Radboud Repository

Radboud University Nijmegen

PDF hosted at the Radboud Repository of the Radboud University Nijmegen

The following full text is a publisher's version.

For additional information about this publication click this link.
http://hdl.handle.net/2066/175221

Please be advised that this information was generated on 2019-11-16 and may be subject to change.

LANGUAGE, COGNITION AND NEUROSCIENCE, 2017
VOL. 32, NO. 8, 984–1000
https://doi.org/10.1080/23273798.2017.1279338

Routledge
Taylor & Francis Group

REGULAR ARTICLE

OPEN ACCESS Check for updates

Focus in Dutch reading: an eye-tracking experiment with heritage speakers of Turkish

Remy van Rijswijk[a], Antje Muntendam[a,b] and Ton Dijkstra[a,c]

[a]Centre for Language Studies, Radboud University, Nijmegen, The Netherlands; [b]Department of Modern Languages & Linguistics, Florida State University, Tallahassee, Florida, USA; [c]Donders Centre for Cognition, Radboud University, Nijmegen, The Netherlands

ABSTRACT

This study examines whether heritage speakers of Turkish in the Netherlands interpret focus in written Dutch sentences differently from L1 speakers of Dutch (controls). Where most previous studies examined effects from the dominant L2 on the heritage language, we investigated whether there are effects from the weaker heritage language on the dominant L2. Dutch and Turkish differ in focus marking. Dutch primarily uses prosody to encode focus, whereas Turkish uses prosody and syntax, with a preverbal area for focused information and a postverbal area for background information. In written sentences no explicit prosody is available, which possibly enhances the role of syntactic cues in interpreting focus. An eye-tracking experiment suggests that, unlike the controls, the bilinguals associate the preverbal area with focus and the postverbal area with background information. These findings are in line with transfer from the weaker L1 to the dominant L2 at the syntax–discourse interface.

ARTICLE HISTORY
Received 2 October 2015
Accepted 15 December 2016

KEYWORDS
Turkish-Dutch bilinguals; heritage speakers; eye-tracking; syntax–discourse interface; L1 transfer

1. Introduction

To understand a sentence, one must determine its information structure: what does it contain as background information and what as the new and important information? Speakers and writers facilitate this process for listeners and readers by highlighting the important information of their discourse. To do so, several strategies exist across languages. Languages like English rely mostly on prosody, while other languages use syntactic means to express information structure (i.e. changes in word order, such as fronting), and/or encode important information morphologically (i.e. through the use of an affix). These cross-linguistic differences raise the question of how bilinguals who speak two languages that differ in this respect determine the information structure of a sentence. Do bilinguals exclusively use cues of the target language or do they also pay attention to cues from the other language? The second possibility may lead to difficulties in language processing and to non-native interpretations in listening and reading. Various studies have revealed that bilinguals have difficulties in interpreting information structure, that is, at the syntax–discourse interface (e.g. Montrul, 2011; Sorace, 2011).

Our study examines the on-line processing of focus in Dutch written sentences by second-generation heritage speakers of Turkish in the Netherlands and a control group of L1 speakers of Dutch. Focus usually refers to the new, important information in the sentence (Gussenhoven, 2007; Jackendoff, 1972), and is expressed differently in Turkish and Dutch. Second-generation heritage speakers are a special type of bilinguals, because, although they acquired their heritage language as their first language (L1), they are dominant in their second language (L2), which is the language of the society in which they were born (e.g. Benmamoun, Montrul, & Polinsky, 2013). Whereas most studies on heritage speakers concentrate on how heritage languages are affected by the dominant L2 (e.g. Montrul, 2008; Silva-Corvalán, 2008), we investigate whether the weaker heritage language (Turkish) affects on-line processing in the dominant L2 (Dutch) at the syntax–discourse interface.

The paper is organised as follows. To set the stage for studying on-line processing of focus in Dutch written sentences by Turkish heritage speakers, we first discuss previous studies that have investigated bilinguals' difficulties at the syntax–discourse interface. In Section 1.2, we describe empirical studies that have demonstrated the importance of focus for language processing in speech and reading comprehension. We subsequently describe focus marking in Dutch and Turkish (Section 1.3). In Section 1.4, we zoom in on Turkish heritage

CONTACT Remy van Rijswijk r.vanrijswijk@let.ru.nl
Supplemental data for this article can be accessed at https://doi.org/10.1080/23273798.2017.1279338.
© 2017 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (http://creativecommons.org/licenses/by-nc-nd/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

speakers in the Netherlands, and describe what we know about their Turkish and Dutch language use regarding focus marking. We then turn to our eye-tracking experiment, discussing the characteristics of the participants and the methodology in Section 2, and the results in Section 3. Section 4 discusses our findings and the theoretical implications in the light of our research question.

