. As fixed effects in the model, we used word type and trial number. As random effects, we had intercepts for subjects and items, as well as by-subject random slopes for the effect of word type. This model was performed on the data of the correct responses to all stimulus types.

The models were compared using the likelihood ratio test. So, $p$-values were obtained by comparing models stepwise by doing ANOVAs between two models each time. Two models were compared, one of which contained the examined factor and the other did not. Based on the significance of the $p$-value in the output of the ANOVA it was decided whether the factor had a significant effect on the response time and, thus, whether the factor should be part of the model.

To examine the research question, the correct responses to the experimental stimuli were analyzed. We did not exclude any of the participants, because no participant
showed abnormalities compared to the group. We did exclude the response times of the trials in which participants did not respond (value -9999), and response times that were below 400 ms. When the percentage of correct responses to a target item was below 60%, that item was excluded as well. This was done for five target non-words: bir, vir, don, pem, and tan. These words were probably too similar to existing words in Dutch. For example, bir (/bɪr/), which is a non-existing word in Dutch, sounded almost the same as beer (/bɪr/), which is an existing word in Dutch. The total percentage of excluded data was approximately 4%.

5. Results and Discussion

In this section, the results are explained and interpreted. First, the raw data is described to see the distribution of the responses. After that, the data of the cohort and prime pairs is described and compared.

5.1 Data exploration

Figure 2 shows a histogram of the response times of all trials of the experiment. The bell curve indicates that the distribution of the response times is a normal distribution with a mean response time of approximately 1050 ms. The mean response time per stimulus type is presented in Figure 3 with boxplots.

![Histogram of response times](image)

*Figure 2. Histogram of response times in milliseconds of all trials in the experiments.*

As can be seen from the boxplots in Figure 3, the mean response times of the existing words with either the cohort prime or rhyme prime are lower than the mean response times of the other (filler) stimulus types. In addition, the existing word with a rhyme prime has the lowest mean response time. The mean response times of the experimental stimuli (word cohort and word rhyme) are around 1000 ms. The mean response times of the filler stimuli are all around 1100 ms. However, as can be seen in the figure, there are a lot of outliers. Most outliers were not excluded, because the mixed model controls for this.
The linear mixed effects analysis of the correct responses to all stimulus types showed that there was a significant effect of word type ($\chi^2(1) = 7.80, p = 0.0052$). The mean response time of the existing words was 104 ms (SE = 36 ms) faster than the mean response time of the non-existing words. This result indicates that the auditory lexical decision task worked properly.

In the next section, the results of the linear mixed effects analysis are described. In this analysis, only the data of the correct responses to the cohort and rhyme priming stimuli are taken into account.

### 5.2 Rhyme versus cohort priming

The linear mixed effects analysis of correct responses to the phonologically primed stimuli indicated that there were significant effects of priming type ($\chi^2(1) = 8.41, p = 0.0037$) and trial number ($\chi^2(1) = 13.33, p = 0.00026$) on the response times. The results suggest that the participants were 48 ms (SE = 15 ms) faster on average when the prime word had the same rhyme as the target word than when the prime and target words had the same cohort. The boxplots of the mean response time per stimulus type in Figure 3 is in line with this finding, because the mean response time for existing words with a rhyme prime was the lowest.

The outcome of the analysis showed that there was, except for a significant effect of priming type, also a significant effect of trial number. The mean response time decreased with 0.6 ms (SE = 0.2 ms) per trial number on average. So, participants responded faster in the course of the experiment. It could be that this result reflects a learning effect or habituation effect.

The significant positive effect of rhyme priming is in favour of the TRACE model. According to this model, the auditory stimulus is divided into phonemes but instead of looking for exact matches, even approximate matches in phoneme sequences anywhere in the target word...
are allowed to be activated. So, the results reflect continuous mapping. The mean response times to target words with a cohort prime word were lower than the response times of words with a rhyme prime word. This could be due to an effect of lexical access that inhibits word activation of the target word in the cohort condition (Norris et al., 2002).

6. Conclusion

In conclusion, this study examined the effect of cohort and rhyme priming on the word recognition of monosyllabic Dutch words. The research question was whether priming with a matching rhyme (rhyme prime) results in faster response times to the target word than priming with a matching onset and nucleus (cohort prime). Based on the literature, we expected that the effect of rhyme priming was stronger than the effect of cohort priming. To examine this, an auditory lexical decision task was performed. The results of a linear mixed effects analysis showed that the participants responded on average 48 ms (SE = 15 ms) faster when the target word was primed with a rhyme word than when it was primed with a cohort word. Therefore, the results indicate that the rhyme of a prime word has a stronger positive effect on the activation of a target word than the cohort of a prime word. This result is in line with the TRACE model and the literature described in Section 2, because it reflects bottom-up as well as top-down activation.

In contrast, this result cannot be explained by the Cohort model and contradicts the results found by Marslen-Wilson and Zwitserlood (1989). This may be caused by the methodological differences between the current study and Marslen-Wilson and Zwitserlood (1989). The latter study used auditory primes and visual targets, which may affect word recognition in a different way than purely auditory stimuli pairs. This then implies that there are differences in how words are recognized and co-activated depending on how stimuli are presented. This finding contributes to the field of psycholinguistics by showing that different modalities lead to different priming effects. More research is needed to explain these differences in priming effects. However, based on our results, we conclude that the TRACE model is more complete than the Cohort model. This suggests that the brain processes spoken words in a bottom-up and top-down fashion.

The stimulus items used in the current study were only monosyllabic words. Further research could be done to see whether the effect of rhyme priming is still stronger in words that contain more syllables. The effect of rhyme priming could also be investigated in different modalities, or even in cross-modalities. It could be that a rhyme priming effect in written words is dependent on the transparency of the orthography of a language. So, for instance, the rhyme priming effect on written words could be stronger in Dutch than in English.

The current study has given evidence for feedback or top-down activation of spoken word recognition. Out of this follows that the TRACE model is more complete than the Cohort model in terms of explaining phonological priming effects.

Received April 2018; accepted September 2018.
References


APPENDICES
APPENDIX 1. STIMULI

Gemiddelden (en standaarddeviaties) per conditie en per variabele

<table>
<thead>
<tr>
<th>Type</th>
<th>Target</th>
<th>Prime</th>
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<tr>
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<td>ruis</td>
<td>buis</td>
</tr>
<tr>
<td>Word unrelated</td>
<td>dam</td>
<td>rug</td>
</tr>
<tr>
<td>Non-word cohort</td>
<td>neuf</td>
<td>neus</td>
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<tr>
<td>Non-word unrelated</td>
<td>gop</td>
<td>dier</td>
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Experimental trials

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<tr>
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Experimental trials

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1 Tuin is of course not a cohort prime word of the target word ruig. We accidentally made a mistake here. Since this was only one item, we do not think that this influenced the results.
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| 27 | som  | win  | Word unrelated |
| 28 | toen | lip  | Word unrelated |
| 29 | vel  | wat  | Word unrelated |
| 30 | wit  | zus  | Word unrelated |
| 31 | buur | luik | Word unrelated |
| 32 | duin | reis | Word unrelated |
| 33 | duif | zoon | Word unrelated |
| 34 | mis  | pop  | Word unrelated |
| 35 | vis  | lak  | Word unrelated |
| 36 | jas  | peil | Word unrelated |
| 37 | hip  | rot  | Word unrelated |
| 38 | roem | wijs | Word unrelated |
| 39 | zoem | pit  | Word unrelated |
| 40 | deur | tas  | Word unrelated |
| 41 | zik  | tik  | Non-word rhyme |
| 42 | jaal | maal | Non-word rhyme |
| 43 | pes  | les  | Non-word rhyme |
| 44 | juur | kuur | Non-word rhyme |
| 45 | zam  | tam  | Non-word rhyme |
| 46 | jaak | kaak | Non-word rhyme |
| 47 | tag  | dag  | Non-word rhyme |
| 48 | git  | dit  | Non-word rhyme |
| 49 | poem | noem | Non-word rhyme |
| 50 | hog  | nog  | Non-word rhyme |
| 51 | pum  | gum  | Non-word rhyme |
| 52 | mel  | fel  | Non-word rhyme |
| 53 | tul  | gul  | Non-word rhyme |
| 54 | gol  | mol  | Non-word rhyme |
| 55 | sut  | nut  | Non-word rhyme |
| 56 | lon  | non  | Non-word rhyme |
| 57 | tep  | nep  | Non-word rhyme |
| 58 | res  | mes  | Non-word rhyme |
| 59 | zos  | mos  | Non-word rhyme |
| 60 | beeg | deeg | Non-word rhyme |
| 61 | baafl| koop | Non-word unrelated |
| 62 | maap | wis  | Non-word unrelated |
| 63 | bir  | raaf | Non-word unrelated |
| 64 | vir  | maat | Non-word unrelated |
| 65 | zil  | lap  | Non-word unrelated |
| 66 | kes  | maag | Non-word unrelated |
| 67 | din  | wal  | Non-word unrelated |
| 68 | mip | rus | Non-word unrelated |
| 69 | ler | roer | Non-word unrelated |
| 70 | ker | rol | Non-word unrelated |
| 71 | lar | woon | Non-word unrelated |
| 72 | koom | raap | Non-word unrelated |
| 73 | laar | kook | Non-word unrelated |
| 74 | lim | zag | Non-word unrelated |
| 75 | wap | loop | Non-word unrelated |
| 76 | mief | waar | Non-word unrelated |
| 77 | pem | lood | Non-word unrelated |
| 78 | beup | lied | Non-word unrelated |
| 79 | lep | pool | Non-word unrelated |
| 80 | zeet | lach | Non-word unrelated |
| 81 | nof | met | Non-word unrelated |
| 82 | mieg | rek | Non-word unrelated |
| 83 | leup | jaar | Non-word unrelated |
| 84 | wug | toch | Non-word unrelated |
| 85 | rup | tol | Non-word unrelated |
| 86 | jit | haar | Non-word unrelated |
| 87 | beep | maar | Non-word unrelated |
| 88 | nof | lik | Non-word unrelated |
| 89 | joek | heus | Non-word unrelated |
| 90 | toes | reus | Non-word unrelated |
| 91 | paaf | loog | Non-word unrelated |
| 92 | zaap | tuig | Non-word unrelated |
| 93 | reen | hoog | Non-word unrelated |
| 94 | hig | zuig | Non-word unrelated |
| 95 | goef | lijk | Non-word unrelated |
| 96 | soel | rijm | Non-word unrelated |
| 97 | nijk | roes | Non-word unrelated |
| 98 | moon | rap | Non-word unrelated |
| 99 | taap | rein | Non-word unrelated |
| 100 | wuws | room | Non-word unrelated |
| 101 | mup | mus | Non-word cohort |
| 102 | mef | mep | Non-word cohort |
| 103 | deg | dek | Non-word cohort |
| 104 | dap | das | Non-word cohort |
| 105 | sup | suf | Non-word cohort |
| 106 | boep | boen | Non-word cohort |
| 107 | bijm | bijl | Non-word cohort |
| 108 | book | boog | Non-word cohort |
| 109 | tef | tel | Non-word cohort |</p>
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Appendix 2. R Output Effect Word Type

Linear mixed model fit by maximum likelihood t-tests use Satterthwaite approximations to degrees of freedom [lmerMod]
Formula: rt ~ WordNonword + trialnum + (1 + WordNonword | ppid) + (1 | id)
Data: AllDataCorrect

AIC      BIC   logLik deviance df.resid
59001.2  59052.0 -29492.6  58985.2     4234

Scaled residuals:
Min      1Q  Median      3Q     Max
-3.0254 -0.6045 -0.1757  0.3730  5.9504

Random effects:
Groups   Name            Variance Std.Dev. Corr
id       (Intercept)     22875    151.2
ppid     (Intercept)     43015    207.4
          WordNonwordWord 19315    139.0   -0.76
Residual                 55960    236.6
Number of obs: 4242, groups: id, 155; ppid, 29

Fixed effects:
Estimate Std. Error   df t value Pr(>|t|)
(Intercept)     1267.45116   43.10824   43.00000  29.402  < 2e-16 ***
WordNonwordWord -103.69689   36.19937   83.00000  -2.865  0.00529 **
trialnum          -0.84470    0.08104 4050.00000 -10.423  < 2e-16 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Correlation of Fixed Effects:

    (Intr) WrdNnW
WrdNwrdWrd -0.698
trialnum -0.152  0.002
APPENDIX 3. R OUTPUT PRIMING EFFECT

Linear mixed model fit by maximum likelihood t-tests use Satterthwaite approximations to degrees of freedom [lmerMod]
Formula: rt ~ type + trialnum + (1 + type | ppid) + (1 + type | id)
  Data: TargetsCorrect

AIC  BIC  logLik deviance df.resid
14787.7 14837.5  -7383.8 14767.7  1068

Scaled residuals:
  Min  1Q Median   3Q  Max
-2.0489 -0.6075 -0.1743  0.3630  5.2444

Random effects:
  Groups   Name        Variance Std.Dev. Corr
  id       (Intercept) 19328 139.02
  typeW_RH  2227  47.19  0.38    
  ppid     (Intercept) 15335 123.84
  typeW_RH  157  12.53  1.00
  Residual             43539 208.66
Number of obs: 1078, groups: id, 40; ppid, 29

Fixed effects:
  Estimate Std. Error     df   t value Pr(>|t|)
(Intercept) 1117.7470 35.4270  74.8000  31.551  < 2e-16 ***
typeW_RH  -47.6454 14.9875  36.1000  -3.179  0.003030 **
trialnum  -0.5540  0.1506 1017.8000  -3.678  0.000248 ***

---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Correlation of Fixed Effects:
  (Intr) tyW_RH
typeW_RH 0.056
trialnum -0.358 0.020
Self-names as Emotionally Competent Stimuli
A linguistic perspective on the emotional perception of one’s own name

L. (Lisa) Verbeek
Manuscript written during her RMA Linguistics, Utrecht University, Utrecht, Netherlands

1. Introduction

Your own name might be the most important word in your lexicon, being linguistically speaking the greatest connection to your existence, identity, and individuality (Koole & Pelham, 2003). When someone remembers your name after meeting you, you feel recognised and seen. People tend to be frustrated when their name is mispronounced or deliberately abused (Starks, Leech, & Willoughby, 2012:143), but are more likely to comply with a request if the requester remembered their name (Howard, Gengler, & Jain, 1995).

Names thus have strong emotional connotations, that can even stick to the words themselves. For example, the name Adolf connotes a strong negativity, whereas the name Elvis exudes positivity – at least to some. Although this clearly shows that names are emotionally charged words, there has been little scientific discussion about the emotional consequences of the processing of self-names, i.e. names to oneself.

In order to fill this knowledge gap, this paper addresses the question of why and how self-names affect their owner. It applies findings from previous social studies to a linguistic model, which yields a new perspective on self-names as an interface between language and emotion. In the pages that follow, it will be argued that via associative learning, self-names become “Emotionally Competent Stimuli” (ECS; Damasio, 2004; Van Berkum,
words that are able to trigger an emotional response. The scope of this paper is limited to first names, although self-names comprise all names that specifically refer to one’s own self (e.g., nicknames and mispronounced names).

The paper is organised in the following way. Section 2 lays out the paper’s definition for emotion. Section 3 reviews research on self-names, showing that self-names are highly arousing words that are processed with cognitive advantages. Next, section 4 discusses studies on attitudes towards self-names. These studies suggest that the valence of self-names is dependent on self-esteem and context. Section 5 combines findings of previous research by applying self-names to the Affective Language Comprehension model (Van Berkum, 2018). Finally, section 6 concludes and identifies areas for future research.

2. Emotion processing

Emotions are packages of events that lead to the emergence of feelings. They are initiated by a particular stimulus (Van Berkum, 2018) that is (1) cognitively appraised as relevant to oneself, i.e. consciously or unconsciously evaluated and interpreted, leading to (2) an automatic physiological and behavioural response, which is experienced as (3) a subjective feeling (James-Lange theory, as sited in Shiota & Kalat, 2012, p. 14). For example, one may perceive stimulus Adolf as the name of the new boyfriend of one’s sister. This is cognitively appraised as relevant to oneself and possibly negative, leading to a frown and experienced as an unpleasant feeling.

In order to classify emotional feelings, the circumplex model of affect is employed (Posner, Russel, & Peterson, 2005). This model arranges emotions along two dimensions: valence (negative/unpleasant versus positive/pleasant feelings) and arousal (physiological strength of the emotional feeling, deactivation versus activation; Shiota & Kalat, 2012:9). How self-names affect their owner is, in this view, dependent on the specific combination of valence and arousal, as illustrated in Figure 1. For example, the combination of a pleasant valence and active arousal results in a feeling of excitement.

3. Cognitive advantages in processing self-names

Traditionally, self-names have been investigated in the field of social sciences in light of self-processing biases: the effect of processing self-related information with significant cognitive advantages (Cunningham & Turk, 2017). Particularly, self-names are able to catch attention immediately, even under unattended conditions (cocktail-party effect; Cherry, 1953). Alexopolous, Muller, Ric, and Marendaz (2012, Study 1, 2, and 4) have shown these attention capturing properties by using a visual search paradigm, in which participants had to seek the letter ‘O’ amongst a collection of ‘Q’s. The position of the target letter was primed either by the participant’s self-name, or by another unknown participant’s name. Crucially, the primes were presented very briefly such that participants only unconsciously perceived them. The findings indicate that participants fount the ‘O’ faster when it was preceded by their own name, compared to when preceded by another name. Processing one’s own name thus shows larger attentional capture effects than processing other’s names, and Alexopolous and colleagues (2012) argued that this occurs unconsciously, unintentionally, and automatically.
Figure 1. Circumplex model of affect (Posner et al., 2005). Horizontal axis represents valence; vertical axis represents arousal.

Yet, such studies do not answer the question of why self-names capture attention. Not only are self-names related to oneself instead of someone else (‘me’ versus ‘not me’), they are also of higher significance to oneself than unknown other’s names are (‘important to me’ versus ‘not important to me’). Moreover, self-names are highly frequent and familiar words (García et al., 2015), that are processed faster and more accurately than words with lower frequencies (e.g. Grainger, 1990).

To address this issue, much of the current literature aims to disentangle the effects of self-relatedness, significance, familiarity, and frequency. Alexopolous and colleagues (2012, Study 3) evaluated the role of familiarity on processing biases in self-names by adding another category of prime in their visual search paradigm, next to participants’ self-names and names of unknown people: names of people who were familiar to, but not a friend of participants. Their results yielded no significant differences in response times for identifying an ‘O’ among ‘Q’s when primed by an unknown name versus a familiar name, both being slower than when primed by one’s own name. This led Alexopolous and colleagues (2012) to argue against a role for familiarity in the attention capturing properties of self-names. Unfortunately, whether the degree of familiarity of the familiar person affected the results was not considered, neither was the frequency of the included names.
Yang, Wang, Gu, Gao, and Zhao (2013) further investigated the role of familiarity in processing self-names by comparing self-names to one's mother's name and names of famous people, the former considered more familiar to the latter. Data for this study were collected using a visual search paradigm, in which participants had to identify one of these three target names among 100 unknown names as fast as possible. Once again, the results revealed superior performance for self-names. More importantly, no significant differences between response times to famous names and participants' mothers' names were found. The researchers concluded that familiarity cannot account for the cognitive advantage of attention in processing self-names. Their findings do not support a role for significance either ('important to me' versus 'not important to me'): one's own mother is clearly of more importance to oneself than famous people, although Yang and colleagues failed to define which famous names were chosen and how famous they were. Moreover, the authors overlooked the fact that one generally calls their mother *mum* rather than her first name, which may have confounded the results.

Tacikowski and colleagues (2011) overcame this potential confounder by asking the names of their participant's most significant other (e.g., partner or best friend). Contrary to Yang and colleagues (2013) and Alexopolous and colleagues (2012), their fMRI study did not find substantial differences between the auditory perception of self-names and significant other's names. Instead, very similar patterns of neural activation were observed for the two conditions. Yet the study did identify one neural region, the right interior frontal gyrus, that was activated only for self-names. Therefore, Tacikowski and colleagues (2011) argued for a far more limited role for self-relatedness and a considerable role of significance and familiarity in processing self-names.

Taken together, there is consensus among social scientists on the significant cognitive advantages in processing self-names. Linking this to emotion, it can be inferred that self-names are cognitively appraised automatically and unconsciously (Alexopolous et al., 2012) and that the behavioural response is 'paying attention' (Yang et al., 2013; Alexopolous et al., 2012; Tacikowski et al., 2011). These attention capturing properties in processing self-names suggest that self-names are highly activating, arousing words; that is, their emotional consequences are in the upper half of the circumplex model (see Figure 2). Potential feelings associated with perceiving self-names may thus range from upset, to surprise, to happy.

This section also showed that the exact nature of the cognitive advantages for self-names is controversial. It appears hard to disentangle the potential effects of self-relatedness, significance, and familiarity, and no studies were found investigating the effect of frequency on self-names processing. Furthermore, although it is clear that self-names are highly arousing stimuli, the link to emotion has not been made in previous work. It is thus unclear how people cognitively appraise their names, and consequently, whether self-names are perceived with negative or positive valence. The following section will therefore review research on subjective attitudes towards self-names.
4. **SUBJECTIVE ATTITUDES TOWARDS SELF-NAMES**

People’s attitudes to their own names are usually assessed as whether one likes his own name (positive attitude) or not (negative attitude). Such attitudes reflect the emotional outcome of processing self-names, the feeling. Since the feeling aspect is the indirect result of the appraisal phase, this paper takes it to infer what happened in the appraisal phase, and thus, whether self-names have a positive or negative valence (i.e., pleasant or unpleasant in Figure 2 above).

Social studies typically employ self-names to show that self-related information in general is processed with a self-positivity bias, the finding that self-related information in general is typically appraised with positive valence (e.g., Watson, Dritschel, Obonsawin, & Jentzsch, 2007). It has been claimed that this reflects the generally positive implicit self-esteem (e.g., Albers, Rotteveel, & Dijksterhuis, 2009; Nuttin, 1987) that the great majority of people appears to have (Farnham, Greenwald, & Banaji, 1999; Paulhus, 1993). Implicit self-esteem is the automatic evaluation of the self, contrary to explicit self-esteem, which is characterised by conscious introspection. As one’s name is claimed to be very closely associated with one’s identity (Farnham, Greenwald, & Banaji, 1999; Koole & Pelham, 2003), it is considered a good measure of implicit self-esteem.