1.1. Bilinguals' difficulties at the syntax–discourse interface

1.1.1. Production tasks and grammaticality judgments

Numerous studies on language production and comprehension indicate that bilinguals experience difficulties at the syntax–discourse interface (e.g. Montrul, 2011; Sorace, 2011). For example, in production and acceptability judgment tasks, bilingual speakers of a null subject language, like Italian, and a non-null subject language, like English, produce and accept more overt pronouns in the null subject language than control groups of L1 speakers (Belletti, Bennati, & Sorace, 2007; Sorace & Filiaci, 2006). Moreover, bilinguals interpret these pronouns differently from L1 speakers. For example, the Italian pronominal subject *lei*, "she" can be expressed or dropped (1) (Sorace & Filiaci, 2006, p. 352).

(1) La mamma dà un bacio alla figlia mentre lei/*pro* si mette il cappotto.
"The mother gives a kiss to the daughter while she/*pro* wears the coat."

Sorace and Filiaci showed that L1 speakers of Italian preferred *lei* to refer back to *la figlia*, "the daughter", in this way interpreting the pronoun as introducing a new subject in the subordinate clause. The near-native English learners of Italian, however, chose more often than the control group the option in which the pronoun referred back to the subject of the main clause (*la mamma*, "the mother"). Thus, they interpreted the pronoun in such a way that *la mamma*, "the mother" continued to be the subject in the subordinate clause (i.e. topic continuity).

Other studies on the use of pronouns by English-Italian bilinguals, such as Serratrice, Sorace, and Paoli (2004) and Sorace, Serratrice, Filiaci, and Baldo (2009), concern children. These studies demonstrated two important points. First, transfer only occurs within the limits of the syntactic structure, hence without syntactic violations. Second, a comparison between English-Italian and Spanish-Italian children showed that differences with monolingual children cannot solely be explained by cross-linguistic differences. Specifically, both Spanish and Italian are null subject languages, but Sorace et al. (2009) found that Spanish-Italian children, similar to English-Italian children, accepted overt pronominal subjects in Italian more often than monolingual children. Therefore, the authors suggest that both cross-linguistic differences and a delay in language acquisition play a role in bilinguals' acceptability of overt subject pronouns. That is, given that monolingual children in principle show the same acceptance pattern, sufficient language exposure is required to attain a native-like level in the use of pronouns.

Beside pronouns, studies examined focus structure, e.g. in Greek-English bilinguals (Argyri & Sorace, 2007). In Greek, a relatively free word order language, preverbal subjects are associated with what the authors call narrow contrastive focus (2), whereas postverbal subjects indicate wider non-contrastive focus (i.e. focus on the verb and subject) (3) (Argyri & Sorace, 2007, p. 84).

(2) a. Pios tilefonise, o Janis i o Kostas?
"Who phoned, Janis or Kostas?"
b. [o Janis]$_{\text{FOCUS}}$ tilefonise.
[the Janis-NOM]$_{\text{FOCUS}}$ phoned-3SG.
"Janis phoned."

(3) a. Ti ejine to molivi tis Marias?
"What happened to Maria's pencil?"
b. [to pire o Petros]$_{\text{FOCUS}}$
[it-CL took-3SG the Petros-NOM]$_{\text{FOCUS}}$
"Petros took it."

In English, word order is usually SVO, irrespective of focus structure. In Argyri and Sorace, English-dominant bilingual children produced and accepted preverbal subjects in wider non-contrastive focus contexts more often than Greek monolinguals. Importantly, Greek-dominant bilinguals behaved like Greek monolinguals. Thus, bilinguals showed transfer from English to Greek when English was the dominant language, but not when it was the weaker language. Furthermore, there was an influence from English in Greek, but not vice versa: all bilinguals behaved like the L1 speakers of English in all English tasks. This one-directionality of transfer can be explained by differences in Greek and English word order. While Greek has two options for the location of the subject, depending on the pragmatic context, in English the subject is always placed before the verb. Difficulties at the syntax–discourse interface may be explained in terms of optionality (e.g. Sorace, 2000). If a language has several possibilities, e.g. for the position of the subject, and the "correct" option depends on the discourse, this may lead to (processing) difficulties, even in near-native bilinguals.

1.1.2. On-line processing

Other bilingual studies have examined on-line processing at the syntax–discourse interface. Regarding subject pronouns, Roberts, Gullberg, and Indefrey (2008) compared off-line interpretations and eye-

movements of proficient learners of Dutch who had Turkish, a null subject language, or German, a non-null subject language like Dutch, as their L1. In (4) (Roberts et al., 2008, p. 336), the Turkish learners interpreted *hij*, "he" as containing contrastive information, thus referring back to Hans. This interpretation is compatible with their L1. L1 speakers of Dutch and the German learners, on the other hand, interpreted *hij*, "he" as referring back to Peter (topic continuity).

(4) Peter en Hans zitten in het kantoor. Terwijl Peter aan het werk is, eet hij een boterham.
"Peter and Hans are in the office. While Peter is working, he is eating a sandwich."

Nonetheless, both German and Turkish learners had longer fixations than the Dutch control group, reflecting on-line processing difficulties. These findings together show that differences between L1 and L2 at the syntax–discourse interface affect bilinguals' interpretations and that connecting linguistic structure and discourse is difficult for bilinguals more generally. Similarly, Sorace (2011) discusses that, beside cross-linguistic differences, general processing difficulties in bilinguals may play an important role at the syntax–discourse interface.

Concerning focus structure, Hopp (2009) investigated the on-line processing of discourse-related scrambling in German by advanced and near-native learners of German whose L1 was Russian, English, or Dutch. Scrambling refers to the fronting of objects before other constituents, such as subjects, in non-initial positions in the sentence, which is possible in specific pragmatic contexts in German. In (5), the object *den Vater*, "the father" is placed before the subject, leading to focus on the subject *der Onkel*, "the uncle" (Hopp, 2009, p. 467).

(5) a. Wer hat den Vater geschlagen?
"Wo beat the father?"
b. Ich glaube, dass den Vater der ONKEL geschlagen hat.
"I believe that the uncle beat the father."

The scrambling in (5) is felicitous, because the preceding question led to focus on the subject. If the object was in focus, scrambling would be infelicitous.

The L1s of the participants differed regarding scrambling. Whereas Russian is similar to German, in English scrambling is ungrammatical. In Dutch, scrambling is possible, but it has a different function than in German and Russian. While scrambled objects in German and Russian are defocused, scrambled objects in Dutch are in contrastive focus. The question-answer pair in (5) would thus be infelicitous in Dutch. Comparison of the three groups of learners indicated that the Russian and near-native English learners of German showed native-like processing of scrambling in German, but the advanced and near-native Dutch learners did not show processing differences regarding felicitous and infelicitous scrambling. Thus, when the same structure has multiple, discourse-related interpretations in different languages (i.e. in Dutch and German), this is more difficult than when there is only one option available (i.e. English has no option, German has one). Next, we consider whether the role of optionality has been examined in transfer from the weaker L1 to the dominant L2 in heritage speakers.

1.1.3. Transfer from the weaker to the dominant language in heritage speakers

The studies described above involve several types of bilinguals, such as L2 learners and simultaneous bilinguals. Differently from most other bilinguals, the L2 of heritage speakers is often the dominant language, and the L1, which is commonly not the school language, is subject to incomplete acquisition or attrition (e.g. Benmamoun et al., 2013). Research on heritage speakers mostly concerns how the heritage language is affected by the stronger L2. A less frequently posed question is to what extent the weaker, yet first language may affect the L2. Studies that looked at both directions have demonstrated transfer from the dominant language to the weaker language, but not vice versa (Argyri & Sorace, 2007, for the syntax–discourse interface; Daller, Treffers-Daller, & Furman, 2011; Hohenstein, Eisenberg, & Naigles, 2006, for conceptualisation patterns of motion events; Montrul & Ionin, 2010, for morpho-syntax). Furthermore, Serratrice (2007) found no transfer from the non-dominant language (English) in bilingual English-Italian children, regarding the use of subject pronouns. These findings suggest that transfer from the weaker to the dominant language is not very common in heritage speakers. Yet, other studies on heritage speakers suggest that the dominant L2 may be affected by the L1 (e.g. Blom & Baayen, 2013, for morpho-syntactic features in the Dutch of child heritage speakers of Chinese; Queen, 2012, for the German prosody of Turkish heritage speakers; Van Meel, Hinskens, & Van Hout, 2013, 2014, for phoneme distributions in the Dutch of Turkish heritage speakers). Together, these studies indicate that L1 transfer is possible when the L1 is the weaker language, but whether this also holds for the syntax–discourse interface is unclear.