One piece of evidence for the self-positivity bias comes from the name-letter effect, people’s tendency to prefer their own initials (e.g., MG) over other letters. Koole, Dijk-
sterhuis, and Van Knippenberg (2001, Study 1 & 4) have assessed this effect by using Likert scales on which participants explicitly judged the aesthetics of letters (1-not at all beautiful; 9-extremely beautiful). Participants evaluated their own initials significantly better than other letters indeed, which was interpreted as a self-positivity bias. The extent to which people liked their own initials was shown to correlate positively with implicit self-esteem ($r = .48$), but not with explicit self-esteem. The authors interpreted the positive correlation between explicit name-letter liking and implicit self-esteem as the two being highly related constructs. Moreover, they claimed that explicit name-letter liking represents positive self-evaluation in general, although it is highly debatable whether such conscious letter evaluation actually represents an ecologically valid construct of positivity towards oneself.

Nevertheless, Gebauer, Riketta, Broemer, and Maio (2008, Study 1) have replicated Koole and colleagues’ findings by assessing the extent to which one likes his first name, rather than initials. Likert scales on which participants judged how much they liked their name (1-not at all; 9-very much) indicated that participants were on average positive about their name ($M = 7.02$). In addition, this positive bias towards one’s own name was correlated with the name-letter effect ($r = .32$) and implicit self-esteem ($r = .18$), such that the more one likes his own name and his initials, the higher implicit self-esteem. Since the latter is claimed to be generally positive (Farnham, Greenwald, & Banaji, 1999), people may in general like their own name as well. It can thus be inferred that the average valence for self-names is positive, leading to feelings of alertness or happiness (Figure 2).

One explorative study in the field of sociolinguistics indicates, however, that the situation is more complicated (Starks et al., 2012). This study explicitly focused on people’s attitudes to their own nicknames. Whereas first names are officially given to a person, nicknames are often informally established and may reflect how someone is seen by others (Adams, 2009). Starks and colleagues (2012) used a questionnaire to obtain 55 Australian students’ evaluations of their own nicknames. Contrary to the suggested positive bias towards one’s own first name (Gebauer et al., 2008; Koole et al., 2001), less than half of the students (47%) indicated a consistent positive attitude towards their own nickname. A qualitative analysis of participants’ responses indicated that attitudes appear not to be inherent to the self-name, but instead, “highly contextually bound” (Starks et al., 2012:143). Anecdotal evidence showed, for example, that one nickname may be regarded positive when uttered by one person, while negative when uttered by another (Starks et al., 2009; Adams, 2009); and that nicknames based on names are generally evaluated more positively than nicknames based on physical characteristics— which is in line with the positive attitude to one’s own name (Gebauer et al., 2008), but not with a general self-positivity bias. Thus, appraising self-names seems to yield variable attitudes, rather than an intrinsic positive valence.

In brief, the studies presented in this section show that on the one hand, liking one’s first name is correlated with implicit self-esteem. Because implicit self-esteem is said to be generally positive, it can be inferred that the overall valence of self-names is positive. On
the other hand, attitudes to one's own nickname are argued to be highly context-dependent, which suggests that valence of self-names might be variable. Taken together, these findings imply that how self-names affect their owner is dependent on an interaction of several factors, including context and specific names used. Besides self-esteem, however, no research has been found that systematically surveyed what other factors might be involved in determining valence of self-names and in what way. Moreover, it is not yet clear how all these factors can be wrapped up in just one word.

5. Self-names as Emotionally Competent Stimuli

5.1 The Affective Language Comprehension model

In order to fully understand how self-names affect their owner, it is important to consider a framework that incorporates potential factors that determine the perceived valence of self-names. One model that allows for such incorporation is the Affective Language Comprehension (ALC) model (Van Berkum, 2018; see Figure 3), which asserts that word valence is determined by several psycholinguistic, emotional, and communicative components. The ALC model comprises two processing modules, located at the left side of the figure, and one memory module, located at the right. The listener (here, 'Elvis') must (a) recognise and parse the verbal and non-verbal signs produced by the speaker ('Mother'), and (b) interpret the speaker's communicative move. Recognition and interpretation of these representations are drawn upon and added to the listener's Long Term Memory (LTM); the model shows which representations are activated. Importantly, all individual representations may be Emotionally Competent Stimuli, which may trigger emotions and thus the emergence of a feeling.

In Figure 3, the ALC model is applied to the communicative action of perceiving Elvis' own name when spoken by his mother. Listener Elvis starts with recognising the word Elvis by phonologically and semantically parsing the verbal sign and the associated nonverbal signs (e.g., eye-contact, the mother's voice, and affective prosody). All of these components are retrieved from LTM. Importantly, all elements in already this first stage are potential ECS (marked by a red sign in Figure 3): that is, these elements might be appraised as positive or negative towards the listener's interest, and could therefore trigger an emotional response (e.g., alertness or tension). For example, Elvis may recognise his mothers' voice and her affective prosody, and infer her positive stance toward him.

Then, Elvis has to interpret his mothers' communicative move, which consists of several interpretational layers. Firstly, Elvis has to infer his mothers' referential intention, namely, that the self-name serves as a label to his own being. In line with self-processing biases, the ALC model acknowledges one's own self as an important ECS — that is, oneself is a stimulus that likely provokes emotion. As discussed before, the emotion that is triggered by the referential situation of oneself may be associated with one's implicit self-esteem (Gebauer et al., 2008; Koole et al., 2001). Secondly, Elvis needs to infer his mother's stance towards him. This is a potential ECS as well, as it once again refers one's own self. In this particular example, one could postulate that mother has an affectionate attitude towards her child, leading to positive valence.
Based on these two steps, Elvis then has to infer his mother’s social and communicative intentions. A self-name may in particular be produced when a speaker wants the listeners’ attention in order to bring about a joint communicative project. Once this has been established, the speaker may request or share something, or get the speaker to know something (Tomasello, 2008). The social intention of getting attention is a potential ECS too, for example when a self-name is used to warn someone.
After working out what the speaker aimed to communicate, listener Elvis might infer a bonus meaning. While this additional meaning may not have been part of what the speaker wanted to convey, it may nevertheless be computed by the listener (Van Berkum, 2018). Since self-names are closely connected to one’s own existence and identity (Koole & Pelham, 2003), the bonus meaning of perceiving one’s own name might be that the speaker acknowledges the listener’s existence, although this would be dependent on the listeners’ self-esteem. Once again, this bonus meaning is a potential ECS, since it directly touches upon one’s existence.

The ALC model suggests that the ECS in all representational layers accumulated determine the perceived valence of self-names. Each potential ECS can trigger emotion, as defined in Section 2, which leads in a conscious feeling. The model incorporates findings of previous studies on self-names by hypothesising how context-dependent factors (e.g., nonverbal signs and speaker’s stance), and self-related factors (e.g., the referential intention) may work together in determining the possible emotional consequences of self-name perception.

5.2 ASSOCIATIVE LEARNING IN SELF-NAME PROCESSING

The claim that processing self-names involves multiple steps of inferences seems to conflict with the automatic, unconscious processing of self-names that was identified by Koole and colleagues (2001). However, the ALC model (Van Berkum, 2018) asserts that words themselves can acquire valence via associative learning if they are sufficiently selectively, and sufficiently reliably. As self-names have a very unambiguous, exclusive, and emotionally competent referential meaning, this section argues that self-names acquire a particular word valence, such that it encompasses all affective representations as identified in Figure 3. In other words, self-names become ECS themselves.

Associative learning is the process of several components becoming linked to one another in the LTM. Since self-names are perceived already from birth on, their affective processing, as shown in Figure 3, has been repeated extremely frequently over one’s lifespan. As a result, associative learning might have associated all stable ECS (e.g., typical referential intention and typical social intention) to the self-name as a mere linguistic sign. Hence, the sign becomes a powerful Emotionally Competent Stimuli in itself, meaning that self-names are words that trigger emotions. They acquire an affective meaning, determined by all typical inferential layers that are ECS. Every time when one’s name is said, the brain immediately, unconsciously activates the whole emotional package that is associated with one’s name. In other words, “the appraisal leading to the emotional response is nothing more than automatic associative memory retrieval” (Van Berkum, 2018:7), leading self-names to evoke emotions very early in processing.

Nevertheless, this automatic retrieval does not dismiss that their processing is context-dependent. Due to their high frequency, only the most stable subsets of the process might get linked to the self-name. Typically, the self-name refers to the listener, the speaker’s eyes are directed towards the listener, and the speaker requests the listener’s attention. By contrast, facial expressions, prosody, speaker’s stance, and the communicative project are variable, and thus do not get associated with the self-name itself. Consequently, when
perceiving one’s self-name, the listener has to infer from those variable factors how well the speaker knows him and what he thinks of him. For familiar speakers, these variable subset of factors may be individually stored as subsets of affective self-name memory traces (e.g., positive valence for one’s mother leading to a feeling of happiness, but negative valence for one’s strict teacher leading to a feeling of tension), explaining the role of familiarity in self-name processing. Thus, associative learning via the ALC model acknowledges both the stable high arousal of self-names and their variable valence.

If variable factors determine the valence of a self-name, then how does the ALC model account for the self-positivity bias (Section 4)? In the first years of one’s life, a self-name may be processed most frequently by one’s parents. Typically, parents’ attitudes towards their newborn baby are positive. One could speculate that they will produce one’s self-name with positive prosody and affectionate stances. These representations may form a foundation for the affective, associative learning process of one’s self-name in early infancy. Since these are clearly positive ECS, the ALC model predicts a basic positive valence for self-names, in line with the self-positivity bias.

Finally, the ALC model also tears apart the roles of frequency and self-reference in self-processing biases. On the one hand, the ALC model accounts for self-processing biases by the inference of the referential intention. When perceiving self-names, the referential intention will always be one’s own self, which might be a very powerful ECS. On the other hand, the ALC model presumes a major role for frequency in light of associative learning: due to the extremely high frequency of the self-name already from birth on, multiple emotional inferences get attached the self-name itself, as discussed before.

6. Conclusion
The goal of the current paper was to determine why and how self-names affect their owner. A literature review provided two main arguments that formed the basis for the answer on this question. First, section 3 showed that self-names are highly arousing words, located in the upper half of the circumplex model. They are processed with major cognitive advantages, but studies are inconclusive in the roles herein for self-reference, significance to one’s own self, their high frequency, and familiarity. Second, section 4 indicated that the valence of self-names correlates positively with implicit self-esteem and is highly context-dependent. Nevertheless, the factors that determine self-name valence are not yet studied and it remained unclear how these potential factors get associated with self-names. To address these issues, Section 5 applied self-names into the Affective Language Comprehension model (Van Berkum, 2018). The model connected major previous findings by viewing self-names as an interface between language and emotion. It suggested that self-names affect their owner because of associative learning: affective memory traces have become part of word meaning, making self-names highly arousing words that are processed automatically and unconsciously. How self-names affect their owner was hypothesised to be dependent on several variable levels of representations, including inferences of social intentions and bonus meanings. Besides, it was able to tear apart the roles for familiarity, frequency, and self-reference.
Viewing self-names as Emotionally Competent Stimuli on the interface of language and emotion has thrown up many new questions in need of further investigation. More research is required to explore the hypotheses put forward in this paper. It needs to be established whether one’s first name has indeed a general positive valence. Additionally, future studies should systematically compare and quantify the emotional responses that different self-name stimuli (e.g., first names versus mispronounced names or nicknames) are able to yield. This may provide insight in the roles of familiarity, frequency, and self-reference. One could, for instance, establish a zero baseline for frequency (and hence, associative learning) by giving participants new (nick)names and test their response times in a visual search paradigm. For a more natural experiment, people that underwent a name-change could be investigated. The present study established a comprehensive framework for future investigations of the affective consequences of self-name processing. By taking a linguistic, rather than social perspective to self-names, this study added an interesting object for investigation to the rapidly expanding field of emotion and language processing.

Received April 2018; accepted September 2018.

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Can bilingualism delay age-related cognitive decline?

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Abstract
Getting older is associated with a decline in cognitive abilities. In recent years the search for factors that can protect us against cognitive aging has grown. One of those factors is proposed to be bilingualism. In previous studies, bilingualism has been shown to lead to cognitive advantages, such as enhanced executive functions. However, those previous findings are controversial, as it has been argued that they might as well be explained by several confounding factors, such as immigration status, cultural differences and socio-economic status. This paper proposes a study with the aim to question bilingualism as a potential factor to delay age-related cognitive decline. The proposed study will compare the performance of middle-aged and older monolingual and bilingual adults on the Simon task, a task measuring non-verbal inhibitory control, and the trail-making task, a task measuring switching. Importantly, the participant groups will be carefully matched in order to eliminate possible confounding factors. The results are expected to show that the performance of the monolinguals and bilinguals will decline to the same extent between the two age groups. These expected results will suggest that bilingualism might not be a protective factor against age-related cognitive decline.

1. Theoretical background
1.1 Aging and cognitive decline
Getting older comes with a decline in cognitive abilities. Salthouse (2009) showed that this decline is already visible in the performance of people in their 20s and 30s on different tasks measuring cognitive functioning. He also discusses that after the age of 60, the magnitude of the age-related cognitive decline accelerates, resulting in a decline twice to four times greater than before the age of 60. Examples of cognitive abilities that decline with age are processing speed (Salthouse, 2009; Schaie, 1996) and episodic memory (i.e. memories of events experienced in the past) (Salthouse, 2003, 2009). The greatest impairments with age were found to be those associated with executive functions (Basak, Boot, Voss, & Kramer, 2008; Braver & Barck, 2002). Executive functions are higher order cognitive processes that regulate behaviour and other cognitive processes, such as attention and visual perception (see Diamond, 2013 for a review). They mostly depend on structures in the prefrontal cortex (review in Stuss, 2011). In the literature there is no consensus about the organization of the executive function system. Nevertheless, most studies are based on the organization proposed in the Unity and Diversity model by Miyake, Friedman, Emerson, Witzki, & Howerter (2000). According to this model there are three separable executive functions: 1) switch-
ing, the ability to switch between different tasks and mental sets, 2) updating, the ability to monitor representations in working memory and update them with new information, and 3) inhibition, the ability to suppress a dominant response. Age-associated impairments have been found in inhibitory control (Darowski, Helder, Zacks, Hasher, & Hambrick, 2008; Zanto, Henningan, Östberg, Clapp, & Gazzaley, 2010), task switching (Cepeda, Kramer, & Gonzalez de Sather, 2001; Kray, 2006) and working memory (Bopp & Verhaeghen, 2005; Fiore, Borella, Mammarella, & De Beni, 2012; Fournet et al., 2012). Furthermore, brain imaging data has demonstrated abnormal activation in the prefrontal cortex in older adults during a task demanding cognitive control (Braver & Barck, 2002).

With increasing numbers of older people across the world, the interest in the search for factors that can protect against cognitive aging has grown. This search is important, since the age-related decline of cognitive abilities has effects on daily life activities such as driving, making decisions, remembering what groceries to buy, and understanding (complex) instructions (e.g. Blazer, Yaffe, & Karlawish, 2015). Furthermore, Vaughan and Giovanello (2010) showed that measures of executive functioning predicted so-called ‘instrumental activities of daily living’ (e.g. financial management, cooking, household chores) in older adults, meaning that a decrease in executive functioning will also affect daily life activities. Previous studies have found that cognitive training in reasoning, processing speed, working memory and attentional control (e.g. by means of video game training) have lasting positive effects on cognitive abilities in older people and also transfer to other non-trained domains (Basak et al., 2008; Brehmer, Westerberg, & Bäckman, 2012; Rebok et al., 2014). Furthermore, lifestyle factors such as physical and social activities have been shown to prevent age-related cognitive decline (Buchman et al., 2012; James, Wilson, Barnes, & Bennett, 2011; Bherer, Erickson, & Liu-Ambrose, 2013). The current proposed research will focus on a different, and more controversial, factor that is suggested to delay the decline of executive functions, namely bilingualism.

1.2 BILINGUALISM AS A PROTECTOR AGAINST COGNITIVE DECLINE

In the current study, the term bilingualism will be used to refer to those who grew up with two languages from birth or early childhood. Previous studies suggest that bilinguals have enhanced executive functions compared to monolinguals. That is, enhanced inhibition, switching and updating abilities have been found in bilinguals throughout the whole lifespan using a wide variety of tasks (recent review in Bialystok, 2017). Traditionally, this bilingual advantage has been explained by the Inhibitory Control model proposed by Green (1998). The theory is based on the consistent finding that in bilinguals both languages are constantly active during language production, even in contexts where only one language is required (review in Kroll, Dussias, Bic, & Perrotti, 2015). Because of the joint activation of both languages, there is a constant competition between simultaneously activated lemmas from both languages to be selected. This suggests that bilinguals must have some sort of control system to prevent intrusion from the non-target language. Green (1998) proposed in his model that bilinguals are constantly inhibiting lemmas from the non-target language in order to solve the competition. This would lead to a continuous training and therefore improvement of inhibitory control. Recently, however, new findings have challenged the prevailing theory and doubts have been raised if inhibition
really is the underlying mechanism of the bilingual advantage. Instead, it has been proposed that the bilingual advantage might be explained by the bilinguals’ use of executive attention, which is the ability to monitor attention. That is, bilinguals would shift their attention away from the non-target language to the target language, rather than actively inhibit the non-target language (Bialystok, 2017).

The enhanced executive functions found in bilinguals make bilingualism interesting as a possible factor to delay cognitive decline in aging, since effects of this decline have been found to be the greatest in executive control processes. Previous studies that have looked into the effects of bilingualism on aging, suggest that bilingualism can delay the onset of dementia by 4 to 5 years (Bialystok, Craik, & Freedman, 2007; Craik, Bialystok, & Freedman, 2010) and can also delay the decline in executive control (Bialystok, Craik, Klein, & Viswanathan, 2004; Bialystok, Craik, & Luk, 2008; Bialystok, Poarch, Luo & Craik, 2014; Gold, Kim, Johnson, Kryscio, & Smith, 2013). These results suggest that bilingualism is one of the factors that contributes to cognitive reserve, which is a compensatory mechanism enabling individuals to function normally despite neural damage or impairment to the brain. Bialystok et al. (2004) were the first to study the effects of bilingualism on executive functions in older populations. They let monolingual and bilingual middle-aged (mean age 43 years old) and older adults (mean age 71 years old) participate in a Simon task, which measures inhibitory control. In this task participants are presented with blue and red squares that are associated with a left or right button press. Stimuli appear on the left or right sight of the screen, thus leading to incongruent trials (e.g. left button, right side of the screen) and congruent trials (e.g. left button, left side of the screen). In the incongruent trials participants need to inhibit their reaction triggered by the side of the screen and only focus on the color of the square. The difference in reaction time between the congruent and incongruent trials is called the Simon effect. One thing the researchers looked at was the increase in the Simon effect between the two age groups. They found that this increase was greater for the monolinguals than for the bilinguals, which suggests that the age-related processing decline was more severe for the monolinguals than for the bilinguals. The studies conducted by Bialystok et al. in 2008 and 2014 found similar results on tasks assessing inhibition and working memory, and Gold et al. (2013) found evidence for delayed age-related declines in bilinguals by using a switching task.

1.3 Confounding variables
In the past years researchers have questioned the existence of a bilingual advantage more and more (e.g. De Bruin, Bak, & Della Sala, 2015; Paap & Greenberg, 2013; Paap, Johnson, & Sawi, 2015). According to those researchers, there are methodological problems within this field of research which make the results hard to interpret. One of those problems is the possibility of confounding variables such as immigration status, cultural differences, socio-economic status (SES) and IQ (Bak, 2016). When not controlled for, those factors might cause the tested monolinguals and bilinguals to not only differ in how many languages they speak but also in other respects. Furthermore, they can cause differences within the group of bilinguals, making them a heterogenous group. Importantly, those factors can have an influence on the performance on tasks that are used to test executive control. For example, the studies by Bialystok, Craik and Freedman (2007, 2010) have been criticized
because the participants were not matched in terms of immigration status (Fuller-Thomson & Kuh, 2014). In Craik et al. (2010), 79% of the bilinguals were immigrants, compared to 32% of the monolinguals (De Bruin et al., 2015). Fuller-Thomson and Kuh (2014) argue that the difference found in age of onset of dementia might have been due to what is known as the healthy migrant effect—the tendency of migrants to be healthier and to have “better morbidity and mortality outcomes than non-immigrants” (p. 129). It might be possible that healthy people are more likely to immigrate and thus to become bilingual. In line with this argumentation, several studies have found that immigrants show increased cognitive control and a delay in cognitive decline when compared to non-immigrants, independently of bilingualism. Similarly, Bialystok et al. (2008) used participants with and without a migration background. The study by Bialystok et al. (2004) can also be criticized, because they compared monolingual speakers of English living in Canada with bilingual speakers of English and Tamil or Cantonese living in India or China. In this study, differences in culture and lifestyle between the monolinguals and bilinguals could have been confounding factors. The importance of controlling for cultural factors has been shown by Carlson and Choi (2009). In their study, Korean-English bilinguals performed better than American monolinguals on executive control tasks. However, this bilingual advantage was not found when the same sample of bilinguals was compared with Korean monolinguals. This suggests that the found differences between the bilingual group and the American monolinguals were not due to bilingualism, but due to cultural differences. The same could have been the case for the study by Bialystok et al. (2004). The importance of controlling for possible confounding variables has been highlighted even more by a study by De Bruin et al. (2015). They compared the performance of carefully matched monolingual and bilingual older adults on two tasks measuring executive control. The participants were matched for immigration status, lifestyle, SES, education, IQ and gender. On both tasks they did not find an effect of bilingualism. This suggests that earlier findings that did show a bilingual advantage might have been caused by one or more confounding factors, and not by the bilingualism of the participants.

2. The proposed study
The literature review showed that there is still uncertainty about whether bilingualism leads to enhanced executive functions and whether it could delay age-related cognitive decline. That is, previous studies suggesting that it does (e.g. Bialystok et al., 2004, 2008, 2014), did not control for possible confounding factors such as migration status and cultural differences which could have had an effect on the outcome of the studies. The present proposed study will try to answer the research question to what extent bilingualism is able to slow down the process of age-related decline in executive functions. This is an important question to answer, since diminished executive functions have been shown to be related to problems in daily functioning in older people (Vaughan & Giovanello, 2010). The present study will replicate the studies previously conducted by Bialystok and colleagues (2004, 2008, 2014). Importantly, it will differ from those previous studies by carefully matching participant groups and by taking care of potential confounding factors. Furthermore, whereas these previous studies focussed on the executive function of inhibition, the current study will expand these studies by also including a task assessing switching.
Given the inconsistent findings reported in studies on the bilingual advantage in older bilinguals and the lack of well-controlled designs in previous studies, the research question in the present study proposal will be explorative and no specific hypothesis will be formulated. That is, the study will function to find out whether previous reported delays of age-related cognitive decline can be replicated when using a well-controlled design, or whether those previous findings could possibly be explained by confounding factors.