Regarding the syntax–discourse interface, Roberts et al. (2008) is, to our knowledge, the only study that showed L1 transfer in the heritage speakers' L2. However, it is uncertain whether Dutch was the dominant language for all these bilinguals, because the Turkish heritage speakers in this study varied greatly in age of first exposure to Dutch (ranging from 4 to 41 years, with a mean age of 19.9). The researchers

considered them L2 learners of Dutch, comparable to the German L2 learners of Dutch, who learned Dutch in adulthood and were matched to the Turkish group regarding L2 proficiency. The Turkish-Dutch bilinguals in our study, by contrast, are all dominant in Dutch. In Section 1.4, we consider how these bilinguals mark focus, but we first discuss the importance of focus for general language processing (Section 1.2) and describe focus marking in Dutch and Turkish (Section 1.3).

1.2. Focus structure in language processing

Various studies have demonstrated the importance of focus for speech and reading comprehension. Research in the auditory domain revealed that focused information is detected faster than defocused information and that sentence comprehension is facilitated by the recognition of focus (Cutler & Fodor, 1979; Cutler & Foss, 1977). Furthermore, this research showed that prosody usually helps to define the focus structure of a sentence in speech comprehension (Cutler, Dahan, & Van Donselaar, 1997). Electro EncephaloGram (EEG)-experiments further examined the importance of focus and prosody for speech comprehension (Dimitrova, 2012; Heim & Alter, 2006; Magne et al., 2005; Toepel, Pannekamp, & Alter, 2007) and revealed processing difficulties when new information is deaccented or given information accented. For instance, Dimitrova (2012) found late positivities after inappropriately accented words and inappropriately unaccented words in Dutch spoken sentences, reflecting difficulties in understanding sentences with prosodic mismatches.

While in speech comprehension prosody helps to determine the focus, in written sentences no explicit prosody is available. Yet, studies on reading demonstrate that focus plays a role in detecting (in)correct information, such as the "Moses illusion" (e.g. Erickson & Mattson, 1981). The original Moses illusion refers to the situation in which participants answered the question: "How many animals of each kind did Moses take on the ark?" without realising that it was not Moses, but Noah who took animals on the ark. The *wh*-phrase in this question elicits focus on the animals, moving the attention away from Moses. Additionally, Bredart and Modolo (1988) showed, using a sentence verification task with cleft constructions (i.e. "It was Moses who …"), that statements with the incorrect information in focus (through the cleft construction) more often led to detection of inconsistencies than when the incorrect information was not focused. Other studies on written sentences revealed that focused information is memorised better (Birch & Garnsey, 1995; Osaka, Nishizaki, Komori, & Osaka, 2002). An eye-tracking study found that focused words have longer reading times than defocused words, indicating that readers pay more attention to focused information (Birch & Rayner, 1997).

Summarising, prosody and focus are crucial for speech comprehension, and focus is also important for reading, in which prosody is not explicitly present. The relation between focus and prosody in spoken discourse raises the question of what the role of prosody is in reading. Several studies have claimed that readers assign prosody to what they silently read, i.e. the implicit prosody hypothesis (e.g. Ashby & Clifton, 2005; Fodor, 1998). Moreover, studies indicate a positive relationship between prosodic proficiency (i.e. the ability to correctly assign prosody to sentences) and reading comprehension. For instance, Miller and Schwanenflugel (2006) found that children who used more pitch changes while reading aloud understood the text better. Veenendaal, Groen, and Verhoeven (2014) found that, besides reading aloud prosody, proficiency in speech prosody (as elicited in a story-telling task) had a positive effect on reading comprehension. Whalley and Hansen (2006) demonstrated that children with a poorer performance on accent placement in a reiterative speech task performed poorer on reading comprehension than children with a better prosodic proficiency (see also Holliman, Wood, & Sheehy, 2010a, 2010b). Similarly, prosodic sensitivity appears to be highly predictive of reading proficiency in children with developmental dyslexia (e.g. Mundy & Carroll, 2012), again emphasising the importance of prosody for reading.

The relationship between implicit prosody and focus structure for reading has been investigated in adult L1 speakers of German with an EEG-experiment (Stolterhoft, Friederici, Alter, & Steube, 2007). This experiment showed two separate event related potential (ERP) correlates, one related to focus structure (a positive-going waveform around 350–1300 ms) and the other to implicit prosody (a negativity around 450–650 ms). This indicated that both accent placement and defining focus structure are crucial, related processes in silent reading.

1.3. Focus in Dutch and Turkish

Dutch and Turkish use different linguistic cues to mark focus. Similar to English, Dutch expresses differences in focus structure prosodically. The basic word order in Dutch main clauses is SVO (Bouma, 2008). In broad focus sentences, the nuclear accent (i.e. the final accent in the sentence; underlined in the examples) falls on the rightmost constituent (6) (Gussenhoven, 1984).

(6) Het kind valt uit de boom.
"The child falls down from the tree."

An example of contrastive focus is given in (7). The prepositional object *boom*, "tree" is contrasted with *dak*, "roof". Similar to (6), the nuclear accent is located on *boom*:

(7) Het kind valt uit de boom, niet van het dak.
"The child falls down from the tree, not from the roof."

When the subject is in contrastive focus, the nuclear accent is located on *kind*, "child", without a change in word order (8).

(8) Het kind valt uit de boom, niet de kat.
"The child falls down from the tree, not the cat."

In Turkish, both prosody and word order are used in focus marking (İşsever, 2003; Özge & Bozsahin, 2010). Turkish basic word order is SOV, but other orders are possible. In broad focus sentences with SOV order, the nuclear accent falls on the preverbal constituent, *ağaçtan*, "from the tree" in (9) (İşsever, 2003, p. 1047):

(9) Bir çocuk ağaçtan düşmüş.
a child tree-ABL fall-PERF
"A child fell down from the tree."

As in Dutch, focused constituents are accented. The nuclear accent on *ağaçtan*, "from the tree" in (9) can also be interpreted as contrastive focus on this constituent (in the appropriate context), without any change in word order. Furthermore, it is possible to shift the nuclear accent from the immediately preverbal constituent to the sentence-initial constituent *bir çocuk*, "a child", signalling contrastive focus on the subject (10):

(10) Bir çocuk ağaçtan düşmüş.
a child tree-ABL fall-PERF
"A child fell down from the tree."

Contrary to Dutch, in Turkish focused words are located before the verb, whereas the postverbal region is reserved for given information (İşsever, 2003; Özge & Bozsahin, 2010). Accents on elements after the verb are not allowed: In (11), *ağaçtan*, "from the tree", which appears after the verb, is deaccented to indicate that it is defocused background information. *Bir çocuk*, "a child", carries the nuclear accent and receives narrow (contrastive) focus.

(11) Bir çocuk düşmüş ağaçtan.
a child fall-PERF tree-PERF
"A child fell down from the tree."

In sum, both languages use prosody to encode focus, but while in Dutch broad focus sentences the nuclear accent falls on the rightmost constituent, in Turkish broad focus sentences the nuclear accent is located on the constituent that immediately precedes the verb. Moreover, Turkish distinguishes syntactically and prosodically between a preverbal area for accented, focused information, and a postverbal area for deaccented, given information, whereas Dutch does not.

We now turn to Turkish heritage speakers in the Netherlands, and describe what we know about their language use regarding focus marking.

1.4. Heritage speakers of Turkish in the Netherlands

Language production studies examined how Turkish heritage speakers in the Netherlands use word order to mark focus. Doğruoz and Backus (2007, 2009) considered word order in Turkish. Because SVO order in Turkish is a grammatical option in certain pragmatic contexts, and the default word order in Dutch main clauses, Doğruoz and Backus (2007) expected to find this word order more frequently in Turkish spoken in the Netherlands than in Turkish spoken in Turkey, due to transfer from Dutch. However, no differences were found, although other cues (which are not described here) suggested a gradual language change.