3. Methods
3.1 Participants

There will be four groups of participants: monolingual and bilingual adults between 30 and 50 years old and older adults between 60 and 80 years old. The participants will all be non-immigrant, native speakers of English living in the UK. Following Bialystok et al. (2004, 2008, 2014), the bilingual participants will have acquired their second language from birth or during early childhood (i.e. before the age of 5). Ideally, bilingual participants should use both their languages on a daily basis. The monolinguals will not have functional command of any other language. The participants will all have normal or corrected-to-normal vision.

All participants will first fill out a questionnaire which will collect information about the age of acquisition of the languages they speak, patterns of language use, language proficiency, medical history and activities that are suggested to be cognitively enriching, such as playing computer games or musical instruments and engaging in physical activity (Valian, 2015). They will also complete two non-verbal components of the Wechsler Abbreviates Scale of Intelligence (WASI-II, Wechsler, 2011) as a measure of IQ. Finally, they will be screened for symptoms of dementia/mild cognitive impairment using the Addenbrooke's Cognitive Examination-III (ACE-III, Hsieh, Schubert, Hoon, Mioshi & Hodges, 2013). Based on the results of the questionnaire and the tests, the monolinguals and bilinguals in each age group will be matched on: gender, age, SES, lifestyle, IQ and ACE-III score. Within the bilingual groups, the participants will be matched on the age of acquisition of their second language and language proficiency.

3.2 Task and Procedure
3.2.1 Simon task

The Simon task (Simon, 1990) will be used to assess inhibitory control. The participants will be given a button box with a red button on the left side and a blue button on the right side. On a computer, they will see a blue or a red square on the left or on the right side of the screen and they will have to press the button corresponding to the right colour. There will be two kinds of trials: congruent and incongruent trials. In the congruent trials, the side of the screen matches with the button that needs to be pressed (e.g. red square presented on the left side of the screen). In the incongruent trials, there is a mismatch between the side of the screen and the button that needs to be pressed (e.g. red square presented on the right side of the screen). So, in the incongruent trials, the participants need to inhibit their reaction triggered by the side of the screen and only focus on the colour of the square. Half of the trials will be congruent and half will be incongruent. The two trial types will be presented quasi randomly. The participants will be instructed to respond as
quickly and as accurately as possible. From the data, the Simon effect can be calculated, which is the proportional increase in reaction time between the congruent and incongruent trials. It is calculated using the formula (incongruent – congruent)/congruent. Using this formula rather than only subtracting the reaction time in the congruent trails from the reaction time in the incongruent trials corrects for potential baseline differences.

3.2.2. Trail making task

The trail making task will be used to assess switching (Armitage, 1946). The task consists of two parts. The first part is a neutral condition to assess baseline speed. During this part, participants will receive a sheet of paper with circles containing the numbers 1 to 25 randomly arranged over the sheet. Their task will be to connect the numbers in ascending order as quickly as possible. During the second part, participants will be presented with a sheet of paper containing the numbers 1 to 12 and the letters A to L. Those will have to be connected by alternating between letters and numbers in ascending order (e.g. 1-A-2-B etc.). Again, they will have to do this as quickly and as accurately as possible. This part of the test measures switching between mental sets of letters and numbers. Any mistakes will have to be corrected immediately or will be pointed out by the experiment leader if the participants do not notice their mistake themselves. Correcting of mistakes will add to the time of completion of the task.

For both parts, the time it takes the participants to complete them will be measured in seconds, which will be used to measure the switching cost. This is the proportional increase in time of completion between the neutral and the switching part. The formula to calculate the switching cost is (switching – neutral)/neutral.

4. Possible results

Because this is a study proposal written for a course, no real results can be presented. Instead, an expectation of what the results will look like will be described. First of all, it is expected that in both the Simon task and the trail making task, all participants will be significantly slower in the trials that demand the use of executive functions compared to the trials that do not. That is, in the Simon task it will take time to resolve conflict by inhibiting a response triggered by interfering stimuli and during the trail making task it will take time to switch between mental sets of numbers and letters.

Second, it is expected that this extra time needed to resolve conflict and to switch between mental sets will be comparable between monolinguals and bilinguals in both age groups. Thus, no significant differences are expected in the Simon effect and the switching cost between monolinguals and bilinguals.

Finally, it is expected that the Simon effect and the switching cost between the two age groups will significantly increase for both the monolinguals and the bilinguals, since both groups will suffer from some age-related cognitive decline. Furthermore, since the Simon effect and the switching cost are not expected to significantly differ between the monolinguals and bilinguals in each age group, the results are also predicted to show that the Simon effect and the switching cost will increase to the same extent between the two age groups for the monolinguals and bilinguals.
5. Discussion

In this paper, a study has been proposed that puts bilingualism as a potential factor to delay age-related cognitive decline in executive functions to the test. Recent studies have suggested that the bilingual advantage found in previous experiments might have been caused by confounding variables and not by the effect of bilingualism per se (e.g. De Bruin et al., 2015). Based on this, the current study proposal aims to replicate previous studies by Bialystok et al. (2004, 2008, 2014), which found that in bilinguals the age-related decline of executive functions was delayed compared to monolinguals. This will be done by matching the monolingual and bilingual participants on different possible confounding variables. Middle-aged and older monolingual and bilingual adults will perform in a Simon task and trail making task, used to tap into the executive functions inhibition and switching. The results are predicted to show that in both age groups there will be no significant difference in performance between the monolinguals and bilinguals, meaning that no cognitive advantage is predicted to be found for the bilinguals. Therefore, the results are expected to show that the age-related cognitive decline between monolinguals and bilinguals will be the same.

First of all, these results will suggest that bilingualism does not lead to a slowing of age-related cognitive decline in executive functioning. This is in contrast with previous studies reporting a delay in decline of executive functions in bilinguals compared to monolinguals (Bialystok et al., 2004, 2008, 2014; Gold et al., 2013), and suggests that the positive results in these studies might be explained by confounding variables. However, it is important to note that these results will not exclude any other possible effect bilingualism could have on cognitive aging. For example, studies have shown that bilingualism might delay the onset of dementia by 4 to 5 years (Bialystok et al., 2007; Craik et al., 2010). These studies have been criticized before on not controlling for immigration status. However, Alladi et al. (2013) found the same delaying effect of bilingualism on dementia after controlling for immigration status and other potential confounding factors. Furthermore, Bak, Nissan, Allerhand and Daery (2014) showed in their longitudinal study that bilingual participants of 72 years old had better general intelligence, memory, speed of information processing, reasoning, reading skills and verbal fluency than would be expected based on their childhood intelligence scores. This was a very well conducted study, as the participants were controlled for all important factors. Those results suggest that bilingualism might still be a potential factor to delay decline in other cognitive domains than executive control. A suggestion for future research is therefore to extent this line of research and to compare decline in cognitive domains such as memory and processing speed between carefully matched monolinguals and bilinguals.

Second, this study will add to the ongoing discussion about the bilingual advantage. That is, since it is expected that in both age groups the bilinguals will not outperform the monolinguals, it will contradict previous studies that have suggested that bilinguals have a cognitive advantage compared to monolinguals. On the other hand, it will be in line with studies that did not find evidence for an advantage (for recent overviews of the discussion on the bilingual advantage see Bialystok, 2017 and Antoniou, 2019). Whereas some authors that found null results have concluded that the bilingual advantage does not ex-
ist at all (e.g. Duñabeitia et al., 2014; Paap & Greenberg, 2013; Paap et al., 2015), others have argued that this conclusion is too radical. According to Bialystok (2017) “studies that have failed to find differences between monolingual and bilingual groups have instead found no differences, that is, null results, but are interpreted as negative results. However, absence of evidence is not evidence of absence.” (p. 253). A recent proposed alternative interpretation of the null results is that the underlying mechanism of the possible bilingual advantage might not be inhibition, but executive attention (Bialystok, 2017). Executive attention is the ability to monitor attention. According to this view, bilinguals do not inhibit one of their languages during speech, but rather focus their attention to the target language. The predicted failure of the current study to find a bilingual advantage on the Simon task (a task measuring inhibition) might support this view. If executive attention is the mechanism that is trained in bilinguals by focusing attention to the target language, they should outperform monolinguals on tasks assessing executive attention. In a recent study, Grundy, Chun-Fat-Yim, Friesen, Mak and Bialystok (2017) tested this in monolingual and bilingual young adults by measuring their attentional disengagement abilities. Disengagement of attention is the ability to shift attention away from previous information that is no longer relevant and to focus attention on current relevant information. They found evidence for enhanced disengagement abilities in the bilinguals compared to the monolinguals. If it is executive attention that is enhanced in bilinguals rather than inhibition, it would be interesting to see whether the results found by Grundy et al. (2017) could be replicated in bilingual older adults and if bilingualism can slow the decline in attentional abilities with age.

To conclude, the results of this study proposal are predicted to suggest two things: 1) that bilingual middle-aged and older adults do not show enhanced inhibition and switching abilities compared to carefully matched monolinguals, and 2) that bilingualism does not slow age-related decline in executive functions. Despite these null results, it is important to note that they should not be taken as evidence that the bilingual advantage does not exist at all or that bilingualism cannot contribute to slowing of age-related cognitive declines in any other way. Therefore, suggestions have been made for future studies to focus on the effects of bilingualism on other cognitive abilities, such as memory, processing speed and executive attention.

Received November 2017; accepted September 2018.

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Participiumconstructies in het vroegmodern Nederlands
De positie van het tegenwoordig deelwoord binnen de beknopte bijzin in de Statenvertaling

Participle constructions in early modern Dutch: the position of the present participle in the non-finite clause in the Statenvertaling

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Keywords
- participle clause
- early modern Dutch
- Statenvertaling

Abstract
In the current corpus study all non-finite clauses headed by a present participle in the gospel of Luke from the Statenvertaling are analyzed with respect to the position of this head. It is explored which factors from the fields of linguistics and literature studies possibly derived the position of the present participle. The results show that in many participle clauses in Luke the present participle is located in first position. Principles like ‘extraposition’ and ‘verb raising’ can only derive a portion of those constructions. A substantial portion remains where material is located after the present participle. This material consists of adjuncts and particles, which are prohibited from extraposition or raising. In order to derive those non-finite clauses, it is proposed that the present participle itself projects an extra projection containing a left-branching node (XP). The present participle is then moved to the head of that projection, which is the first position of the clause. One of the motivations triggering this movement is the need to mark text uttered by characters in the narrative.

1. Introductie
In het modern Nederlands worden participiumzinnen zoals (1) (beknopte bijzinnen met als hoofd een onvoltooid deelwoord) nog maar zeer beperkt gebruikt.

(1) Sander luisterde naar de docent, [zijn aantekeningen schrijvende].

In de vroegmoderne tijd had de participiumzin een veel prominentere plaats in het toenmalig Nederlands taalgebied. De Gouden Eeuw (17e eeuw) wordt in het bijzonder de bloeiperiode van het participium genoemd (Van der Horst, 2008). Ondanks dat het modern Nederlands en het vroegmoderne Nederlands binnen zinnen een vaste woordvolgorde met restricties op verplaatsingen van constituenten kent, blijkt in het vroegmoderne...

1 Mijn dank gaat uit naar Marjo van Koppen voor het geven van feedback tijdens het schrijven van dit artikel in scriptievorm tijdens het afronden van mijn bachelor Nederlandse Taal en Cultuur.
2 In dit artikel duidt het begrip participium uitsluitend het onvoltooid deelwoord aan.
Nederlands de positie van het participium binnen zijn beknopte bijzin onberekend. Zie (2) uit het vroegmoderne Nederlands.

(2) Zommige ruyters, nochtans, ontglipten [laatende paarden en waapenen achter].

(uit Van der Horst, 2008)

In tegenstelling tot de positie van het participium in (1), staat binnen de beknopte bijzin laatende paarden en waapenen achter in (2) het participium vooraan. Zinnen zoals (2) vormen bewijs uit het vroegmodere Nederlands voor een constructie waarvan het in de literatuur over het modern Nederlands onduidelijk is hoe deze woordvolgorde kan worden afgeleid. Literatuur over verplaatsing van participia in het vroegmoderne Nederlands biedt veel beschrijving, maar geen sluitende verklaring voor de woordvolgorde van deze constructies (Van Gestel et al., 1992; Hoeksema, 2003; Van der Horst, 2008).

Dit artikel geeft een beschrijving van de factoren die van invloed kunnen zijn op de positie van het participium binnen zijn beknopte bijzin in de Statenvertaling uit 1637. Ik zal aantonen dat sommige participiumzinnen in dit corpus alleen kunnen worden afgeleid door verplaatsing van het participium naar een hogere projectie met een vertakking naar links in de structuur. De Statenvertaling als literair werk biedt een literaire verklaring voor deze verplaatsing: het participium beweegt naar een hogere projectie om de persoonstekst te markeren. Hiermee wil ik aantonen dat het van belang is om bij het taalkundig analyseren van literaire teksten ook letterkundige begrippen te hanteren. Zo kan men ontdekken hoe de inhoud van de tekst van invloed is op taalkundig processen zoals verplaatsing van constituenten.

Dit artikel is als volgt opgebouwd. In paragraaf 2 wordt een theoretisch kader uiteengezet over de positie van het participium binnen de beknopte bijzin. Op grond van dit theoretisch kader komen in paragraaf 3 de hypotheses en methode aan bod. In paragraaf 4 volgen de resultaten van het onderzoek. Om deze resultaten te interpreteren, worden de hypotheses een voor een langsgelopen in paragraaf 5. Vervolgens worden in paragraaf 6 factoren behandeld die mogelijk van invloed zijn op posities van het participium. Paragraaf 7 sluit af met de conclusie.

2. THEORETISCH KADER

In deze paragraaf volgt een beschrijving van taalkundige principes die zorgen voor verschillende soorten woordvolgorde in participiumzinnen. Het zal blijken dat sommige constructies uit het vroegmoderne Nederlands door deze principes niet verklaard kunnen worden. Ook komt kort het letterkundige begrip stemmigheid aan bod.

2.1 DE STANDAARD POSITIE VAN HET PARTICIPIUM

Participia zijn niet-finiet: zij hebben geen getalskenmerken of tijdsbepaling. Ze hebben in het Nederlands echter wel het suffix –de of -d. Deze moet bij een functionele projectie
worden opgehaald. Bennis (2000) oppert het bestaan van een functionele projectie AspP die (on)voltooidheid uiteeit. Het participium verplaatst vanuit zijn verbale projectie daar naartoe om ‘–de’ of ‘–d’ op te halen. Zie de boomstructuur van de participiumzin uit (1), hieronder uitgewerkt in Figuur 1:

![Boomstructuur van de participiumzin zijn aantekeningen schrijvende](image)

In Figuur 1 is te zien dat het participium geen AgrP projecteert; PRO betekent dat het subject leeg is. Het subject van een conjuncte participiumzin wordt namelijk gecontroleerd door een argument in de matrixzin. Het participium verplaatst wel naar Asp om zijn suffix ‘–de’ op te halen voor zijn onvoltooidheid, maar er is geen hogere projectie waar het naar kan door verplaatsen. Het blijft daarom bij Asp staan. In de uiteindelijke participiumzin resulteert de landingsplaats van het participium in de finale positie. Op grond van bovengenoemde beschrijving kunnen we daarom concluderen dat participia de laatste positie van hun beknopte bijzin innemen.

2.2 Extrapositie

In paragraaf 2.1 is uitgelegd dat het participium binnen zijn beknopte bijzin blijft staan bij AspP, wat in de oppervlaktestructuur resulteert in de finale positie. Toch zijn er gevallen te constateren waar in de participiumzin het participium niet op de finale positie staat:

(3) De conducteur stapte op de treinreiziger af, [[AspP [VP PRO ø] bevelende], dat hij zijn kaartje moest laten zien].

In de participiumzin van (3) staat niet het participium, maar de objectzin op de finale positie. Volgens de theorie uit paragraaf 2.1 kan het participium in (3) niet verder verplaatst zijn dan AspP door het ontbreken van een hogere projectie. Hoe is deze woordvolgorde dan ontstaan?

De meest voor de hand liggende verklaring is het fenomeen genaamd extrapositie. Bij extrapositie moet een objectzin zich over het participium heen naar rechts verplaatsen (Bennis, 2000). *Dat hij zijn kaartje moest laten zien* in (3) is een objectzin, waardoor deze dus extrapositie ondergaat. Extrapositie is optioneel bij bijwoordelijke bijzinnen, bijvoeglijke bijzinnen en prepositieconstitucenten (Broekhuis & Corver, 2017).
2.3 HEAVY-NP SHIFT
Paragraaf 2.2 liet zien dat binnen een participiumzin een objectzin door middel van extraposition rechts over het participium heen moet verplaatsen. Er bestaan echter ook wel-gevormde participiumzinnen waarin niet een objectzin, maar een object-NP rechts van het participium staat, zoals in (4):

(4) Hans liep door de kamer, [f_AspP[vP PRO ø,] zoekende] een oud verfrommeld boodschappenlijstje van zijn vrouw.

In (4) bevindt het participium zich links van de NP een oud verfrommeld boodschappenlijstje van zijn vrouw. Dit soort constructies wordt door Stallings et al. (1998) gemotiveerd met het principe heavy-NP shift, wat inhoudt dat een lange object-NP naar het einde van de zin wordt verplaatst. De norm voor deze verplaatsing ligt op een NP van minstens 4 woorden langer dan de lengte van het andere materiaal in de zin (Hawkins, 1994). In (4) geldt dat de object-NP zes woorden langer is dan de overige woorden in de beknopte bijzin. Dat maakt dat na de verplaatsing van het participium zoekende naar AspP, deze NP vanwege zijn lengte naar rechts over het participium heen naar de finale positie van de beknopte bijzin verplaatst.

2.4 VERB RAISING
In de vorige paragrafen is er bewijs geleverd voor het bestaan van participia links van CPs en lange object NPs binnen de beknopte bijzin. De participiumzin in Figuur 2 vraagt echter om een andere verklaring dan extrapositie of heavy-NP shift.

Figuur 2. Boomstructuur van de participiumzin de vijanden proberende te vermoorden.
In Figuur 2 staat de constituent te vermoorden rechts naast het participium proberende. Dit is geen CP, PP of lange object NP, maar een infinitief. Dit infinitief is deel van de infinitiefzin de vijanden te vermoorden, waarvan het object de vijanden weer links van het participium staat. Hier heeft waarschijnlijk verb raising plaatsgevonden. Bij verb raising worden infinitive hoofden die een complement zijn van het matrixwerkwoord (bijv. objectzin), verplaatst en aangetoond aan het verb op de laatste positie in de zin (Bennis, 2000). Als de infinitiefzin een TP projecteert, haalt het infinitivale hoofd daar onderweg het woord te op. Het gevolg is een cluster van verba aan het zinseinde. Zo is in Figuur 2 te zien dat, na de verplaatsing van het participium proberende naar AspP, het infinitivale hoofd vermoorden uit zijn verbale projectie is verplaatst, te bij T heeft opgehaald en zich vervolgens aan het einde van de participiumzin heeft vastgehecht.

2.5 V1 POSITIE
Met alle mogelijkheden voor de positie van het participium binnen zijn beknopte bijzin die het theoretisch kader tot nu toe heeft geboden, kunnen we nog steeds niet alle constructies uit het vroegmoderne Nederlands verklaren. In (2) bijvoorbeeld, staat het scheidebare participium laatende op de eerste positie (hierna V1 positie) en het partikel achter op finale positie. Hoe het participium en zijn partikel in (2) gescheiden op deze posities terrecht zijn gekomen is in de literatuur nog niet helder verklaard.

Hoeksema (2003) deed onderzoek naar participiumzinnen in het vroegmoderne Nederlands waar het participium op V1 positie staat en de rest van de beknopte bijzin niet verklaard kan worden door de behandelde factoren uit dit theoretisch kader. Hij ontdekte een aantal correlaties die mogelijk samenhangen met de positie van het participium. Een van die correlaties is transitiviteit: in constructies waar de participia op V1 positie staan, zijn deze vaak transitief. Welke concreet syntactische verplaatsingen binnen de participiumzin deze correlatie veroorzaken maakt Hoeksema niet duidelijk. Ook hij geeft geen heldere verklaring en daarbij geen voorbeelden uit zijn corpus om deze correlatie onder te steunen.

2.6 INGEBEDDE COMMUNICATIE

(5) Huil veel, dacht hij, huil veel.

(uit Van Boven & Dorleijn, 2015)
Bij de analyse van de data uit dit artikel in paragraaf 6.3 zal blijken dat de verdeling van persoonstekst en vertellerstekst over de tekst invloed uitoefent op de positie van het participium binnen de beknopte bijzin. In de volgende paragraaf volgt de opzet van het huidige onderzoek. We zullen met name onderzoeken of het hiervoor uiteengezet theoretisch kader erin slaagt om de constructies van de participiumzinnen te verklaren.

3. Hypotheses en Methode
Met de bagage uit paragraaf 2 wordt de positie van het participium in de Statenvertaling geanalyseerd. Deze paragraaf bestaat uit een uiteenzetting van de hypotheses waarmee de data wordt verklaard als wel de methode voor het verzamelen van die data.

3.1 Hypotheses
Van participiumzinnen in de Statenvertaling waarbij het participium op finale positie staat wordt verondersteld dat deze zijn afgeleid door de verplaatsing van het participium uit zijn VP naar AspP, met de objecten in hun canonische positie. Voor dit onderzoek zijn we juist geïnteresseerd in participiumzinnen met een woordvolgorde waar de verplaatsing van het participium naar AspP niet voldoende blijkt. Dat zijn beknopte bijzinnen waarbinnen het participium niet op finale positie staat, maar vooraan of in het middenveld. Bij deze constructies worden drie hypotheses gesteld:

(i) Constituентen zijn over het participium heen verplaatst op grond van de uit het theoretisch kader gestelde taalkundige factoren;

(ii) Waar constituenTen niet over het participium heen kunnen zijn verplaatst, is het participium zelf over de constituenTen heen naar V1 positie verplaatst.

(iii) Waar het participium zelf naar V1 positie is verplaatst, kunnen daarna nog constituenTen volgens het theoretisch kader naar de finale positie verplaatsen. Dit zou zichtbaar zijn door materiaal, zoals partikels in het middenveld, dat is gepasseerd door zowel het participium naar links als door andere constituenTen naar rechts.

Methode
Het onderzoeksmateriaal betreft het evangelie van Lucas in de Statenvertaling. Voor de analyse is gebruik gemaakt van een online transcriptie van de originele bron uit 1637 (Van der Sijs, 2008). Een van de voornaamste doelen van de Statenvertaling was dat zij algemeen bruikbaar moest zijn binnen het Nederlandse taalgebied.

Tegelijkertijd moest de vertaling zo dicht mogelijk bij de Griekse en Hebreeuwse grondtekst blijven, mits het vroegmoderne Nederlands dat toestond (Van der Sijs & Willemijs, 2009). We mogen in de tekst dus uitgaan van participiumzinnen die volledig zijn aangepast op de conventies van het vroegmoderne Nederlands.

Alle participiumzinnen uit het evangelie van Lucas zijn gekwantificeerd. Alleen participia die het hoofd zijn van een beknopte bijzin zijn geanalyseerd. Het resultaat bestaat uit een overzicht van de participiumzinnen en hoe deze taalkundig functioneren.
4. Resultaten
Het evangelie van Lucas bevat 359 participiumzinnen. Deze participiumzinnen zijn allemaal conjunct. In Tabel 1 volgt een verdeling van de data in de verschillende posities van het participium.

Tabel 1
Frequentie en percentage (%) per type participiumzin in Lucas met betrekking tot de positie van het participium

<table>
<thead>
<tr>
<th>Positie participium binnen beknopte bijzin</th>
<th>Frequentie</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vooraan</td>
<td>163</td>
<td>45.40</td>
</tr>
<tr>
<td>Achteraan</td>
<td>104</td>
<td>28.97</td>
</tr>
<tr>
<td>Participium als enige constituent</td>
<td>62</td>
<td>17.27</td>
</tr>
<tr>
<td>In het middenveld</td>
<td>30</td>
<td>8.36</td>
</tr>
</tbody>
</table>

5. Analyse van het materiaal volgens de hypotheses
Deze paragraaf onderzoekt in hoeverre de constructies uit tabel 1 kunnen worden ondersteund door de hypotheses. Het zal blijken dat hypothese i (verplaatsing van constituenten naar rechts) onvoldoende is om alle data uit Lucas te verklaren en hiervoor hypothese ii (verplaatsing van het participium naar links) als aanvulling nodig heeft. Eén constructie vormt bewijs voor het plaatsvinden van beide verplaatsingen.

5.1 Hypothese I: Constituenten verplaatsen naar rechts
Een groot deel van de data valt af te leiden door aan te nemen dat constituenten over het participium heen naar rechts zijn verplaatst op grond van de in het theoretisch kader gestelde principes. Zie bijvoorbeeld (6):

(6) Ende de scharen vraeghden hem, [AspP [VP PRO ø, seggende] , Wat sullen wy dan doen j]?

Deze constructie is mogelijk te verklaren met het principe extrapositie. In (6) is het direct object een CP, wat betekent dat deze verplicht over het participium heen naar de rechterkant van de beknopte bijzin verplaatst.

5.2 Hypothese II: Het participium verplaatst naar links
Er blijven constructies over die het theoretisch kader niet kan verklaren. Deze constructies hebben allemaal het participium op V1 positie. Voorbeelden daarvan zijn constructies waarbij het participium voorafgaat aan een object-NP, zoals in (7):

4 Voor dit moment gaan we ervan uit dat extrapositie constituenten aanhecht aan de hoogste projectie van de beknopte bijzin, namelijk AspP.
(7) Ende van stonden aen was daer met den Engel een menichte des hemels chen heyrlegers, [prijsende Godt]

In de participiumzin in (7) staat het participium op V1 positie. Een manier om dit type constructie vanuit het theoretisch kader te kunnen verantwoorden is heavy-NP shift. Maar volgens Hawkins (1994) vindt heavy-NP shift pas plaats wanneer de NP minstens 4 woorden meer bevat dan de rest van de zin. Het object in (7) blijkt te kort om heavy-NP shift te ondergaan en kan dus niet zijn verplaatst. Hoe is deze constructie dan tot stand gekomen?

In aanvulling op het theoretisch kader stel ik voor dat in de constructies met het participium op V1 positie het participium een extra knoop boven AspP projecteert met een linkertak in de boomstructuur, waardoor deze alsnog naar die positie kan verplaatsen. Van (7) ontstaat dan de volgende boomstructuur:

Figuur 3. Boomstructuur van de participiumzin *prijsende God*.

In Figuur 3 is de object-NP *God* in zijn canonische positie blijven staan. Het participium *prijsende* heeft zich eerst op de gebruikelijke wijze naar AspP verplaatst en is vervolgens door verplaatst naar een knoop hoger in de boomstructuur, waar deze links op V1 positie terecht is gekomen. Participiumzinnen zoals Figuur 3 kunnen dan verklaard worden door verplaatsing van het participium links over het object heen naar XP. Alle constructies waar het theoretisch kader geen antwoord op heeft, de beknopte bijzinnen met het participium op V1 positie, kunnen op deze manier worden verklaard. Het maakt niet uit welke constituenuten na deze verplaatsing rechts van het participium staan of in hoeverre deze nog door middel van de factoren uit het theoretisch kader naar zinsfinale positie verplaatsen. Zie voorbeeld (8):

(8) Maer hy [[XP *willende*$_1$ AspP [VP PRO hem selven *ø*$_2$ ø$_1$] ] rechtveerdigen$_2$, seyde tot esum, [...]]

In (8) verplaatst het participium *willende* via AspP naar XP, waardoor deze op V1 positie terecht komt. Mogelijk ondergaat het infinitivale hoofd *rechtveerdigen* daarna nog verb raising. Of deze verplaatsing heeft plaatsgevonden is echter niet te zien aan de oppervlaktestructuur.
In constructies met het participium op finale positie of in het middenveld moet het partici-prium zijn gestrand in AspP en is het dus niet verder verplaatst naar een hogere projectie. Bijvoorbeeld (9):

\[
(9) \text{[[[AspP [vp niet [vp PRO \emptyset, \emptyset, \emptyset]] vindende], waer door sy hem inbrengen moechten, overmits de schare]], so clommen sy op het dack}
\]

In (9) staat het adjunct niet op de eerste positie van de beknopte bijzin. Het participium kan dus niet zijn verplaatst naar een hogere knoop dan AspP. Als het wel zou zijn verplaatst naar een hogere projectie, dan zou deze het adjunct hebben gepasseerd en was het op V1 positie terecht gekomen. Het adjunct markeert hier dus het ontbreken van XP. Hypothese ii kan deze constructie dus niet verklaren. Hypothese i kan wel verklaren waarom de objectzin waer door sy hem inbrengen moechten en de prepositieconstituënt overmits de schare rechts van het participium staan, namelijk door middel van extrapositie. Hypothese i is dus nodig voor deze constructies waarbij het participium zich in het middenveld van de beknopte bijzin positioneert.

5.3 Hypothese III: Het participium verplaatst naar links en andere constituenten verplaatsen naar rechts

In paragraaf 5.2 is de verplaatsing van het participium naar XP geïntroduceerd. Door deze verplaatsing kunnen alle participiumzinnen met het participium op V1 positie worden afgeleid. In zulke constructies kunnen verplaatsing van andere constituenten naar rechts ook hebben plaatsgevonden, maar dat is in de oppervlaktestructuur niet zichtbaar. De data bevatten echter één constructie die alleen verklaard kan worden door hypothese iii: het participium is naar XP verplaatst en andere constituenten zijn naar rechts verplaatst. Beide verplaatsingen zijn in deze constructie gemarkeerd. De constructie is weergegeven in Figuur 4.

\[
\text{Figuur 4. Boomstructuur van de participiumzin nemende wech dat ik niet gelecht en hebben.}
\]
In Figuur 4 is het scheidbare verbum wechnemen verplaatst naar AspP, waarna nemende als participium is doorverplaatst naar XP en zijn partikel wech heeft achtergelaten. Het partikel wech in AspP markeert dus de verplaatsing van het participium nemende naar XP. Het partikel zou door zijn landingspositie in AspP op de finale positie moeten staan. Toch staat de objectzin dat ick niet gelecht en hebbe nog rechts van het partikel. Dit kan volgens het theoretisch kader alleen worden verklaard door extrapositie. Het partikel markeert dus niet alleen de verplaatsing van het participium naar XP, maar ook de extrapositie van de objectzin naar finale positie. Zo hebben beide verplaatsingen zichtbaar plaatsgevonden in de oppervlaktestructuur.

6. Factoren die het participium naar links bewegen

In deze paragraaf worden drie factoren uiteengezet die mogelijk van invloed zijn op de verplaatsing van het participium naar XP in de data uit Lucas.

6.1 Informatiestructuur

De eerste factor is het links-rechts-principe. In de pragmatiek gaat men ervan uit dat in de zin bekende informatie voor de hoorder, de topic, zo ver mogelijk vooraan komt te staan. De constituent met de hoogste informatieve waarde, de focus, komt achteraan te staan (De Haan, 2002). Wanneer het participium in zijn beknopte bijzin bekende informatie bevat, of het moet ruimte geven aan de constituent met de hoogste informatiewaarde, dan zou deze factor mogelijk het participium naar XP forceren. Zie (10):

\[(10)\] Ende dese mensche was rechtveerdigh ende Godtvreesende, [[topic verwachtende
focus de vertroostinge Israëls]]

In (10) heeft het object de vertroostinge Israëls de hoogste informatiewaarde en moet het participium dus verplaatsen naar XP om het object als focus op finale positie te laten eindigen. Daardoor staat het participium zelf als topic op V1 positie.

Het grootste probleem in de data met betrekking tot informatiestructuur is het participium zijnde. In een aantal participiumzinnen staat deze op focuspositie, terwijl het als koppelwerkwoord de laagste informatiewaarde bevat. Uit vervolgonderzoek moet blijken waarom zijnde in deze constructies niet is verplaatst.

6.2 Transitiviteit

De tweede factor is de bevinding dat bijna alle participia op V1 positie transitief zijn en dus een object selecteren. In paragraaf 2.5 werd al genoemd dat dit de enige correlatie is die de data uit Lucas gemeen hebben met de data van Hoeksema (2003). Transitiviteit zou dus een factor kunnen zijn die het participium dwingt te verplaatsen naar XP. Intransitieve participia zouden in dit geval geen knoop boven AspP projecteren en daarom bij AspP op finale positie blijven staan. Er zijn echter ook participiumzinnen zoals (11), waarbij een intransitief participium op V1 positie staat.

\[(11)\] Ende aldaer was een cudde veler swijnen [[AspP [vp \_ [vp PRO \_]] weydende,] op den bergh]
Uitgaande van de factor transitiviteit markeert het intransitieve participium op V1 positie in zijn beknopte bijzin extrapositie van de overige constituenten. De data bevatten echter ook een aantal participiumzinnen met een transitief participium op finale positie, die een probleem vormen voor het principe dat transitieve verb en naar XP verplaatsen. Uit vervolgonderzoek moet blijken in hoeverre deze factor van transitiviteit houdbaar is voor deze data en hoe het dan mogelijk is dat transitieve participia op finale positie van hun beknopte bijzin kunnen staan.

6.3 Stemmingheid
In het theoretisch kader is het begrip stemmingheid gedefinieerd. Wanneer we kijken naar persoonstekst in Lucas, dan zien we dat deze wordt ingeleid door een participium in de vertellerstekst. Samen vormen het participium en de persoonstekst een beknopte bijzin. Het participium staat bij deze constructie altijd op V1 positie. De letterkundige factor die dit forceert is de volgende: participia die een persoonstekst inleiden, moeten naar XP verplaatsen om die persoonstekst te markeren. Deze factor is dus alleen van toepassing op participiumzinnen die op dit grensvlak liggen van vertellerstekst en persoonstekst. Dit type constructie bevat geen uitzonderingen op de voorbeelden in (12).

(12) a. [verteellertekst ende hy vraghde haer, seggende, [persoonstekst, dat ick ben?]]
   b. ende hy vraghde haer, [participium, seggende, [direct object Wie seggen de scharen dat ick ben?]]
   c. ende hy vraghde haer, [topic seggende, [focus Wie seggen de scharen dat ick ben?]]
   d. ende hy vraghde haer, [XP seggende, [AspP [VP PRO Wie seggen de scharen dat ick ben? ø]]]

In (12a) leidt het participium de persoonstekst in. Om die persoonstekst te markeren moet het verplaatsen naar XP De rest van de voorbeelden uit (12) laat zien dat op participiumzinnen waarbij het participium persoonstekst inleidt ook de taalkundige factoren uit paragraaf 6.1 en 6.2 kunnen worden toegepast. Aangezien de persoonstekst altijd het direct object is van het participium, is het participium per definitie transitief, waardoor het naar XP verplaatst (12b). De persoonstekst is altijd nieuwe informatie en daarmee de focus. Het participium dat de persoonstekst inleidt is dan per definitie topic en moet naar XP verplaatsen (12c). Al deze motivaaties voor verplaatsingen zorgen voor de structuur in (12d): het participium verplaatst naar XP en komt op V1 positie terecht. We zien hier hoe de taalkundige factoren samenvallen met een patroon dat we alleen kunnen analyseren met een letterkundig instrumentarium. De verdeling van stemmingheid beïnvloedt de verdeling van de informatiestructuur van de beknopte bijzin en de transitiviteit van het participium, waardoor deze naar XP moet verplaatsen.

7. Conclusie
In dit artikel is onderzocht welke factoren mogelijk samenhangen met de positie van het participium binnen zijn beknopte bijzin in het evangelie van Lucas in de Statenvertaling uit 1637. In de literatuur wordt aangenomen dat wanneer het participium niet op finale
positie staat, constituenten over het participium heen naar rechts zijn verplaatst onder invloed van factoren zoals extrapositie.

Uit mijn analyse van de participiumzinnen in Lucas blijkt echter dat in veel constructies met het participium op V1 positie, constituenten zich links naast het participium bevinden die volgens de literatuur niet over het participium heen naar rechts kunnen zijn verplaatst. Ik heb voorgesteld dat in deze constructies het participium een knoop boven AspP projecteert om daar vervolgens zelf heen te verplaatsen. Figuur 4 is de enige participiumzin in Lucas waar aan de oppervlaktestructuur is te zien dat het participium naar links is verplaatst en andere constituenten naar rechts zijn verplaatst. Beide verplaatsingen zijn in deze beknopte bijzin zichtbaar gemerkt door een partikel dat door het participium in AspP is achtergelaten.

Een mogelijke factor voor het verplaatsen van het participium naar XP is een letterkundige: bij participiumzinnen waar het participium persoonstekst inleidt, moet deze naar XP verplaatsen om deze persoonstekst te markeren. Zo kan deze constructie in Lucas inzicht geven in de motivatie voor de verplaatsing van het participium naar V1 positie.

Ontvangen in april 2018; geaccepteerd in september 2018.

BIBLIOGRAFIE
**Abstract**

This review paper compares three models seeking to account for force dynamicity encapsulated within language. A basic introduction to force representation in language will firstly be given. The three models under consideration, by Talmy (1988), Wolff (2007) and Copley and Harley (2015), will then be objectively explained and discussed briefly. Finally, by means of considering three aspects of each model, the models will be compared. The three aspects that will be discussed are the following. Firstly, the definition of the notion of force that is being handled in the models will be elaborated on. Secondly, the empirical coverage of each model will be under investigation. Finally, the models will be compared in terms of the degree to which they succeed in mapping their semantics onto the syntax the meaning arises from. It will be concluded that the models by Wolff and Copley and Harley come out best when the three models are compared with respect to the three aspects: Wolff’s model is able to model a great variety of dynamic events with different numbers of involved forces and the model by Copley and Harley is very successful considering compositionality.

1. **Introduction**

Until the end of the twentieth century, the semantic subfield of force dynamics was only marginally explored. This is remarkable, given its prominence and comprehensiveness: conceptual forces, as they are generally understood within force theory, underlie a broad range of dynamic situations. Several frameworks have been proposed which seek to provide an account of forces represented within linguistic material and the way the relevant involved entities behave with respect to those forces. In the present paper, three such models are firstly described and secondly compared to each other with respect to three aspects of force dynamic models.

Before turning to the discussion of the three models, the diversity of events which involve forces will be illustrated shortly. The most evident example of a situation involving a force is one involving a physical force. Consider the sentence in (1):

(1) The wind made the boat float away.

Among other forces, the event denoted by the sentence in (1) involves a force exerted by the wind on a boat, resulting in an event of the boat floating away. The notion of dynamicity, however, not only applies to events in which this dynamicity is directly visible, as is usually the case with physical forces, but also to situations in which dyna-
micity is more abstract. Consider, for example, situations such as the ones denoted by
the sentences in (2):

(2) a. John obliged Hannah to stop running.
   b. Brenda wants to fly very badly.

These situations do not only involve physical forces. Sentence (2) a can be viewed as invol-
vring a social force, brought forth by John, which is meant to stop Hannah from running. In
the sentence in (2)b, Brenda generates a psychological force consisting of a wish of flying.

In general, the properties of the relevant entities and forces result in specific situations,
which language allows its speakers to denote by means of all words, phrases and construc-
tions our linguistic machinery has to offer. What force theoretic models aim to do is to cap-
ture the apparent universality of force within their framework, and by doing so, to build a
bridge between language and reality with respect to force.

The present paper is structured as follows. Firstly, in section 2, the three models which are
under consideration in this paper – the one by Talmy (1988), the one by Wolff (2007) and
the one by Copley and Harley (2015) – will be introduced and explained one by one and
will be compared to each other on a general level. Secondly, in section 3, based on three
aspects of force dynamic frameworks, the three models will be compared in more detail.
Those three aspects are 1) the definition of force that is assumed in the three models, 2)
the empirical coverage of the models and 3) their validity with respect to compositiona-
lity. Those three aspects are assumed to constitute a great deal of the relevant properties
of force dynamic models. Moreover, these aspects are the most interesting ones to study,
since the three models differ greatly in these respects. Finally, based on the findings from
section 3, it will be followed up which model(s) can be said to be the most adequate of the
three models.

2. THREE ACCOUNTS OF FORCE DYNAMICITY
2.1 A FIRST ATTEMPT IN MODELLING FORCE DYNAMICS: TALMY’S MODEL
One of the first force dynamic models was proposed by Leonard Talmy (1988). What was
groundbreaking about his work at the time was that he abstracted away from causation
as a primitive, holistic notion by further decomposing it and by placing it within a broader
framework on the basis of which more dynamic notions could be modelled. Talmy ana-
yzed all dynamic events as involving two entities, which he called the Agonist and the
Antagonist, which exert opposing forces. He took those forces to fall in two categories:
forces arising from a tendency toward action and forces arising from a tendency toward
rest. The two forces exerted by the Agonist and by the Antagonist yield a resultant force,
which has the same direction as the force of the stronger entity, thus resulting in an event
of either action or rest (Talmy, 1988, p. 53-56). Talmy shows his framework to account not
only for physical, but also for psychological, social and argumentative force interactions,
which causes this framework to allow a broad range of linguistic material to be displayed
using a very minimal set of aspects: the two entities, the direction and relative strength of
their forces and the outcome of the interaction.
One of the most disputed aspects of Talmy’s model is that it assumes the forces exerted by the Agonist and by the Antagonist to be opposing (Talmy, 1988, p. 54). This assumption raises problems in modelling linguistic structures denoting dynamic events with entities exerting forces in the same direction. This is the case with a verb like *help*, which seems to denote situations in which the two interacting entities are working toward a shared goal. Talmy accounts for this problem by posing that, for a verb like *help*, the Agonist is trying to accomplish a certain goal and the Antagonist is constituted by an abstract entity preventing the intended goal from being accomplished. The helper, in this case, is an external entity abating this Antagonist and by doing this the helper facilitates accomplishing the goal (Talmy, 1988, p. 64). This way of accounting for the problem might be judged to be cumbersome and in the next section the second model will be discussed, which provides a more elegant solution to this problem.

2.2 Rejecting necessarily opposing forces: Wolff’s model

The problem posited by situations involving non-opposing forces forms the basis of one of the most outstanding differences between Talmy’s model and the second model discussed in this paper, which was proposed by Wolff (2007). Wolff reformulates the elements in Talmy’s model into three binary questions to determine the nature of the dynamic predicate: whether the patient (corresponding to the Agonist in Talmy’s model) and the affector (corresponding to the Antagonist) are in concordance or not, whether the patient has a tendency toward the end state or not and whether the end state is approached or not (Wolff, 2007, p. 6). Wolff’s model therefore roughly agrees with Talmy’s model regarding the way of approaching dynamicity, but it allows the forces exerted by the interacting entities to be in concordance. What is more, Wolff leaves open the possibility of the resultant force to be a product of more forces than just those exerted by the two main entities, as will be seen in section 3.2.

Talmy and Wolff both argue purely from the semantics of dynamic predicates – they decompose and analyze the reference of linguistic representations of dynamic events. In the next section, a third model will be discussed, in which quite a different starting point is taken.

2.3 The syntax-semantics interface as a starting point: Copley and Harley’s model

A different starting point in analyzing dynamicity than adapted by Talmy and Wolff was taken by Copley and Harley in their 2015 paper. In this paper, Copley and Harley develop a new framework on force dynamics, which reasons from the syntax-semantics interface and will be our third model under consideration. Their main purpose is to account for so-called non-culminating events, which are situations in which the telos associated with parts of the linguistic product is not reached due to the presence of intervening forces. They do this by adapting a definition of the notion of force in which the presence of a force does not directly imply the occurrence of its associated effect: forces can interact with and thus be nullified by other forces. The authors suggest that dynamic verbs refer to forces rather than to endpoint situations, so that non-culmination is taken to be the default rather than the exception (Copley & Harley, 2015, p. 104). In favor of this standpoint they also deliver cross-linguistic evidence.
Also, Copley and Harley particularize away from the idea of one broad causative function by presuming that every dynamic verb refers to a unique force with a unique result (Copley & Harley, p. 116 & 119). More specifically, they analyze the semantics of dynamic verbs to be twofold: on the one hand, they refer to a force, exerted by an entity, and on the other hand, they refer to the unique final situation aimed to reach by means of exerting that force (Copley & Harley, 2015, p. 123-124). The authors are successful in applying this dual analysis of dynamic predicates onto the different syntactic projections present within the linguistic material, as will be further elaborated on in section 3.3.

3. COMPARATIVE ANALYSIS OF THE THREE MODELS

Now that the main characteristics of the three force dynamic models concerned have been outlined, the main differences between the three models will be elaborated on by considering three aspects of each model. Firstly, the differences in what the models take to be the characteristics of the notion of force will be laid out (section 3.1). Secondly, their applicability and power of expression is discussed (section 3.2). Finally, the models will be reviewed considering compositionality (section 3.3).