Similarly, concerning Dutch as spoken by heritage speakers of Turkish, Van Rijswijk, Muntendam, and Dijkstra's (in press) study on focus marking revealed prosodic differences between the heritage speakers and L1 speakers of Dutch, which could possibly be explained by an effect of Turkish, but they did not find differences in word order.

Thus, these two studies on Turkish heritage speakers in the Netherlands did not show cross-linguistic effects regarding word order in Turkish and Dutch, indicating that these bilinguals have knowledge of the syntactic constraints of their languages. Whereas these studies concerned language production, we examined reading in Dutch and tested the bilinguals' competence at the syntax–discourse interface when explicit prosody is not available. Importantly, the findings by Doğruoz and Backus (2007, 2009) suggest that the heritage speakers were well aware of the relation between focus structure and word order in Turkish and thus that L1 attrition does not play a role here. This makes L1 transfer to the L2 Dutch a possible scenario.

1.5. The present study

We explored whether heritage speakers of Turkish interpret focus structure in written Dutch differently from L1 speakers of Dutch, possibly due to an effect of their weaker heritage language. While in speech prosody is explicitly present (i.e. provided by the speaker), in written language the reader has to (implicitly) determine the prosodic structure of a sentence. Other cues, such as word order, are therefore more important during reading to understand the focus structure of a sentence. As

explained above, Turkish and Dutch both use prosody to mark focus, but only Turkish has clear syntactic cues. Therefore, the question arises whether Turkish-Dutch bilinguals and L1 speakers of Dutch cope differently with the absence of explicit prosody in written Dutch sentences. Our eye-tracking experiment investigated whether the association in Turkish with the preverbal position for new and contrastive information is active in Turkish-Dutch bilinguals while they are reading in Dutch, even though Dutch is their dominant language.

2. Method

2.1. Participants

Twenty-five Turkish-Dutch bilinguals (14 male; mean age: 23.5, ranging from 18 to 33 years) and a control group of 24 native speakers of Dutch (5 male; mean age: 25.3, range: 18–44 years) participated in the experiment. The groups were comparable in educational level: the participants in both groups varied to the same extent from being a university student to having finished intermediate vocational education (see Appendix A). Twenty-four of the bilinguals were born in the Netherlands; the other participant was born in Turkey and moved to the Netherlands when he was 1.5 years old. All participants in the control group were born in the Netherlands. Prior to the experiment, all participants completed a sociolinguistic questionnaire about their language background, language use, and self-reported language proficiency ratings in Dutch and Turkish. Independent *t*-tests revealed no significant differences between the bilinguals and the controls regarding the self-reported proficiency ratings for Dutch (Table 1). However, regarding differences between the bilinguals' proficiency in Turkish and Dutch, paired *t*-tests showed that the bilinguals reported to be significantly better at reading ($t(24) = 4.04$, $p < .001$) and writing ($t(24) = 2.98$, $p < .01$) in Dutch than in Turkish. There were no significant differences between their self-rated proficiency in Turkish and Dutch for speaking, listening, and pronunciation.

The participants also performed the Boston Naming Test (BNT) (Kaplan, Goodglass, Weintraub, Segal, & van Loon-Vervoorn, 2001) in Dutch and Turkish. This test was used to get an objective indication of the participants' proficiency in both languages. An independent *t*-test revealed that the difference in Dutch BNT score between the bilinguals and controls was significant ($t(40.66) = 7.60$, $p < .0001$), with higher scores for the controls (Table 2). Moreover, a paired *t*-test showed that the bilinguals had significantly higher scores on the Dutch than on the Turkish BNT ($t(24) = 11.16$, $p < .0001$).