3.1 INTERPRETATION OF THE NOTION OF FORCE

Firstly, it will be discussed how the definitions of the notion of force differ in the three models. Talmy and Wolff take force in all dynamic events to be inherently equal: what gives rise to the meaning of different dynamic predicates is the way the interacting entities are oriented toward one another and the direction and relative magnitude of the relevant forces, rather than the nature of the forces itself. Copley and Harley, however, take each force to be of a different kind: when two forces are associated with different starting or endpoint situations, they are different forces (Copley and Harley, 2015, p. 112). This difference in the definition of force can also be understood as a difference in the temporal interval within the overall causal chain of events which is referred to by force.

The diagrams in Figures 1 and 2 display the part of the event chain which the models under consideration interpret as force. Both diagrams show two events, of which $e_0$ is the starting situation and of which $e_1$ is the endpoint situation. The two events are chained together by a force transforming $e_0$ into $e_1$. The arrow underneath the force and the two events is a schematization of the time: the transformation of $e_0$ into $e_1$ happens over time. The bold line underneath the time axis displays the demarcation of the event chain which the models take to constitute the definition of force.1 As can be seen, Talmy and Wolff, on the one hand, interpret force purely as what causes $e_0$ to transform into $e_1$ (as is shown in Figure 1), whereas Copley and Harley, on the other hand, take a force to be the entire transformation of the specific event $e_0$ into the specific event $e_1$ (as is shown in Figure 2).

1 Note that in the analysis given in Figures 1 and 2, $e_0$, $e_1$, and $e$ can take place at the same time, so that the time it takes for $e_0$ to transform into $e_1$ is zero. This is the case with verbs of activity such as to dance, where the dancing happens simultaneously with the force causing the dancing to happen being exerted.
From this distinction it necessarily follows that under the definition used by Talmy and Wolff, all forces are the same in nature, whereas under the definition used by Copley and Harley, no two forces are the same unless they are associated with the same $e_0$ as well as the same $e_1$.

While the models by Talmy and Wolff on the one hand and the model by Copley and Harley on the other hand clearly differ with respect to the way the notion of force is interpreted, neither of the two approaches seems to be notably more adequate or powerful than the other. Therefore, in this respect, none of the three models under consideration is deemed to deserve our preference over the other two. In contrast, the next section, in which the expressional power of the three models will be discussed, shows that one of the three models stands out compared to the others.

### 3.2 Empirical coverage

In this section, it is aimed to get insight into the degree to which the two models correspond with respect to power of expression. This will be done in two parts. In section 3.2.1, the models’ applicability to different domains in which forces appear to play a role will be under discussion. In section 3.2.2, it will be investigated to what degree the models stand ground in modelling situations in which different amounts of forces are involved.
3.2.1 Applicability to different domains

In his original paper from 1988, Talmy elaborately discusses the way in which his framework can be extended to different domains. An example of how his framework can be extended to another domain than that of physical force dynamicity is given. Consider the sentence in (3):

(3) Peter restrains himself from eating.

The sentence in (3) contains the psychological verb to restrain. To be able to model psychological verbs like to restrain, Talmy assumes a so-called divided self: the forces being exerted arise from different 'parts' of the self (Talmy, 1988, p. 69). In the sentence in (3), the Agonist is a part of Peter with a tendency toward action (or, more specifically, toward eating), but this force is overcome by the force exerted by a stronger Antagonist, which is taken to be a different part of Peter, with a tendency toward rest. In similar ways, Talmy also shows his framework to be able to account for not only physical and psychological but also for social and argumentative force interactions. For a more precise description of how he does this exactly, I would like to refer to Talmy (1988).

Wolff proves his model to be applicable to physical, psychological and social force interactions. He does this by carrying out a series of experiments in each of which it is tested to what degree the predictions made by his model about situations in a domain in which forces play a role agree with the way participants described those situations. The way the participants described the situations were mostly in accordance with the predictions made by his model, indicating that for all the different domains that his model was tested with, namely physical, psychological and social force interactions, the model is adequate.

Copley and Harley do not explicitly describe the way their model can be extended to different domains. However, they assume that when forces are taken to be inherently abstract, a model for physical forces can easily be generalized to account for other domains as well (Copley & Harley, 2015, p. 113). By stating this, the authors assume to have accounted for the applicability of their model to different domains, too.

Intuitively, neither of the three models seems to greatly stand out concerning its applicability to other force dynamic domains. The papers in which the models are proposed, however, differ in the explicitness with which this applicability is laid out. What is relevant for the present discussion is that Talmy is the most explicit in this respect and that Wolff has shown empirically that his model is extensionally adequate. These models will therefore be preferred here. Also, further research is required to demonstrate explicitly the applicability of the other model by Copley and Harley to the domains the model has not yet been empirically tested for.

3.2.2 Modelling different numbers of forces

As has been shown in the previous section, the applicability in the different domains does not seem to constitute a problem for either of the three models directly. In this section, we
will see to what degree the models are successful in describing situations involving differing numbers of forces.

Firstly, modelling linguistic structures which on the surface do not denote more than one force will be considered. This is something in which the model proposed by Copley and Harley comes out best: Talmy and Wolff assume that there are always two forces. This does not seem to be the case with the verbs in the sentences in (4):

(4)  
   a. Mary dances in the bathroom. 
   b. Manny bakes a cake.

The model by Copley and Harley is able to account for the dynamicity of these verbs as follows. Recall that Copley and Harley decompose the meaning of dynamic predicates into a part selecting for agentivity and a part denoting the final situation of the dynamic event. In the case of the sentences in (4), the agentivity is denoted by the exertion of a force causing the dancing in the case of *to dance* or the baking in the case of *to bake* and the final results are the taking place of the dancing and the existence of a cake. So, whereas Copley and Harley easily model these verbs, it is hard to imagine how Talmy and Wolff would, since they both assume more than one force per force interaction.

Copley and Harley’s model, therefore, comes out best as far as modelling one-force-events is concerned. However, while their main purpose is to account for non-culminating events, they are unclear as to how to model the involvement of more than one force: they propose a way of integrating non-culmination into their framework by suggesting that the presence of a force itself does not imply the occurrence of its associated final situation, but they do not show how this non-culmination comes about in the presence of intervening forces. That is what the models proposed by Talmy and Wolff do best: they can model two forces and they use the aspect of relative force strength to account for the outcome of the interaction. In this way, the models proposed by Talmy and Wolff also seem to neatly account for non-culminating events: the exerted force of one entity, which has an intended result, might not be able to bring about this result because of a stronger force exerted by another entity.

Having noted that Copley and Harley seem to be able to only model one force, the framework proposed by Wolff is the only one able to model more than two forces: Talmy assumes two entities which both exert one force, whereas Wolff also takes into account the resultant force of the other forces present in the interaction (besides those exerted by the two relevant entities) (Wolff, 2007, p. 7).

It seems as if the model by Wolff is able to model a wider range of force interactions concerning the number of involved forces than the models by Copley and Harley and Talmy are. Also, in section 3.2.1, it has been concluded that the models by Talmy and Wolff are the most explicit in accounting for their applicability to different domains. This section will therefore be concluded by mentioning that Wolff’s model can be preferred with respect to empirical coverage.
3.3 Syntax-semantics mapping

Finally, the degree to which the three models are accurate in the light of compositionality will be discussed. The principle of compositionality holds that “the meaning of a [...] whole is a function only of the meanings of its [...] parts together with the manner in which these parts were combined” (Pelletier, 1994, p. 11). This principle is mainly motivated by the creativity aspect of language: we are able to interpret linguistic products we have never heard before (Partee, 1995). This means that in order to attach meaning to sentences, we are able to only rely on information that is present within the sentence, namely the meaning of the individual elements and the underlying sentence structure. The principle thus forms the basis of language comprehension and meaning it is therefore a prerequisite for any semantic model.

Talmy and Wolff both argue purely from the semantic value of dynamic verbs and the syntax is therefore not of utmost priority. Wolff makes no attempt to map the elements in his model onto the syntax. Talmy indicates which elements in his dynamic diagrams correspond to the subject, the object and the verbal phrase by labelling the elements corresponding to those constituents with ‘1’, ‘2’ and ‘VP’, respectively (Talmy, 1988, p. 61). This works to a certain extent, but it makes his semantics-to-syntax-mapping quite rough and undetailed compared to how Copley and Harley’s model performs with respect to compositionality.

Copley and Harley, on the other hand, reason from the syntax-semantics interface, resulting in a model which is relatively successful mapping its semantic analysis onto the syntax. Firstly, they account for the origin of external arguments by stating that they are selected by a voice phrase denoting the source of the force. Secondly, concerning the verbal phrase and the internal argument, Copley and Harley analyze dynamic situations as denoting an endpoint situation and the force necessary to reach that endpoint situation. This dichotomy is integrated into the syntax by making use of the notion of vP. The vP is an extension of the verbal phrase which decomposes verbs into a part selecting for agentivity and a part consisting of the lexical root, which denotes the endpoint situation of the dynamic verb reference (Carnie, 2013). Copley and Harley map the twofold semantics of dynamic verbs as described above onto the vP on the one hand and its complement, a small clause (SC), on the other hand: the agentive part of the verb, the exertion of the force, is denoted by the vP head and the final situation, which is the endpoint of the dynamic verb reference, is referred to by SC (Copley & Harley, 2015, p. 123). This is shown in Figure 3.

In this example, the force is exerted by the VoiceP head, which is Mary. The door being open is the final situation of the vP open the door, so that situation is represented in SC. The dynamicity that precedes that final situation, then, is indicated in the vP head. In the realization of this phrase, however, the vP head is silent.

As we have seen, Talmy analyzes the verbal phrase in a sentence without mapping more specific units within the verbal phrase to more specific elements within his framework. Copley and Harley, on the other hand, decompose the verbal phrase and propose a systematic way of mapping specific parts of the verbal phrase on the elements within their model. With respect to compositionality, therefore, the model by Copley and Harley will be preferred here.
4. CONCLUSION

Now that the three models have been compared, we are in a position to try and look whether one of the three models turns out to be outstandingly more adequate than the other two, overall. Let us summarize the findings that have come forward. In section 3.1, it was concluded that the models clearly differed with respect to the way the notion of force was defined, however none of the different approaches seemed more accurate than the other. In section 3.2, Wolff’s model was taken to be the most accurate one, for it seemed to have the most expressive power in terms of its applicability to different domains and its ability to model dynamic events with different amounts of forces. Finally, the model by Copley and Harley was preferred in the light of compositionality. All things considered, therefore, the models by Wolff and Copley and Harley can be said to be more accurate than the one by Talmy. Both models are not comprehensive, however: Wolff’s model performs poorly with respect to compositionality and Copley and Harley’s model is unable to model more than one force.

It seems as if in modelling phenomena in general, we have to do with a trade-off between universality of the phenomenon and comprehensiveness of models aiming to capture that universality. Force dynamics is a very broad and widely applicable topic, which would make accurate models of force dynamics extremely powerful, but which simultaneously hampers the development of such a comprehensive model, precisely because it has so many aspects enforcing demands on those models. Up until now, no solution for this trade-off has been found, but as attested by the models discussed in this paper, the future is looking bright.

References

Language planning and media
The case of Occitan in Italy

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Abstract
This study investigates the current status of Occitan in Italy, focusing in particular on the development of this language and on its language planning and the use of contemporary media as a way of maintenance. I provide an overview of Occitan and its origin, then I evaluate the state of language planning to understand if something is being done by the institutional authorities to promote the language and to revitalize it. Then, newspapers, music, radio and other cultural and educational activities in Occitan are analyzed. Concluding, it can be stated that despite the limited area where the language is used, the desire of the speakers to promote their culture and their traditions is still strong.

1. Introduction
This paper will examine the current status of one of the minority languages active on the Italian territory, Occitan. This language has its origin in the 11th century and its cultural and social importance are largely recognized not only in Italy but also in France and in Spain. However, despite the historical and cultural relevance of Occitan, there are only a few studies (Micali, 2016; Giordano, 2015; Benedetto Mas and Giordano, 2015) investigating its status in Italy.

In order to correctly frame Occitan as a minority language in Italy, we have to consider the fact that this language is strictly connected to the culture and traditions of its speakers as a representation of their identity. To understand the current status of Occitan in Italy, I consider it relevant to provide a general overview of the language history, its origins and its status today first. Based on this, I developed my research questions, which are the following: What is the present status of language planning for Occitan in Italy? How do media contribute to the maintenance and the development of the Occitan language?

The purpose of this study is to identify the operations that are currently active on the Italian territory and to understand how these can contribute in keeping the language alive. I will do this with an online study of the activities and media available in Occitan language. This analysis will demonstrate that the use Occitan is stimulated in different ways, for example by cultural activities, music, education programs and by different institutions.

1.1 The origins of Occitan
The Occitan is a Romance language and is also known as langue d’oc, a name that was given by the Italian writer Dante Alighieri. The culture and the language have ancient
origins that go back to the 16th century, when it was diffused by the troubadours, composers who were performing in courts of the South of France and later in Italy and Spain, the area which was then called Occitania. In its history, the Occitan culture was influenced by Christians, Hebrews and Catari and it was characterized by a cultural, political and, more importantly, linguistic diversity. Between the 16th and 17th century in Italy, Occitan was mainly spoken in the northern valleys, by the Valdesi. These communities used to be trilingual, speaking French, Occitan, also called patois, and Piemontes 1. In the 17th century, a religious persecution took place against the Valdesi. This event forced most of them to move to France, to Switzerland or to other regions of Italy. Only in 1848, the right of the Valdesi to freely profess their religion was recognized.

Finally, in the 19th century, with the diffusion of Romanticism, the awareness of Occitan as a language increased. The Manifesto o Carta di Chivasso [Manifest or Charter of Chivasso] was the first real written example during the Second World War. With this manifest, Occitan started to be seen as a reflection of the identities of the communities living in the Valdesi valleys. The acknowledgement continued in Italy in the 1960s with the foundation of the association Escolò dòu Po (1961). Their aim was to develop the Occitan culture and language, mainly by proposing a unified spelling for the Italian dialects of Occitan, and by maintaining the relationship between Piedmont and the south of France, regions that shared the Occitan and Franco-Provençal languages. Starting from the 1960s, and even more in the 1970s, new journals in Occitan began to publish content with a more political inclination. However, all were driven by the need to restore the Occitan culture as an expression of the identity of these communities. 2

1.2 Occitan today in Italy

Nowadays, Occitan is spoken in the region of Piedmont, in the municipality of the cities of Cuneo and Turin, and in the southern municipality of Guardia Piemontese. With the law 482 of 1999, the Italian State officially recognized it as a historical minority language. This term, minority language, means that Occitan has its own independent system and that it is part of the Romance language group, but it is not strong or used enough to be adopted as national standard language (Berruto, 2015). Despite being recognized by the national law, many linguists still consider it at risk. The main reason is that Occitan is mostly spoken by adults and there are few schools in this region that provide classes in Occitan. It is, according to Regis (2015), difficult to exactly estimate the number of speakers of Occitan in Italy, and different authors provide distinct data. The latest number listed is from the estimates of Regis (2012), which indicates that there are around 20,000 active speakers of Occitan in Piedmont. 3

1 As Naoko Sano states “Il patois era la lingua popolare, ... il francese era la lingua della chiesa e la lingua dello Stato, i Savoia parlavano francese, (...) l’italiano è arrivato soltanto dopo” [The patois was the popular language, ... the French it was the church language and the state language, the Savoy they spoke French (...) the Italian arrived only after] (Naoko Sano, Un lingua in cammino, ed.Chambra d’Oc, Saluzzo, 2008, p.48.)

2 Some examples are Ousitanio Vivo, Lou Soulestrelh, Novel Temp and Valados Ustianos (1977)

3 This number is based on estimates made by Regis (2012) using data collected by the ISTAT (National Institute of Statistics for Italy), these data refer to the application of the percentage of the use of dialect in each family on the total residence in the area of interest.
It is also important to note that Occitan is not only spoken in the valleys near Turin, but also in Calabria by a small community in the Italian municipality of Guardia Piemontese. This variety of Occitan has to be considered carefully. In fact, as expected, it has received the influence of standard Italian and Calabrese, the dialect of the region where the municipality is located. This small speaking community is the descendant of an ancient settlement of the Valdesi, who moved there during the persecutions of 17th century (Micali, 2016).

2. RESEARCH QUESTION AND HYPOTHESIS
According to the preliminary research, studies on Occitan and its language planning are relatively limited. In order to correctly present and create an efficient plan, it is important to have an updated overview of the current status of the language. Following this reflection, two research questions were developed: (i) What is the present status of language planning for Occitan in Italy? (ii) How do media contribute to the maintenance and the development of the Occitan language?

I will first focus on the status of language planning in Italy, and proceed with a quantitative analysis of the media in Occitan nowadays. I will mainly look at websites, newspapers, journals, radio and social media published in Occitan. With the preliminary research and the review of the literature, it was found that Occitan is significantly used in the Italian media. I believe that a more accurate analysis, regarding the status of the language planning, will confirm the impact that Occitan has in the society, in the culture, and in the everyday life of the population of the regions in the north of Italy.

3. ANALYSIS
3.1 LANGUAGE PLANNING
In the field of sociolinguistics, language planning refers to the active role of the official Institutions or of the individual communities, and the functions they adopt in order to prevent the languages at risk from disappearing. Following the definition of language planning of Cooper (1989: 45), we can say that it is the "deliberate efforts to influence the behavior of others with respect to the acquisition, structure, or functional allocation of their language codes".

Many models and theories have been developed in the context of language planning. In general, a well-constructed language planning can revitalize weaker languages by means of three operations: corpus planning, acquisition planning, status planning. The first one focuses on the codification of a writing and orthographic system. The second concentrates on the acquisition of the language at family and education level, and the third on the promotion of the use of the language by institutions and official organizations. In this analysis and in the remaining part of the study, I will examine the current status of Occitan in Italy, considering the definition of language planning and of these three operations.

3.1.1 Corpus planning
First of all, I will focus on corpus planning, which aims at a normalization of the language. Overall, I have noticed during my research that there are different dictionaries, many of
which also available online, but there is a lack of grammars. Most of these dictionaries focus on the dialects of specific northern valleys of Italy. An example is the Dictionary from Pey de Lizan (1983) or the one written by Pons and Genre (1997), that also describes the morphology of the Occitan dialect in the Germanasca valley. A more recent work is the one from Zörner (2008), where he focuses on the dialects of the Po valley, located in the municipality of the city of Cuneo. Another important text is Dizionario Occitano Robilante-Roccavione (Artusio et al. 2005).

In 2008, the International Committee for the linguistic normalization of Alpine Occitan\(^4\) constituted a bilingual dictionary of a standard Alpine Occitan. This text aimed at describing this language and its general rules, phonetic transcriptions, orthography, and lexical entries\(^5\), rather than focusing on the rules of local dialects of Occitan.

### 3.1.2 Acquisition planning

Along with Occitan normalization, education is another crucial element for the maintenance of the minority languages. Acquisition planning aims at influencing the institutions, such as schools or private institutes, in order to offer the minority language as part of the school curricula. Often, the decision regarding the public education receive political influences, as most of the times prestigious languages are chosen first (Cooper, 1989). If the children will not learn Occitan, either because there are no courses available in public schools or because the parents do not speak it at home anymore, the maintenance of this language is at high risk.

There are very few primary schools offering classes in Occitan or bilinguals schools in Italy and most of them only organize cultural projects rather than grammar classes. Despite this, it is possible to find online courses available for free, for example in the websites of the Chambra d’Òc\(^6\) and Espaci Occitan\(^7\). Regis (2015), also listed an available source for education an Occitan handbook written by Anghilante and Bianco (2002, 2006). The latest edition includes grammar, exercises and literature, mainly conceived for children at their first year of primary school. Other examples are the grammars from Previato and Calliero, made of two volumes, the first in 2009 and the second in 2012, both written for courses organized by the Institute Gouthier in Perosa Argentina.

### 3.1.3 Status planning

The last important point in language planning is the effort that the institutions make in order to revitalize the languages and keep them alive. Status planning refers to the language social and political importance and status if compared with other languages

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\(^5\) With this term we refer to the Occitan variety spoken in Piedmont, and all its variant in the region.


First of all, I would like to refer again to the Italian law of 1999, that is the most important example of an official recognition of Occitan as a minority language in the Italian territory from the government. Together with this, Occitan, as a language and cultural minority heritage of Piedmont, is also protected by the Regional law (LR) n. 58/1978. One of the most important cultural institutions is the Chambra d'Òc, which continues to work actively in the Italian territory in association with the region of Piedmont and with the municipalities of the different valleys. The actions taken by this institution cover different sectors: the first is the linguistic-cultural one, whose main aim is to promote bilingual and cultural education, to produce teaching materials, realize pedagogic activities, to train teachers, and so on. In the international sector the association is committed to become part of events also outside Italy. The last one is the production sector, that aims at promoting local craft and gastronomic products that are made in the Occitan valleys.

Other projects are offered by the cultural association CESDOME0, in the municipality of Turin. This association’s main purpose is the preservation of the language, and for this it makes information about the minority languages available to everyone, in particular Occitan and Franco-Provençal.

3.2 Media in Occitan in Italy

From what we have seen so far, associations and institutions are trying in many ways to keep Occitan alive, but there is still much more to accomplish. This means that methods and plans will have to improve, to stop a decline in the use of the language. The importance of new media for minority languages has been recognized by many researchers, Jones (2012) for example. The new media, like television, radio, music or online newspapers, can play an important role by reaching parts of population that other cultural and linguistic activities can not.

I would like to proceed with the analysis of the main newspapers, radio, music bands active in the territory and available online. The purpose is to try to understand if the media are influencing the status of Occitan and how this can be connected to language planning.

Table 1 gives an overview of the media available in Italian and in Occitan in the region of Piedmont, specifically in the municipalities of Cuneo and Turin. The data were taken from previous papers on the topic (Giordano, 2015), and from the website of CORECOM. This source was mainly used to find a complete list, updated at the year 2018, of all the broadcasting and publishing companies, divided per municipality, whose address was officially registered in the region of Piedmont.

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8 The last regional law (RL) was issued in 2009, but right after it was also judged to be against the Italian Constitution. For this reason, for the moment the region has issued the law LR n. 58/1978 to ensure the protection of the minorities languages in the region. (Regis, 2015)


10 Corecom - Comitato Regionale per le Comunicazioni del Piemonte [Corecom – Regional committee of communication of Piedmont] Retrieved from http://www.cr.piemonte.it/web/per-il-citadino/corecom. Last viewed 02/04/2018
Table 1
*Overview of the media in Italian and in Occitan*

<table>
<thead>
<tr>
<th>Media in Italy</th>
<th>Italian</th>
<th>Occitan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio programs</td>
<td>25 radio stations</td>
<td>4 programs, 1 radio station</td>
</tr>
<tr>
<td>Music</td>
<td>245</td>
<td>50</td>
</tr>
<tr>
<td>Journals and periodical</td>
<td>45</td>
<td>4</td>
</tr>
</tbody>
</table>

As I mentioned in the beginning, Occitan is also spoken in the municipality of Guardia Piemontese. However, registered in this area, there are not enough information or materials available online to carry out a proper comparison with the Italian media, as I did for Piedmont. Despite the lack of resources, I would like to illustrate an interesting project that was realized in cooperation with the University of Calabria, the broadcast “Arberia TV Occitana”, to promote minority languages in the region, Occitan and Albanian.

In Piedmont, a total of 25 radio stations were found. Just one among these is exclusively in Occitan language: Radio Planeta Occitània. Only 4 radio companies provide in their schedules programs in Occitan and aim at promoting the culture and tradition, covering also the most current issues. Some examples of programs are *Occitania*, in collaboration with Radio Tre Rai, *Rabadan* (from 2006 until 2010) and *SLENGadOC* (from 2012) in the schedule of Radio Beckwith Evangelica, and two programs in the regional radio: Radio Dora and Radio Frejus.

As for the music, I only considered groups active at the time of the research in the Italian territory (Benedetto Mas & Giordano, 2015). The authors Benedetto Mas and Giordano estimated 50 active groups in the Italian territory who use Occitan as the main language, compared to the 245 groups in total that are active in the Region. In this context, beside the bands and singers working in Italy on traditional music, I also found more recent reinterpretations in folk rock, reggae or pop groups or even metal, of Silvio Peron. Nowadays two of the most famous singers in this diverse music scene are Lou Dalfin and Lou Seriol. They reinterpreted traditional and popular melodies and dances, adapting them for a younger audience. This analysis shows the importance of the music scene, in a context where a language like Occitan is threatened by the use of other dialects, like Piedmonts, or by the Italian standard itself. Music is not only significant on a linguistic perspective but also on a cultural one. It helps the youngest generations to feel closer to their past tradition and it encourages them to make use of their traditional language more often. It is even more important, and makes us understand the validity of this medium, that some bands or singers in the valleys of Piedmont, for example Lou Dalfin, learned Occitan as a second language. This demonstrates how language is connected to identity and shows the bond that these singers have with their territory and their culture.

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11 This program was not included in the number presented in Table 1. It was in fact not anymore available at the website of the Radio Beckwith Evangelica; however, I believed it was important to mention it.
The latest data, reporting the number of active singers in Italy, was not available online\textsuperscript{12}, despite the fact that most of the information I collected are updated when this paper was written (April, 2018).

Another issue I would like to consider in this section is the use of periodicals and journals. The tradition of press in Occitan, goes back to the 60s, when the first journals were published. I found, through the website CORECOM, that the total of journals and periodicals, whose main offices are found in the municipalities of Cuneo and Turin, is 45. Among these periodicals there are 4 published in Occitan or in bilinguals Occitan-Italian. The first I would like to present is Ousitanio Vivo, a monthly review in French, Italian and Occitan (20-30\%) dealing mainly with political issues.

Soulestrelh is a four-monthly journal, which includes some texts in Occitan. The publication of both Ousitanio Vivo and Soulestrelh were collected online from the association Lou Soulestrei, born in 2014\textsuperscript{13}, whose aim is to promote this language and culture.

Moreover, there is also R Nid’Aiigura, a semestral six-monthly journal which includes 10-20\% of texts in Occitan, and Valados Usitanos, a quadrimestral cultural review including 20-30 \% of Occitan. In the municipality of Turin, the online newspaper L’Eco Mese is published mainly in Italian but with sections in Occitan and information about the language and culture.

As a last remark, I would like to consider blog and social media that were used to promote the culture and the language use. Most of the blogs were already found by Regis (2015), but, as he also commented, it is difficult to understand if the speakers joining the conversations were actually from Italy or France\textsuperscript{14}. After an analysis of social media, especially on Facebook, I found pages and groups dedicated to Occitan. Some examples are the pages Museo Occitano – Espaci Occitan\textsuperscript{15}, Percorsi Occitani\textsuperscript{16}. Another group that Regis (2015) referred to is Nord-occitans e arpitans\textsuperscript{17}, where most of the speakers were Italians.

4. Discussion and Conclusions
Occitan is a minority language that is not fully vital and active, compared to other minorities languages in Europe, as illustrated by other studies (Berruto, 2015, Giordano 2015). Despite this, both the analysis of media and the evaluation of the state of language planning

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\textsuperscript{12} The last paper that I found that evaluated the Occitan music in Italy was Benedetto Mas and Giordano (2015).
\textsuperscript{13} The latest number of the journals and more information about the association can be found at the following link: (https://lousoulestrei.com/edizioni/).
\textsuperscript{14} ‘Occitania Forum’. Retrieved from http://occitania.forumactif.com/
‘Le blog de l’occitan’. Retrieved from http://france3-regions.blog.francetvinfo.fr/le-blog-de-viare-al-
\textsuperscript{15} Retrieved from https://www.facebook.com/museooccitano/?ref=br_rs
\textsuperscript{16} Retrieved from https://www.facebook.com/percorsioccitani/
\textsuperscript{17} Retrieved from https://www.facebook.com/groups/69015151007883/
demonstrate that the language it is not going to disappear anytime soon. In fact, media has a significant impact on the maintenance of Occitan, more than was expected during the preliminary study.

Therefore, to answer the first research question, regarding the state of the language planning, there are already many operations and interesting cultural events that are being carried on by the associations active on the territory. To answer the second question, it seems that media actively contribute to the maintenance of the language and of its traditions, reaching also the youngest generations with music and social media. Despite this, I believe that more could be done and should be done in order to keep this language alive by transmitting it to the next generations. Every language, even if it is spoken only by a minor part of the population, has an important role in the cultural and social development of the country.

Received April 2018; accepted September 2018.

REFERENCES
Een krant beoordelen: wegen of weten?¹
Het effect van het gewicht van de krant en de voorkennis erover op het belang van de krant

Judging a newspaper: extra mass or extra mastery? The effect of weight of the newspaper and the prior knowledge about it on its importance

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Abstract
On the basis of the conceptual metaphor theory and the theory of grounded cognition, Chandler, Reinhard and Schwarz (2012) have proven that a heavy book is considered more important than a light book. This was only the case when people had substantial knowledge about the book. The current study is a conceptual replication of this study. We chose a newspaper instead of a book and redesigned the knowledge condition. We collected the data of 103 respondents. Weight was manipulated by providing the participants a heavy or light version of the newspaper. Knowledge was manipulated by providing half of the participants some additional written information about the newspaper. To measure the newspapers’ importance, influence and interestingness a questionnaire was used. The heavier newspaper was considered more important, more influential and more interesting, regardless of the knowledge about the newspaper that half of the participants had gained. Just like Chandler et al. (2012), we found proof for the conceptual metaphor theory: people rely on metaphors when they judge. The metaphor in this case was: the heavier the newspaper is, the more important news it will contain. Unlike Chandler et al. (2012), no proof for grounded cognition was found. The weight of the newspaper did not activate the gained knowledge that could support the judgment of the newspaper, instead of the weight itself.

1. Introduktie

¹ This study was an assignment for the course Influencing behavior through persuasive communication from the master’s degree Communication & Organisation. We want to thank Maaike Jongeneelen, docent at Utrecht University, who helped us with the design of the research.

2. THEORETISCH KADER
2.1 METAFOREN IN ONS DENKEN EN DOEN


et al. (2012) hebben de ontologische metafoor ingezet door informatie (het boek) letterlijk zwaar te maken. Daardoor is de informatie echt zwaar. Uit onze menselijke ervaring weten wij dat zware voorwerpen doorgaans groot zijn, een groot aandeel hebben of op een andere manier belangrijk zijn. Op deze manier zorgt de zwaarte van de informatie ervoor dat de informatie zelf wordt gezien als ‘doorslaggevend’ en ‘van belang’.

2.2 De conceptuele metaphor theory en grounded cognition


Door een boek extra gewicht te geven, testten de auteurs ook de benadering van grounded cognition. Grounded cognition is een methodologische benadering voor het bestuderen van de precieze werking van menselijke cognitie (Pezzulo, Barsalou, Cangelosi, Fisher, McRea, & Spivey, 2013). Deze benadering houdt rekening met de rol die het lichaam speelt wanneer cognitieve processen aan de gang zijn. Sterker nog: cognitieve processen zouden zelfs zijn gegrond op wat het lichaam voelt en doet. Het cognitieve proces ‘taal’ bijvoorbeeld, komt voort uit de omgang van het lichaam met de mensen in zijn omgeving (Pezzulo et al., 2013).


In lijn met deze onderzoeken en met de theorie van grounded cognition verwachten Chandler et al. (2012) dat het cognitieve proces ‘oordelen’ beïnvloed wordt doordat de metafoor ‘de informatie weegt zwaar’ is belichaamd in het boek.
2.3 Kennis en de werking van metaforen
Chandler et al. (2012) stellen ook de vraag welke invloed metaforen nog hebben wanneer de respondent eigenlijk al weet hoe belangrijk een boek is. Chandler et al. (2012) beschrijven uiteenlopende theorieën over het effect van deze kenniscomponent. Aanwezige kennis kan de rol van de metafoor namelijk verminderen, versterken, of juist helemaal niet beïnvloeden (Chandler et al., 2012).


2.4 De studie van Chandler et al. (2012)
Om de rol van de zwaartemetafoor en de rol van aanwezige kennis bij een beoordelingsproces te toetsen, hebben Chandler et al. (2012) drie studies uitgevoerd. Studie 1 en 2 hadden een 2x2 design: gewicht van het boek (licht of zwaar) en kennis (wel of geen kennis). In Studie 1 moest men alleen de titel (geen-kennisconditie) of de flaptekst (kennisconditie) lezen van een zwaar of een licht boek. In Studie 1 werd gevraagd naar de interesse om het boek te lezen, de geschatte financiële waarde en de invloed die het boek had. In Studie 2 werd gevraagd naar belang en ook naar invloed. De kennisconditie kreeg een iets andere vorm dan in Studie 1: wanneer iemand bekend was met het boek, bevond deze persoon zich in de kennisconditie. In Studie 3 werd alleen naar het belang van het boek gevraagd. Ook werd de kennisconditie anders vormgegeven: er werd een opsplitsing gemaakt tussen a) de hoeveelheid kennis die men dacht te hebben over het boek en b) de hoeveelheid daadwerkelijke kennis. Dit werd gedaan om te controleren of de scores op belang te wijten zouden zijn aan daadwerkelijk parate kennis, of aan het feit dat de metafoor het brein activeert om op zoek te gaan naar bevestigende informatie in het geheugen. Uit een kennistest bleek echter dat mensen die dachten veel kennis te hebben, ook daadwerkelijk veel kennis hadden.

Studie 1, 2 en 3 (voor de mensen die dachten dat ze kennis hadden) laten een hoofdeffect van kennis zien: mensen in de kennisconditie scoorden hoger op interesse, financiële waarde, invloed en belang van het boek. Studie 1 en 3 (voor de mensen met de daadwerkelijke kennis) laten ook nog een hoofdeffect van gewicht zien: mensen met het zwaardere boek geven een hogere score dan mensen met het lichte boek. Studie 1, 2 en 3 (voor de mensen met daadwerkelijke kennis) laten verder een interactie-effect zien: het zwaardere
boek werd positiever beoordeeld als men er kennis over had. Hadden respondenten geen kennis over het boek, dan werden ze niet beïnvloed door gewicht.

Kennis blijkt het effect van de metafoor te versterken: wanneer mensen het boek gelezen hebben en er dus sprake is van aanwezige kennis, vinden zij het zwaardere boek belangrijker dan het lichtere boek. Voor deze bevindingen geven Chandler et al. (2012) twee verklaringen: die van knowledge accessibility en confirmatory hypothesis testing.

Wij betwijfelen of het onderzoek van Chandler et al. (2012) onomstotelijk bewijs geeft dat bestaande kennis de invloed van metaforen op beoordeling versterkt. Chandler et al. (2012) geven namelijk zelf ook veel verklaringen voor het feit dat kennis de invloed van een metafoor juist kan verminderen of onbeïnvloed laat. Met replicatieonderzoek kunnen we toetsen of kennis de invloed van een metafoor opnieuw versterkt, doet afnemen, of juist helemaal niet beïnvloedt.

2.5 Het belang van replicatieonderzoek


Ten tweede stellen Eerland en Van den Bergh (2016) dat de repliceerbaarheid van een onderzoek bijdraagt aan empirisch verantwoorde conclusies. Met meer onderzoek naar het concept van Chandler et al. (2012) kunnen we beter empirisch verantwoorde conclusies trekken over hoe invloedrijk metaforen zijn en wat de rol van kennis daarin is.

Daarnaast kunnen kritiekpunten op de oorspronkelijke publicatie ook reden zijn voor replicatieonderzoek. Wij vinden het opmerkelijk dat de auteurs bij Studie 1 zeggen een interactie-effect te vinden, terwijl dit effect een $p$-waarde van .07 heeft. Ook bij Studie 2 wordt er volgens de auteurs een hoofdeffect van gewicht gevonden, terwijl er sprake is van een $p$-waarde van .09. In ons replicatieonderzoek zullen wij echter het algemeen geaccepteerde significantieniveau van $p < .05$ hanteren.

Ook inhoudelijk hebben we twijfels. De bevindingen van Chandler et al. (2012) zijn gedeeltelijk in strijd met deconceptual metaphor theory. Die theorie stelt dat mensen zich laten leiden door metaforen wanneer ze informatie proberen te begrijpen die hen nog onbekend is (Landau et al., 2010). Maar uit Chandler et al. (2012) blijken de metaforen juist effect te hebben bij mensen die geen nieuwe, maar al bekende informatie over het boek verwerkt hebben. Die bevinding is opvallend, wat verder onderzoek interessant maakt.

Vanwege onze twijfels op conceptueel niveau, zullen wij een conceptueel replicatieonderzoek uitvoeren met als uitgangspunt Studie 1 en 2 uit het onderzoek van Chandler et al. (2012). De vorm van de replicatiestudie zetten we verder uiteen in de methodesectie.
2.6 Onderzoeksvraag
Het doel van dit onderzoek is om meer inzicht te krijgen in de rol die kennis speelt in de relatie tussen de invloed van metaforen en het cognitieve proces oordelen. De onderzoeksvraag in dit onderzoek luidt als volgt:

Wat is het effect van de metaforen op de beoordeling van nieuwe informatie op belang, invloed en interessantheid, en welke rol speelt voorkennis over de nieuwe informatie daarin?

Op basis van het onderzoek van Chandler et al. (2012) valt te verwachten dat als mensen geen kennis hebben over de krant, zij niet beïnvloed zullen worden door het gewicht ervan. Wanneer ze wel kennis hebben over de krant, zullen ze ook beïnvloed worden door het gewicht.

3. Methode
Om antwoord te krijgen op onze onderzoeksvraag hebben we een experiment opgezet met een 2 (gewicht: zwaar versus licht) x 2 (kennis: wel versus niet) factorieel tussenproefpersoonsontwerp. Dit houdt in dat elke proefpersoon maar één type krant moest beoordelen. Om te toetsen of de bevindingen van Chandler et al. (2012) alleen gelden voor boeken, hebben wij gekozen voor een ander medium: kranten. Voor het experiment hebben we twee identieke exemplaren van de Russische krant Sovsekretno gemainipuleerd. De voorpagina van deze krant is te zien in Bijlage 1. We hebben gekozen voor een Russische krant, zodat onze Nederlandse proefpersonen geen voorkennis konden hebben over de krant. Ook konden ze de tekst op de krant niet lezen. Zoals al vermeld vormen Studie 1 en 2 van Chandler et al. (2012) de basis van ons onderzoek. Studie 3 hebben we niet gerepliceerd, omdat de proefpersonen voorafgaand aan het onderzoek geen voorkennis konden hebben over de krant, wat voor Studie 3 wel nodig was.

3.1 Stimuli en pretests
3.1.1 Pretest gewicht
De Russische kranten wogen bij aankoop 70 gram. Voordat we de kranten manipuleerden, hebben we een kleinschalige pretest gedaan om het gewicht van een Nederlandse krant te onderzoeken. Onze respondenten zijn namelijk Nederlands. Die kranten varieerden in gewicht van 180, 170, 120, 110 tot 100 gram. Gemiddeld wogen ze 136 gram.

3.1.2 Stimulus gewicht
Omdat de Russische krant met 70 gram erg van deze gewichten afweek, hebben we aller eerst beide exemplaren van de krant verzwaaard tot 100 gram met extra vellen onbedrukt krantenpapier van een identieke kleur. Vervolgens zijn uit de pagina’s van de lichte versie stukken geknipt waarbij de randen intact werden gehouden, en bij de zware versie zijn die stukken verspreid over de pagina’s erin geplakt. Op deze manier hadden beide kranten een gelijke dikte, maar een verschillend gewicht. De lichte krant woog 80 kilogram en de zware krant 120 kilogram. 120 gram kwam in de buurt van het gemiddelde gewicht van een Nederlandse krant. 80 gram zal licht aanvoelen, hoewel het slechts 20 kilogram afwijkt van de range (100-180 gram) waarbinnen het gewicht van een Nederlandse krant
zich bevindt. Bovendien is het gewicht van de lichte versie tweederde deel van het gewicht van de zware versie, evenals in Chandler et al. (2012).

3.1.3 *Pretest dikte*
We wilden de dikte van de krant geen rol laten spelen. Om te controleren of proefpersonen geen verschil zagen in dikte van de krant, hebben we bij acht mensen een pretest afgenomen. We presenteerden de twee kranten en stelden de vraag of hen iets opviel. Zeven van de acht proefpersonen viel niets op. Eén persoon merkte een verschil in dikte op.

3.1.4 *Stimulus kennis*
Kennis werd gemanipuleerd door de helft van de personen schriftelijke informatie aan te bieden over de krant. Hierbij ging het om algemene informatie over de krant *Sovsekretno*, met aanvullende informatie over de inhoud van de krant die we via de website van de krant hebben verkregen. Deze informatie is terug te vinden in Bijlage 3. Deze informatie stond in de vragenlijsten voor de vragen, zodat mensen de vragen konden beantwoorden met de kennis in hun achterhoofd. De mensen in de geen-kennisconditie kregen een vragenlijst zonder deze aanvullende informatie. Door de manier waarop we kennis manipuleren, was er meer controle op de variabele kennis. Aangezien niemand Russisch kon lezen, konden mensen geen extra informatie verkrijgen.

3.2. *Respondenten*
In tegenstelling tot Chandler et al. (2012) zullen wij niet alleen studenten laten deelnemen in ons onderzoek, maar mensen van alle leeftijden en opleidingsniveaus. Aan het experiment namen 103 respondenten deel, waarvan er twee uit het onderzoek zijn verwijderd omdat ze de krant opensloegen, en één omdat deze de krant niet vasthield. 100 respondenten bleven over, waarvan 39 mannen en 61 vrouwen. De respondenten waren tussen de 15 en 89 jaar oud, met een gemiddelde leeftijd van 31,8 jaar (SD = 16,6). Eén respondent had geen opleiding afgerond, 18 respondenten hadden de middelbare school afgerond, 23 respondenten hadden een mbo-opleiding, 37 respondenten een hbo-opleiding en 31 respondenten een wo-opleiding. Chikwadraattoetsen wijzen uit dat de respondenten niet gelijk verdeeld waren over de vier condities wat betreft geslacht ($X^2 (3) = 10.63, p = .01$), maar wel wat betreft opleidingsniveau ($X^2 (12) = 11.85, p = .05$) en leeftijd ($F (3, 99) = .70, p = .56$). De ongelijke verdeling over de vier condities wat betreft geslacht zal naar verwachting niet van invloed zijn op het onderzoek. Alle respondenten hadden het Nederlands als moedertaal en gaven aan de Russische taal niet te beheersen.

3.3. *Instrumentatie*
Om de afhankelijke variabelen te meten, hebben we een vragenlijst ontwikkeld. Deze vragenlijst is te zien in Bijlage 4. Hierin werden drie afhankelijke variabelen gemeten: belang van de krant, invloed van de inhoud en interesse om de krant te lezen. De variabele ‘financiële waarde’ die Chandler et al. (2012) gebruikten, is achterwege gelaten omdat de prijs al afgedrukt is op de krant. Bij alle gevallen hebben we gebruikgemaakt van vijfpunts-Likertschalen. Het belang van de krant werd gemeten met drie items ($\alpha = .79$), de invloed van de inhoud met twee items ($\alpha = .66$) en de interesse om de krant te lezen met drie items ($\alpha = .82$). De items per vragencluster zijn terug te vinden in Bijlage 2.
3.4 Procedure
We hebben respondenten benaderd in de universiteitsbibliotheek in het centrum van Utrecht en op station Utrecht Centraal. De respondenten zaten tijdens het onderzoek op een rustige plek en kregen een krant aangereikt die ze even vast moesten houden. We hebben de respondenten geïnstrueerd om alleen een indruk op te doen van de voorkant van de krant. Hierbij mochten ze de krant niet openslaan. Vervolgens kreeg de respondent een vragenlijst, waarop al dan niet additionele informatie over de krant stond vermeld.

4. Resultaten
In Tabel 1 zijn de gemiddelden en standaardafwijkingen weergegeven per conditie. Hierin zien we dat de zware krant telkens hoger scoort op belang, invloed en interesse. We zien dat de kenniscondities bij invloed en interesse telkens iets hoger scoren, maar niet bij belang. Met een tweeweg ANOVA zal worden nagegaan of de weergegeven verschillen in scores ook daadwerkelijk significant zijn.

<table>
<thead>
<tr>
<th>Kennis</th>
<th>Krant</th>
<th>Wel kennis</th>
<th>Geen kennis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belang</td>
<td>Zwaar</td>
<td>3.64 (.78)</td>
<td>3.41 (.82)</td>
</tr>
<tr>
<td></td>
<td>Licht</td>
<td>2.89 (.56)</td>
<td>2.96 (.51)</td>
</tr>
<tr>
<td>Invloed</td>
<td>Zwaar</td>
<td>3.61 (.59)</td>
<td>3.34 (.85)</td>
</tr>
<tr>
<td></td>
<td>Licht</td>
<td>2.88 (.65)</td>
<td>2.85 (.73)</td>
</tr>
<tr>
<td>Interesse</td>
<td>Zwaar</td>
<td>2.78 (.73)</td>
<td>2.61 (.71)</td>
</tr>
<tr>
<td></td>
<td>Licht</td>
<td>2.36 (.94)</td>
<td>2.22 (.98)</td>
</tr>
</tbody>
</table>

Hoewel Chandler et al. (2012) wel een interactie-effect vonden tussen kennis en gewicht, vinden wij met een tweeweg ANOVA geen interactie-effect in dit onderzoek voor het belang van de krant ($F(1, 96) = 1.17, p = .28, \eta^2 = .01$). Ditzelfde gold voor de invloed van de krant ($F(1, 96) = .78, p = .38, \eta^2 = .01$) en de interesse in de krant ($F(1, 96) = .01, p = .94, \eta^2 < .001$).

Uit de tweeweg ANOVA bleek verder dat er een hoofdeffect was van het gewicht van de krant op het belang ervan ($F(1, 96) = 19.16, p < .001, \eta^2 = .17$), op de invloed ervan ($F(1, 96) = 18.47, p < .001, \eta^2 = .17$) en op de interesse in de krant ($F(1, 96) = 5.70, p = .02, \eta^2 = .06$). Dat betekent dat het gewicht uitmaakt in de beoordeling van de krant. Blijkbaar doet de ontologiese metafoor ‘zwaar is belangrijk’ zijn werk: respondenten voelen dat de informatie (de krant) zwaar is, en associëren dat vervolgens voornamelijk met belang en invloed.

Zoals in Tabel 1 te zien is, zorgt de zwaardere krant telkens voor hogere scores op alle drie de onafhankelijke variabelen. Dat betekent dat mensen met een zwaardere krant,
de krant ook belangrijker, invloedrijker en interessanter vinden dan de lichte krant. Deze significante verschillen zijn gevisualiseerd in figuur 1, 2 en 3.

Figuur 1. Gemiddelde score op belang per conditie.

Figuur 2. Gemiddelde score op invloed per conditie.

Verder bleek dat er geen hoofdeffect was van kennis over de krant op het belang van de krant ($F(1, 96) = .33, p = .57, \eta^2_p = .003$), de invloed van de krant ($F(1, 96) = 1.05, p = .31, \eta^2_p = .01$) en ook niet op de interesse in de krant ($F(1, 96) = .80, p = .37, \eta^2_p = .01$). Dat betekent dat de minimale verschillen die we in Tabel 1 zagen tussen de twee kenniscondities niet significant zijn. Kennis over de krant maakt dus niet uit in de beoordeling of de krant belangrijk, invloedrijk of interessant is.
Om te onderzoeken of het effect verschilde voor geslacht (mannen versus vrouwen) en leeftijd (jong: 15-24 versus oud: 25-89) is een tweeweg ANOVA uitgevoerd met geslacht en leeftijd als onafhankelijke variabelen en belang van de krant als afhankelijke variabele. Uit de tweeweg ANOVA bleek dat er geen hoofdeffect was voor geslacht ($F(1, 96) = .71, p = .40$) en leeftijd ($F(1, 96) = 0.10, p = .76$). Mannen ($M = 3.28, SD = 0.73$) en vrouwen ($M = 3.21, SD = 0.77$) beoordeelden de krant gelijk op belang, net als jonge mensen ($M = 3.16, SD = 0.77$) en oudere mensen ($M = 3.32, SD = 0.73$). Ook was er geen significante interactie tussen geslacht en leeftijd ($F(1, 96) = .24, p = .62$). Uit een tweeweg ANOVA met geslacht en leeftijd als onafhankelijke variabelen en interesse in de krant als afhankelijke variabele, bleek dat er geen hoofdeffect was voor geslacht ($F(1, 96) = 1.52, p = .22$) en leeftijd ($F(1, 96) = .22, p = .64$). Ook was er geen significante interactie tussen geslacht en leeftijd ($F(1, 96) = .44, p = .51$). Uit een tweewegs ANOVA met geslacht en leeftijd als onafhankelijke variabelen en invloed van de krant als afhankelijke variabele, bleek geen hoofdeffect te zijn voor geslacht ($F(1, 96) = 1.52, p = .22$) en leeftijd ($F(1, 96) = .002, p = .96$). Daarnaast bleek er geen significante interactie te zijn tussen geslacht en leeftijd ($F(1, 96) = .001, p = .98$).

5. Conclusie en discussie
In dit onderzoek hebben we naar aanleiding van de studie van Chandler et al. (2012) verder onderzocht wat voor rol kennis en metaforen spelen bij het beoordelen van een krant. Onze onderzoeks vraag hierbij was: “Wat is de invloed van een metafoor wanneer een krant wordt beoordeeld op belang, invloed en interessantheid, en welke rol speelt voor-kennis over de krant daarin?”

Uit de studie van Chandler et al. (2012) bleek dat kennis een versterkende rol speelt in de relatie tussen de metafoor en beoordeling van een krant. In de huidige studie verwachtten wij hetzelfde effect te vinden bij de kranten, maar dit interactie-effect bleef uit.
Uit onze studie bleek verder wel een effect van gewicht: men vond zware kranten belangrijker, invloedrijker en interessanter dan de lichte kranten. Deze bevinding sluit aan bij de conceptual metaphor theory, die stelt dat mensen vertrouwen op metaforen wanneer ze nieuwe informatie te verwerken krijgen. Men vertrouwde dus op de metafoor ‘het weegt zwaar’ voor ‘het is belangrijk’.

Er bleek volgens ons onderzoek ook geen hoofdeffect te zijn van kennis op de beoordeling van de krant. Het hebben van kennis over de krant leidt dus niet tot een andere beoordeling van de krant dan wanneer er geen kennis over de krant was. Zelfs wanneer men kennis had over hoe belangrijk, invloedrijk en interessant de krant kon zijn, liet men zich leiden door het gewicht en dat beïnvloedde de beoordeling van de krant. Dat levert bewijs voor de theorie van grounded cognition, die ervan uitgaat dat cognitieve processen zijn gegrond op wat het lichaam voelt en doet. Uit dit onderzoek blijkt dat het cognitieve proces ‘oordelen’ wordt beïnvloed door het gewicht dat het lichaam met de handen voelt.

Een verklaring voor het feit dat we geen effect van voorkennis vinden, ligt in de operationalisatie van voorkennis. In Chandler et al. (2012) gaat het om voorkennis over het boek. Die voorkennis was opgedaan door het lezen van het boek. Voorkennis van deze aard is niet geheel objectief. Dat was wel het geval in het huidige onderzoek omdat de voorkennis als informatie bij de krant werd gegeven. Daardoor kan het zijn dat de respondenten de voorkennis over de krant veel minder diep verwerkt hadden dan de respondenten in Chandler et al. (2012). Mogelijk blijft daardoor een effect van voorkennis in het huidige onderzoek uit. In lijn hiermee is de verklaring dat de informatie te summier was om diep genoeg te verwerken; hierdoor is de informatie wellicht niet voldoende subjectief verwerkt om een goede mening te kunnen vormen over de krant. Als gevolg vonden we mogelijk geen effect van voorkennis in ons onderzoek.

Het verschil in uitkomst over de rol van kennis tussen het onderzoek van Chandler et al. (2012) en dit onderzoek kunnen we verklaren door het verschil in manipulatie van kennis. Bij Chandler et al. (2012) werd kennis gemanipuleerd door een deel van de proefpersonen een korte samenvatting van het boek te laten lezen (Studie 1) en door een deel van de proefpersonen een boek aan te bieden dat ze al eens gelezen hebben (Studie 2 en 3). In het huidige onderzoek werd kennis gemanipuleerd door de proefpersonen al dan niet schriftelijk additionele algemene informatie aan te bieden over de krant en informatie over de inhoud van de krant. Hierbij was het echter moeilijk te controleren of de proefpersonen al deze informatie grondig hebben gelezen, of dat de proefpersonen enkel vluchtig de informatie hadden gescand. Het vluchtige lezen zou een mogelijke verklaring kunnen zijn voor het uitsluiten van een effect van kennis in de huidige studie. De kennisconditie in Chandler et al. (2012) was niet geheel objectief. De inhoudelijke kennis die participaten hadden over het boek, was immers ook een factor die de beoordeling beïnvloedde. Bovendien was deze kennis al langer aanwezig en hadden respondenten dan ook langer de tijd om erover na te denken. Dit was niet het geval bij de neutrale, oppervlakkige kennis die participaten kregen aangeboden in ons onderzoek. Deze verschillende stijlen van voorkennis zouden in een vervolgonderzoek nader kunnen worden onderzocht. Het is namelijk mogelijk dat een positie-
Lie de tekst een positievere beoordeling kan primen dan een neutrale of negatieve tekst. In een vervolgonderzoek zou kunnen worden onderzocht waar de grens ligt tussen zwaar en licht. In zowel ons onderzoek als het onderzoek van Chandler et al. (2012) kregen proefpersonen maar één voorwerp in handen om te beoordelen. Er was dus geen materiaal om dit object mee te vergelijken. Hoe wist men dan dat het ging om een relatief zwaar of licht object? Waar ligt de grens tussen zwaar en licht? Worden deze dingen bepaald door een soort prototype die wij hebben van het gewicht van bepaalde objecten?

Wanneer we de uitkomsten van de studie van Chandler et al. (2012) afwegen tegen de resultaten van onze replicatiestudie, kunnen we stellen dat er geen consensus bestaat over de invloed van kennis op de rol die metaforen spelen bij het beoordelen van het belang, de invloed en de interessantheid van een boek of krant. Er is dus meer onderzoek nodig om beter inzicht te krijgen in de rol van kennis en metaforen bij het beoordelen van een object. Vervolgonderzoek naar dit fenomeen is dan ook noodzakelijk om tot een consensus te kunnen komen.

Ontvangen in april 2018; geaccepteerd in september 2018.

Bibliografie
Bijlagen

Bijlage 1. De Russische krant

**СОВЕРШЕННО СЕКРЕТНО**

**Случайный инцидент при острой этаноловой интоксикации**

**Убит пассажира в момент волшебной интоксикации**

**Черное блюдо**

**Петр Великий**

**Фото: Сергей Волков**
BIJLAGE 2. VRAGEN PER VRAGENCLUSTER

Belang van de krant

Ik denk dat dit een belangrijke krant is.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens

Ik denk dat het nieuws in deze krant van belang is voor de lezer.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens

Iemand die deze krant lees, is op de hoogte van het belangrijkste nieuws.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens

Invloed van de inhoud

Ik denk dat deze inhoud van deze krant belangrijk is in Rusland.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens

Het nieuws in deze krant lijkt me invloedrijk in Rusland.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens

Interesse om de krant te lezen

Als ik Russisch kon, zou ik deze krant willen lezen.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens

Ik zou deze krant kopen als ik Russisch zou kunnen spreken.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens

Ik heb interesse in het nieuws dat in deze krant staat.

Helemaal mee oneens  O  O  O  O  O  Helemaal mee eens
Achtergrond

De krant die voor u ligt is de Sovsekretno, een Russische krant. De krant is bedacht door de Russische schrijver en journalist Julian Semenov. Het eerste nummer is verschenen in mei 1989. De naam ‘Sovsekretno’ betekent ‘topgeheim’ in het Russisch. Deze naam is een reactie op de geheimhouding van informatie die er heerste in de Koude Oorlog.

De Sovsekretno is een algemene nieuwskrant die zich focust op zowel binnenlands nieuws (zoals politiek en economie) als op buitenlands nieuws. Ook bevat de krant een sectie speciaal gewijd aan opiniestukken, een sportkatern en regelmatig ook een wetenschapsbijlage. De Sovsekretno verschijnt zes dagen per week.

Op de voorpagina van de editie voor u staat informatie over de doodsoorzaak van Mikhail Lesin, een Russisch politiek figuur en media executive en adviseur van Vladimir Putin. Na uitgebreid onderzoek blijkt dat de dood van Lesin een ongeluk was. Linksonderin staat een aankondiging van een nieuwe musical, waar meer over te lezen valt in de cultuursectie. Rechtonderin staat informatie over een nieuwe blustechniek van de Russische brandweer.
BIJLAGE 4. VRAGENLIJST

Beste deelnemer,

Voor onze studie doen wij onderzoek naar de beeldvorming over kranten op basis van de voorpagina van de krant. U krijgt zometeen een buitenlandse krant te zien. Dat u de tekst niet kunt lezen is geen probleem. Aangezien het onderzoek gaat om de voorpagina, mag u de krant niet opvouwen. Het is de bedoeling dat u de voorpagina even bekijkt en vervolgens antwoord geeft op een aantal korte vragen en stellingen.

1. Het nieuws in deze krant lijkt me invloedrijk in Rusland.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

2. Iemand die deze krant leest, is op de hoogte van het belangrijkste nieuws.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

3. Als ik Russisch kon, zou ik deze krant willen lezen.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

4. Ik denk dat het nieuws in deze krant van belang is voor de lezer.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

5. Ik zou deze krant kopen als ik Russisch zou kunnen spreken.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

6. Ik denk dat deze inhoud van deze krant belangrijk is in Rusland.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

7. Ik heb interesse in het nieuws dat in deze krant staat.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

8. Ik denk dat dit een belangrijke krant is.
   Helemaal mee oneens  O   O   O   O   O   Helemaal mee eens

Bedankt voor het invullen van de vragenlijst. U hebt ons erg geholpen met ons onderzoek.
Pairing up networks
Phonological and graphemic networks in interaction

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KEYWORDS
phonological priming
graphemic priming
lexical decision

ABSTRACT
This study looks at the interaction between phonological and graphemic priming, since previous literature (Meyer et al., 1974, Shulman et al., 1978, Hillinger, 1980, Evett & Humphreys, 1981) has been inconclusive and conflicting. In order to give new insights, Dutch participants were tested with word pairs, by means of a Lexical Decision task. These pairs where graphemically and phonologically related, only graphemically related, only phonologically related, or unrelated. This experiment was carried out in order to investigate whether phonological and graphemic priming combined is stronger than only phonological priming or graphemic priming. The results partially confirmed our predictions, with as main outcome the increased facilitation of both phonological and graphemic priming, compared to the other types of priming that were taken into consideration. Furthermore, this study found that graphemic priming has an inhibitory effect on the participant’s responsiveness.

1. INTRODUCTION
Since the 1980s, great importance has been given to the field of modularity with regard to cognitive networks. Previous studies have assumed the existence of demarcated systems in the human brain that serve a particular purpose or operation (see Fodor, 1983, for a detailed description), also known as cognitive modules. In the domain of linguistics, parsing processes of lexical items are thought to be driven by different modules, such as the visual and the semantic module, among others. The question is whether and to what extent these modules interact with each other.

In this paper, we will explore the interaction of the phonological and graphemic networks. By means of a lexical decision task we measured the response time of 19 Dutch participants, who were presented with different types of word-word pairs and word-non-word pairs. The first word in a pair is the prime, the second word the target. We tested the unconscious influence of the prime on the recognition of the target word (also called ‘priming effect’) by means of three categories of related pairs: phonologically related, graphemically related, and phonologically + graphemically related. The control condition consists of unrelated pairs.

Concretely, we will formulate an answer to the following research question: To what extent is the priming effect different, in terms of response time, for phonologically related words...
or graphemically related words, compared to the case in which words are both phonologically and graphemically related? Formally, we propose the following null hypothesis: the reaction time to stimuli that are graphemically and phonologically related does not differ from stimuli that are either graphemically or phonologically related. Furthermore, we propose as alternative hypothesis that the reaction time to stimuli that are graphemically and phonologically related differs from stimuli that are either graphemically or phonologically related.

We predict that the interaction of the phonological component and the graphemic component will lead to a cumulative effect. Concretely, this would mean a lower response time for the graphemic + phonological category compared to both of the two components taken alone. Below, we present a series of expectations for the individual categories as compared to the baseline condition and to each other:

(1) Response times for phonological priming are lower than for no priming (cf. Swinney, 1979).

(2) Response times for graphemic priming are different than for no priming: there is no evidence for a precise direction in which graphemic priming would differ from the baseline condition, but we do believe that there is 'some' difference.

(3) Response times for phonological + graphemic priming is lower than phonological priming: as the words in a pair are rhyming and visually similar, we believe that the target word should be recognized faster.

(4) Response times for phonological + graphemic priming is lower than graphemic priming: the same reason as for phonological priming in prediction (3) is adopted.

Hence, we expect that, when words are both phonologically and graphemically related, there indeed is a facilitating effect. From this, the prediction follows that there is no ceiling effect when the words are only graphemically or only phonologically related. This implication argues against a modular approach, given that in a modular approach the combination of two modules would be just as fast as one module alone.

This study might give further insight in the interaction between phonological and graphemic priming, as well as the availability of both types of priming. From a broader point of view, this study might give additional evidence in favor of either the modular or the interactive approach, and which one should be taken when examining neural networks.

The present paper is divided into four parts. Section 2 offers an overview of the literature in the domain of phonological, graphemic, and semantic networks that are thought to be active in the human brain. In section 3, we will explain the methodology that has been used to test the relevant population and to analyze the outcomes of the trials. The results and analysis are reported in section 4. Finally, a conclusion will be presented in section 5.
2. THEORETICAL BACKGROUND

As mentioned before, modularity issues in the field of neural networks have been object of discussion since the early 1980s. It was the publication of The Modularity of Mind (Fodor, 1983) that first drew attention to this matter. Throughout the years, a distinction between two main approaches on modularity has been set: a modular approach versus an interactive approach.

In early psycholinguistic literature, the modular approach to the different networks in the human brain was the dominant hypothesis (Forster, 1981; Tanenhaus, Carlson, & Seidenberg, 1985). This idea implies that the brain functions by using several modules that work independently. For instance, there is a visual module, which processes visual stimuli. However, there is a lot of evidence against this approach (cf. Zwitserlood, 1989; Bülthoff & Yuille, 1996). Alternatively, an interactive approach has been proposed. This approach implies that the assumed cognitive modules interact with each other, which means, for example, that the activation of meaning occurs simultaneously with word-form activation. More in general terms, semantic and phonological networks are believed to be interrelated and activated in parallel in the human brain. According to Marslen-Wilson (1987), however, the coexistence of different cognitive modules can also lead to partial interaction, a situation in which certain modules are of a strictly autonomous nature, whereas others interact.

Apart from the phonological and semantic networks, research has been done on the graphemic network (Shulman, Hornak, & Sanders, 1978; Meyer, Schvaneveldt, & Ruddy, 1974; Hillinger, 1980). However, the results of previous research are conflicting. Meyer et al. (1974) found no evidence of graphemic priming, while Shulman et al. (1978) did find evidence. Hillinger (1980) showed that there was no difference between phonological priming and graphemic priming, although this lack of difference might be due to a ceiling effect. Finally, Evett & Humphreys (1981) found evidence for graphemic priming, but report no additional benefit for phonologic and graphemic priming at the same time. These findings provide sufficient motivation for us to cautiously assume that graphemic priming and a related cognitive module do exist. The question remains whether the graphemic and phonological systems interact with each other and what the effect might be, if there is any. In the following section, we describe the methodology of the experiment that will test for the relevant interaction mentioned above.

3. METHODOLOGY

In this section, we will report the methodology of this experiment. Section 3.1 will describe the participants we tested; in section 3.2 we will refer to the materials used. Section 3.3 outlines the procedure of the lexical decision task adopted, and 3.4 explains what tools we used to analyze the collected data.

3.1 PARTICIPANTS

For this experiment, 20 participants were tested in total. The mean age of the participants was 21.3 years. The participants were all native speakers of Dutch. They were not dyslexic and had normal or corrected to normal vision. The participants were recruited with caution at Utrecht University, so that the participants had little to no experience with the lexical decision task. All but one participant were right-handed. Furthermore, all but one
participant were monolingual. There was no control for gender, since we had no reason to think this would make a difference.

The experiment was written for right-handed participants, specifically. Given that the participant’s dominant hand is generally faster than the non-dominant hand, a left-handed person could possibly react faster to nonwords (left button) than to words (right button). After comparing the reaction times of the only left-handed participant with the mean reaction times of the right-handed population of our sample, the left-handed participant was excluded from the analysis based on their performance. As for bilingual participants, there was only one. This participant was not excluded, since their performance did not differ from the monolinguals among the sample.

3.2 MATERIALS
The stimuli were created in four different categories: phonologically related and graphemically related (PHAF), only phonologically related (PHON), only graphemically related (GRAF), and unrelated (UN). For every category, there were two levels: word-word and word-nonword. The nonwords were designed in such a manner, that they would satisfy the category they are in. We decided to use relatively short stimuli with a length of minimally three letters and a maximum of seven letters. The stimuli were both monosyllabic and disyllabic words. This specific choice has been made so that different word lengths would not result in different reading times, and different response times as a consequence. In the categories PHON and GRAF, multiple English and French loanwords were used as a prime in order to create the desired contrast or likelihood. Loanwords were never used as a target to avoid misinterpretations. In fact, a loanword could be (erroneously) interpreted as a nonauthentic Dutch word and therefore be considered as a nonword in the lexical decision task. Examples of the stimuli can be observed in Appendix 1.

There were 22 word-word pairs and 22 word-nonword pairs per category, adding up to a total of 176 word pairs. These word pairs were randomized and presented to all the participants, resulting in a within-subject experiment design. By doing so, the participants would not develop a strategy effect.

The experiment was coded in ZEP (Veenker, 2017) and performed on a Linux operating system. The ZEP script of this experiment is an adaptation of a template file. This template file was retrieved from the Beexy website. The default template is made for a visual lexical decision task with visual priming. The default experiment is auto-paced and returns the response time and correctness as output. In the template modules, we adapted the following settings: the duration of visual elements (e.g. the fixation cross, the intertrial interval, etc.), the stimuli (prime-target pairs and categories), the instructions, and minor aspects of the general layout.

3.3 PROCEDURE
The participants were asked to come to the Uil-OTS research facility in Utrecht, where

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2 Appendices are included in this digital copy of LingUU.
3 https://www.beexy.nl/download/zep/templates/latest/vislexdec_vp.zip
they were received by the experimenters. Each subject was instructed to enter a soundproof booth, to sit down on a chair in front of a computer monitor and to lay the index finger of each hand on the left and right button of a BeexyBox, that was placed in front of them on a desk. Then, the experiment was started from a computer outside the booth. First, the instructions screen was run, followed by the practice trial in which 10 non-related word pairs were presented to the subject. The instructions can be consulted in Appendix 2.

During the practice trials, the participant received feedback (√ or X) to their choices, contrary to the experimental trials, where no feedback was provided. If the participant showed that they did not understand the task by returning a relatively high rate of wrong answers during the practice trials, the experiment was started again. When they completed the practice trial in a manner that showed that the task was understood, the experiment was started.

A trial starts with a fixation cross (1000 ms), which gets replaced with the prime for 750 ms. When the target disappears, the target appears after 300 ms. The target disappears after 2000 ms, which is also the time the participants have to answer. After the trial, there is an intertrial interval of 1000 ms. This is repeated until the participant has answered to all stimuli once. When the participant gives the wrong answer, the trial will not be repeated later in the experiment. Repetition could interfere with the priming effect we are investigating. A (Beexy) button box was used to collect the responses, and response labels matching the buttons were presented on the screen.

3.4 Analysis

The analysis was performed using RStudio (RStudio Team, 2016), version 1.1.383. To analyze the data, we used lme4 (Bates, Bolker, & Walker, 2015) and lmerTest (Kuznetsova, Brockhoff, & Christensen, 2017). The latter package is an extension on the summary function, which adds a significance level to the performed t-tests. We created a model taking into account both fixed and random effects in order to fit the data.

All missed targets, i.e. answers that were given after the maximum response time limit of 2000 ms (see section 3.3), were excluded from the datafile. Additionally, when checking the amount of mistakes made per item, three items scored around or below chance (50% wrong). These items were also removed from the dataset. Furthermore, there were outliers with a too low response time (between 0 and 250 ms) on some of the items, for instance a response time of 13 milliseconds. These were deleted, because they were considered to be too fast to represent a conscious response time. Lastly, we excluded all items that were answered wrong.

A critical step of our analysis has been the decision to formally divide each category into a phonological (phon) and a graphemic (graph) component, i.e. in numeric terms. In other words, each word pair has two components that are activated or unactivated based on the relatedness between the prime and the target. Following this formalization, the components of each category can be observed in Table 1.

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4 Data visualisations were made using sjPlot (Lüdecke, 2016), Lattice (Sarkar, 2008), ggplot2 (Wickham, 2009), and dplyr (Wickham, Francois, Hendry, & Müller, 2017).
Table 1

Components per category

<table>
<thead>
<tr>
<th>Component</th>
<th>phon</th>
<th>graph</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHAF</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>PHON</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>GRAF</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>UN</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

In this manner, we were able to analyze the interaction between the components that represent the two cognitive modules we are interested in, rather than a mere comparison between the means of each of the four categories.

4. Results and analysis

In this section, we will provide the results collected from the lexical decision task and provide an analysis of this data. This section will mainly focus on the Mixed Linear model that we created to fit our data.

Figure 1.

In Figure 1, the four categories are represented with different colors, each of them with two levels: words and nonwords. The figure shows that the 75% of response times for each category is placed roughly between 500 ms and 1000 ms, with minima and maxima of around 250 ms and 1500 ms, respectively. Importantly, the boxplots again show slower response
times for nonword (_NON) categories (i.e. the median and IQR are lower on the y-axis), than for word categories. Among the word (_WORD) categories, it looks like word pairs that are phonologically + graphemically related (PHAF_WORD) are recognized the fastest by our participants. At the top of each boxplot, there are data points that are named outliers by R. However, since the participants only have two seconds to answer, this is still within the time frame and we do not consider these data points to be proper outliers. Other major conclusions cannot be drawn about differences between the categories from this graph.

In order to analyze the data, a linear mixed effects analysis (Bates et al., 2015) of the relationship between response time and word category was performed. Since there are missing values in the data set (such as missed targets, or wrongly answered targets), a mixed linear effects analysis seemed most fitting. This type of analysis takes into account both fixed and random effects. We constructed this model using only the word-word pairs, leaving out the word-nonword pairs.

As fixed effects, we took into account whether a word has a phonological component and whether it has a graphemic component, as was previously shown in Table 1. We entered these components into the model with an interaction term. We excluded gender from our model, since it did not improve the fit of our model ($\chi^2(1) = 0.2432, p = 0.6219$). We included random intercepts for participant id and item id, and we included by-participant random slopes for the effect of type.

The lmerTest (Kuznetsova, Brockhoff, & Christensen, 2017) showed that, when the priming was both phonological and graphemic, the participants process the word pairs significantly faster than unrelated word pairs ($t(56.48) = -3.624, p < 0.001$). Additionally, it showed that when the priming was only graphemic, the word pairs get processed significantly slower than unrelated words ($t(72.20) = 2.710, p < 0.01$). There was no significant difference found between unrelated word pairs and phonologically related word pairs ($t(53.93) = 0.487, p = 0.628$). This means that when there is both phonological and graphemic priming, there is a facilitation. When there is only graphemic priming, there is an inhibition effect.

The fixed effects are visualized in Figure 2, which shows the best linear unbiased prediction (BLUP). This means that in this figure the different components are plotted relative to the intercept, which are the unrelated word pairs. The intercept was estimated at 696 ms, which is represented as the 0 on the x-axis. The overlap of PHON with 0 shows that it does not differ from the unrelated words. The BLUP also shows that PHON*GRAPH (i.e. the interaction of the two components) is processed 118 ms faster than the unrelated words and that GRAPH is processed 60 ms slower.

When plotting the random slopes, an interesting observation can be made. Figure 3 shows that the difference between random slopes per participant are very similar for PHON and UN, as well as for PHAF. Interestingly, for the category GRAF we observe that the random slopes are very different per participant, with the biggest difference between two participants being about 500 ms. This implies that the inhibitory effect is stronger for some participants than for others.
In summary, we have found that the combination of phonological and graphemic priming leads to a facilitation. Additionally, we have found that graphemic priming without phonological priming leads to an inhibition effect. When assessing the random slopes, we found that this effect is not equally large for all participants.
5. Conclusion
In this paper we argued that the research on graphemic priming has been inconclusive. We designed a visual lexical decision in order to give answer to the following question: To what extent is the priming effect different, in terms of response time, for phonologically related words or graphemically related words, compared to the case in which words are both phonologically and graphemically related?

The results show that the interaction of both phonological and graphemic priming leads to a facilitation with respect to the other categories, which means that the response time is lower for this category than for the others. This means that the H0 is not borne out and thus the H0 can be rejected, in favor of the alternative hypothesis. Concretely, predictions (3) and (4) are confirmed. Additionally, we have found that graphemic priming taken alone leads to an inhibition effect, which is of a different extent among the participants. This result confirms prediction (2). Furthermore, we found no difference between only phonological priming and the unrelated word pairs, contrary to prediction (1).

Projecting to a higher level, these results are compatible with an interactive approach. If the brain was modular, we would have found that the combined effect of phonological and graphemic priming was equal to the effect of either phonological or graphemic priming. However, this was not the case. On top of that, graphemic priming alone even gave an inhibitory effect on the participant’s responsiveness. We conclude that these results can only be accounted for if we take an interactive approach to the function of the brain.

Several aspects of the experiment might have been dealt with differently. The experiment could be done with a higher number of participants to see if the significance between the categories holds. Also, we could have balanced the numbers of men and women among the participants better; sex was ruled out as a fixed effect now, since this factor was not balanced. Besides, we could have asked a fair amount of left-handed subjects to participate, since we are now basing our results exclusively on a right-handed sample. The results of the only left-handed person lead to their removal, because of different response times between words (right button) and non-words (left button) compared to the right-handed in general. Since we did not know for sure if this difference was due to her being left-handed or to other factors, we excluded them from the model. It is necessary to mention that we did not control for word frequency. In order to statistically exclude the possible effect of word frequency, this should be taken into account in future studies. Lastly, we did not control for Dutch words that resembled an English lexical entry. This turned out to be a problem for just one of the stimuli (which was ‘tree’, meaning ‘step’ in Dutch).

However, we expect that these differences may only strengthen the results we found. We conclude that, indeed, phonologically and graphemically related words are processed faster than only phonologically and only graphemically related word.

This study has shown that there is an effect for graphemic and phonological relations, however it is limited to lexical decision with short words. Further research may look at whether this effect also holds for longer words or even sentences that look or sound simi-
lar to a certain extent. In addition, the semantic module could be taken into play, in order to precisely define their influence and interactions within the human neural networks.

6. Acknowledgments

The design of this experiment has been developed in professor Sergey Avrutin’s course Brain, Language and Cognition. Thanks to fellow students Judith Brinksma and James Teasdale for their contribution in this process. We conducted the experiment and wrote this paper within the course Experimental Design and Data Analysis. Thanks to professor Iris Mulders for her remarks. Finally, thanks to the anonymous participants who took part in this study.

Received April 2018; accepted September 2018

References


# APPENDICES

## APPENDIX 1. EXAMPLES OF STIMULI

*Overview of stimuli (examples)*

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APPENDIX 2. INSTRUCTION TO THE PARTICIPANT

Beste participant,

Bedankt voor het deelnemen aan dit onderzoek.

Je zult gedurende het experiment telkens twee woorden te zien krijgen. Jouw taak is om bij het tweede woord van ieder koppel te bepalen of het een bestaand Nederlands woord is of niet.

Als je denkt dat het woord bestaat, druk dan op de rechterknop; denk je van niet, druk dan op de linkerknop.

Het is belangrijk dat je snel en zo nauwkeurig mogelijk kiest: blijf daarom geconcentreerd.

Voordat het echte experiment begint, krijg je een oefenronde. Het doel hiervan is je te laten zien wat de opdracht inhoudt.

Druk op een knop om door te gaan naar de oefenronde.

Einde van de oefenronde.

Een van de proefleiders zal nu naar binnen komen om te vragen of alles duidelijk is.

Druk op een knop om door te gaan naar het experiment.

Einde van het experiment.

Dank je wel voor het meedoen!
A link for life?

J.M. (Jaap) Kruijt
MSc Artificial Intelligence, Utrecht University, Utrecht

Jaap went on exchange to the University of Edinburgh, Edinburgh, The United Kingdom as part of his Bachelor’s in Linguistics at Utrecht University.

“One of the courses, Origins and Evolution of Languages has had a lasting impact on me and shaped the rest of my Linguistics degree back home.”

This summer I visited Edinburgh, the capital of Scotland, known for its beautiful Georgian architecture and breath-taking views. The city was sprawling with tourists and artists from all over the world gathering for one of the biggest arts and culture festivals in the world. Among the local artists were some of my friends: friends who I made on a semester abroad that shaped me in many ways. In particular, this semester abroad significantly changed my views on linguistics.

Two years ago, I embarked on an adventure to the city of Edinburgh, United Kingdom, to study at the University of Edinburgh. Ever since I started thinking about doing a semester abroad, it had been clear to me that this was the only option I was willing to consider. I did not really feel the urge to leave The Netherlands. I was very happy with my Linguistics degree at Utrecht University and felt very at home in the city. However, I always wondered what it would be like to live in Edinburgh again, where I was born but have only lived for three years. When I discovered that, in addition, Edinburgh University was home to one of the best Linguistics departments in the world, the decision to go there was quickly made.

Together with another student from Utrecht University, I was selected to study Linguistics in Edinburgh. Because I knew the city very well, I quickly felt at home in my new home for the next three months and I did not suffer from any culture shock. Life in this city suited me well and everyone I met was extremely warm-hearted and friendly. I quickly became friends with people I still visit today, especially in the theatre group I joined.
The Edinburgh semester lasts three months, which is relatively short. I took three courses, and aside from one midterm exam in October all my exams and essays were in December, at the end of the semester. This did not distribute the workload very well. Students get one week before their exams to revise. It seems that only during this notorious revision week many students actually start working.

Two of my three courses were on linguistics. One of them, *Origins and Evolution of Languages*, has had a lasting impact on me and shaped the rest of my Linguistics degree back home. Somewhere during my first year, it struck me that I felt I was only hearing one side of the story about language, and although I realised I did not agree with some of the theories that were taught, I did not know of any alternative ones. *Origins and Evolution of Language* offered me new ideas which were exactly the kind of counter-arguments against things I had learned in courses at Utrecht University, which I had been looking for. The course offered a very interesting new insight in the way language, and specifically structure in language, might have originated.

It was during one of these lectures by UU-alumnus and Edinburgh University post-doc Marieke Schouwstra that I found a topic for my Bachelor’s thesis. Back home, I wrote my thesis on the topic of language evolution using a method I learned of while in Edinburgh. It was written under the supervision of Henriëtte de Swart and Marieke Schouwstra, so, even when I was back home, I was still connected to Edinburgh and Edinburgh University academically. I would love to keep this link alive and to return one day to work at the Centre of Language Evolution, where I learned so much.
I agree semantics matters, but must you trick me into it?

According to an old adage attributed to the French poet Baudelaire, the Devil’s greatest trick was to make people believe he did not exist; and just like any good trick there is both enjoyment and wonder to be found in witnessing it. That shine does, however, fade once one understands how it was carried out. The case is similar with Steven Pinker’s *The Stuff of Thought*. Through an impressive array of examples (constructed and from real life), Pinker manages to convince the reader of his story that the semantic restrictions evident in language give us glimpses of how the human mind works. Yet once the reader understands why this story sounds compelling, by subjecting a host of alternative theories, ranging from extreme nativist to extreme linguistic determinism to a rigid and thorough analysis, which is conspicuously left out in the analysis of his own theory, one does feel a bit cheated. The trick being played however, is still entertaining and the argument still instills one with a sense of wonder of having discovered something new. Considering *The Stuff of Thought* is written as popular-science book, this review attempts to balance the strengths and weaknesses of the book by keeping in mind the diverse readership it tries to appeal to and to evaluate it based on whether it managed in its task of showing the reader why “there is nothing mere about semantics”.

The Good and the Bad...

In his attempt to show the reader why linguistics in general and semantics in particular offers a window into the human mind, Pinker shows an intuitive understanding of not only his reader but the subject matter at hand. Thus, he expertly puts the reader into the context of the scientific method and argumentation, while also giving the reader the
necessary historical and scientific context to understand just where his argument is situ-
ated. All the while peppering in just enough popular culture references (though some-
times dated), such as cartoon strips, to keep the subject matter relevant for a modern
audience. And it is these parts (in addition to the humour) that make the book such a joy
to read, even for a non-linguist. They all serve to make Pinker’s argument easy to under-
stand and are backed up with a wealth of evidence to support it.

It is, however, in this wealth of evidence that the quality of the argument starts to slip.
Pinker’s expertise and authority clearly shine through, when he is sticking to the linguistic
and psychological evidence. Once, he however begins to veer into philosophy, the argu-
ments starts loosing traction due to too shallow and imprecise treatments of the subject
matter. This is especially clear in Pinker’s treatment of Wittgenstein that ends up in Pinker
oversimplifying Wittgenstein’s *Tractatus Logico-Philosophicus* in his own favour.

And while the humour is greatly appreciated, one is left to wonder whether it under-
mines the purpose of the book to show why semantics is important in the quest for
understanding the human mind. As can clearly be seen from the many praises this book
has achieved from the general public, the humour is the main thing that seems to stick in
the mind of the reader from the book. “Highly entertaining”, “very good jokes”, “filled
with humour and fun” are only some of the blurbs highlighted at the back of the book.
It soon becomes suspicious just where exactly this humour is often placed. Using it and
other trivia to start off a chapter is ingenious and much welcome, but at times the humour
is also placed in sections where Pinker is trying to convince the reader of his own theory
or discredit a rivalling one. Here humour thus seems, rather than a strategy to keep the
reader’s attention, a strategy to make Pinker’s argument more compelling (this despite
an entire chapter being devoted to fallacious argumentation, ironically). For the linguis-
tic and psychological examples this works well, because it illustrates the pitfalls some of
these theories have. For the oversimplified philosophical points, however, it comes across
as a straw man that ultimately weakens Pinker’s larger argument about how the human
mind constructs the world, which often partially rests on the more philosophical points.

…And the downright Fascinating
Humour and a dazzling array of facts and examples aside, where The Stuff of Thought really
shines is in its prescience. It is easy to forget old while reading it that the book is a dec-
ade by now (2018), as especially the section on Neo-Whorfism could have been taken from
this reader’s Facebook feeds a couple of months ago when a new video claiming to “prove”
the Sapir-Whorf hypothesis was making the rounds. Even the section on how neologisms
are formed has if not a prescient whiff of our present era of ‘fake news’, ‘covfefe’, and ‘big
league’ (adv.) in it, then at least a certain topicality to it when political reporting on both
sides of the Anglophone Atlantic seems to either rummage for old(er) words for new
things or outright invent them (Merriam-Webster’s most searched word of the day could
easily serve as a tracker of political news reporting).

OK, Semantics matters, but what about this book?
Does Pinker however succeed in his goal of convincing his readers that semantics is im-
portant and that it can shine a light into how the human mind works? The answer to that question is undoubtedly “Yes”. To boot he even makes it entertaining and manages to with his bag of humour, trivia and popular culture references to teach most if not all readers something along the ride. It is merely a shame that this excellent display of knowledge and wit sometimes gets overboard into oversimplifications and straw mans. And the more one reads the book, the more one sees exactly how Pinker is winning one over, leading the latter quarter of the book to read much more like an endless "I saw what you did there". But even this might be a blessing in disguise for the book, since by having this effect it at least forces the reader to think about the subject matter and to weigh in the facts that Pinker always presents fairly and neutrally in light of Pinker’s argument. This might thus be the book’s greatest achievement in managing to convert the edutainment formula of the 21st century video platforms into printed form.

The sole regret that Pinker cannot take from this reader though is that, this reader wishes someone could write in equal measures educationally as entertainingly about syntax. ■

Steven Pinker is not only a distinguished scholar as the Johnstone Family Professor at Harvard, but also the author of popular books ranging from the purely linguistic and psychological (as in his trilogy on the human mind, of which The Stuff of Thought is the last one) to ones about science in general (Enlightenment Now). As such he has established himself as an authority in many fields, which are sometimes quite far removed from his main expertise (such as economics in Enlightenment Now).
Taal om mee te spelen

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Als Dan Dus Daarom
SJOERD VAN DER NIET
ISBN 9789463400961

INTRODUCTIE IN DE TAALFILOSOFIE
Met de titel Als Dan Dus Daarom geeft Sjoerd van der Niet direct aan welke richting hij op wil met zijn boek. Door signaalwoorden naast elkaar te plaatsen in de titel geeft hij al weer wat de kern is van taalfilosofie: welk verband geven deze woorden weer en hoe is dat te vertalen naar de wereld om ons heen? In tien hoofdstukken, verdeeld in kleine stukjes met een eigen kopje, beschrijft Sjoerd van der Niet zijn visie over uiteenlopende talige onderwerpen en hoe deze volgens hem te interpreteren zijn in termen van filosofie. Na ieder hoofdstuk is er een passage, intermezzo genoemd, waarin kort gereflecteerd wordt op het voorafgaande hoofdstuk. Op deze manier krijgt het boek een luchtige indeling. Zelf ziet van der Niet de taalfilosofie als de speeltuin van het denken.

SPEELS GESCHREVEN
Het boek heeft 180 pagina’s, verdeeld over tien hoofdstukken. Binnen de hoofdstukken zijn er tussenkopjes geplaatst, en de tekst daaronder is weer verdeeld in meerdere alinea’s van ieder ongeveer acht tot tien regels lang. Door deze indeling is het enerzijds lastig om aan een stuk door te lezen, maar word je anderzijds wel meegenomen in de denkstappen die Van der Niet heeft gemaakt tijdens het schrijven. Door de witregels tussen de alinea’s neem je als lezer steeds een kleine leespauze, en zo krijg je het gevoel dat je de hoofdstukken in verschillende stappen leest die overeenkomen met de manier waarop Van der Niet zijn uiteenlopende ideeën geclusterd heeft.

Een voorbeeld van deze hak-op-de-tak schrijfstijl die Van der Niet hanteert is uit het hoofdstuk Pragmatiek. Onder het kopje dat begint met het voorbeeld Heet je hond Minoes? geeft Van
der Niet eerst een theoretisch inzicht in hoe in het Nederlands het woord *hond* verbonden is aan de harige viervoeter die velen kennen als een huisdier, maar een paar regels later zegt hij dat deze benaming ook als een grap gezien kan worden en dat de theorie niet altijd aangehouden hoeft te worden. Op deze manier lijkt hij een onderbouwde theorie met zijn eigen mening en gedachten tegen te spreken. Vervolgens vat hij het samen door te zeggen dat taal ook maar een verzameling spellen is en dat de regels kunnen veranderen op ieder moment. Door dit te zeggen valt zijn eerdere tegenspraak als het ware weg, omdat volgens hem de taalregels niet vaststaan.

**Onderbreking van de gedachten**

De titels van de hoofdstukken bestaan uit termen die voortkomen uit de linguïstiek, zoals *Redeneren* en *Refereren*. Echter worden deze begrippen niet duidelijk toegelicht in de hoofdstukken zelf. Zo wordt er in het hoofdstuk *Interpretatie* een voorbeeld van het *Gavagai-probleem* van de analytische filosoof Quine gegeven, maar een theoretische uitleg van het probleem ontbreekt. Op deze manier worden er meerdere voorbeelden van problemen of hypotheses in het boek gegeven zonder de theorie erachter uit te leggen. In de intermezzo’s volgend op de hoofdstukken wordt er nog wel iets ingegaan op de theorie, maar dit is voor de lezer lastig te verbinden aan de voorbeelden die gegeven worden omdat het achteraf wordt uitgelegd. Door de lengte van de hoofdstukken krijg je als lezer maar weinig informatie over ieder onderwerp, waardoor je met veel vragen blijft zitten. Achterin het boek worden enkele theorieën nog wel verder toegelicht, maar hier wordt niet naar verwezen in de hoofdstukken of intermezzo’s. Door de speelse indeling van de hoofdstukken krijg je als lezer eerst de indruk dat je in een luchtige roman bent begonnen en dat je je kunt laten meeverwegen door de gedachten van de schrijver. Maar wanneer je na een hoofdstuk aankomt bij een intermezzo is het overschakelen van de makkelijke leesstijl naar een meer kritische blik en wordt je als lezer aan het denken gezet zonder dat je het verwacht had.

**Goede Overstap**

Van der Niet ziet het boek als een introductie in de taalfilosofie. Ik sluit mij hierbij aan, omdat ik ook vind dat het een heel introductoriek boek is. De bijdrage aan de wetenschappelijke wereld van de taalwetenschap van dit boek is niet heel groot. De meest basale concepten op het gebied van linguïstiek worden genoemd, terwijl dit voor de meeste mensen met enige linguïstische kennis wel duidelijk is. Het boek kan, mede door de toegevoegde waarde van de intermezzo’s, wel gezien worden als een populair-wetenschappelijk boek. Met het oog op de wetenschap is het geen geschikt boek om te lezen als je als student of wetenschapper meer te weten wil komen over taalfilosofie, maar het boek is wel een goed begin om over te stappen van romans naar wetenschappelijke werken.

Sjoerd van der Niet is afgestudeerd filosoof en natuurkundige aan de Universiteit van Amsterdam. Hij is momenteel werkzaam bij een adviesbureau voor strategie en argumentatie. Linguïstiek is niet zijn vakgebied, maar hij is al wel sinds zijn studententijd geïnteresseerd in taal en de relatie tussen taal en filosofie. Naast *Als Dan Dus Daarom* heeft van der Niet geen publicaties op zijn naam staan.