To assess their reading speed, the participants read two short texts in Dutch and Turkish after the experiment (cf., Bultena, Dijkstra, & Van Hell, 2014; Libben & Titone, 2009). The first text in each language was used to adjust to the intended language to avoid an effect of potential switching costs on reading times. All texts were followed by a comprehension question. The Dutch and Turkish texts were comparable in length and difficulty, and the order of the languages was counterbalanced. The participants were instructed to read the texts and to answer the question that appeared after reading the text. Eye-movements were recorded to determine the average fixation duration per word. An independent *t*-test revealed that the difference in average fixation duration per word of the Dutch text between the bilinguals and controls was not significant ($t(33.23) = 1.04$, $p > .05$) (Table 3). For the Turkish-Dutch bilinguals, the average fixation durations per word were longer for Turkish than for Dutch (410 vs. 288 ms). However, a direct comparison between the languages is not possible because of the agglutinative nature of Turkish: words in Turkish are generally longer than in Dutch due to their morphological complexity, causing longer reading times.

2.2. Stimulus materials

The stimuli for the reading experiment were sentences followed by contrastive ellipsis involving a subject (S) or prepositional phrase (PP), modelled after Stolterhoft

Table 1. Means self-reported language proficiency ratings (and standard deviations) for all participants.

	Bilinguals Mean Turkish	Mean Dutch	Controls Mean Dutch
Speaking	4.16 (0.94)	4.36 (0.64)	4.67 (0.87)
Listening	4.88 (0.33)	4.80 (0.5)	4.67 (0.87)
Writing	3.72 (1.1)	4.44 (0.65)	4.46 (1.02)
Reading	4.20 (0.91)	4.92 (0.28)	4.63 (0.93)
Pronunciation	4.04 (0.79)	4.36 (0.64)	4.67 (0.87)
Mean	**4.20**	**4.58**	**4.62**

Note: A score of 1 refers to "not good at all" and a score of 5 to "very good".

Table 2. Turkish and Dutch BNT scores for all participants.

	Bilinguals Turkish BNT	Dutch BNT	Controls Dutch BNT
Mean score	73.84	107.44	134.08
SD	12.76	14.75	9.28

Note: The maximum score was 162.

Table 3. Turkish and Dutch average fixation durations per word and standard deviations for all participants, in ms.

	Bilinguals Turkish text	Dutch text	Controls Dutch text
Average fixation duration per word	410	288	314
SD	134	54	110

et al. (2007). In their EEG-experiment, Stolterfoht et al. used contrastive ellipsis (Carlson, 2002; Drubig, 1994) in German sentences to distinguish between the process of determining focus structure on the one hand, and implicit accent placement on the other. As Dutch is similar to German concerning the nuclear accent placement in focus marking, it was likely that L1 speakers of Dutch would process focus in written Dutch similarly to L1 speakers of German, whereas we made different predictions for the Turkish-Dutch bilinguals.

Example (12) illustrates contrastive ellipsis in Dutch:

(12) De barman rookt zijn sigaretten in het steegje, niet in het zaaltje waar dat verboden is.
"The barkeeper smokes his cigarettes in the alleyway, not in the party room in which it is prohibited."

The main clause in (12) (i.e. the part until the comma) has a broad focus interpretation. The sentences appeared without a context, so all information in the sentence was new and the nuclear accent was located on the rightmost constituent, which was the PP. The main clause was followed by a contrastive ellipsis construction that disambiguated the focus structure of the sentence. This disambiguating phrase consisted of the word *niet*, "not", followed by an alternative for either S or PP in the main clause. The word *niet*, "not" changed the focus structure from broad to contrastive focus. The alternative that followed *niet*, "not" indicated the position of the contrastive focus. In (12), the alternative is a PP, leading to contrastive focus on the PP *in het steegje*, "in the alleyway". Following Stolterhoft et al. (2007), we predicted that, for L1 speakers of Dutch, this would lead to a revision of the focus structure (from broad to narrow contrastive focus). However, there would not be a revision of the implicit prosody, given that the location of the nuclear accent did not change: The nuclear accent fell on the PP in both broad and contrastive focus. This was different for contrastive focus on S (13). The disambiguating phrase in (13) indicates contrastive focus on the subject *de barman*, "the barkeeper". Here, L1 speakers of Dutch would both have a focus revision (from broad to contrastive focus on S in the main clause), and a revision of the implicit prosody. Specifically, the nuclear accent shifted in this case from PP to S.

(13) De barman rookt zijn sigaretten in het steegje, niet de tiener die niet rookt.
"The barkeeper smokes his cigarettes in the alleyway, not the teenager who does not smoke."

Let us now turn to the predictions for the bilinguals. If Turkish-Dutch bilinguals made use of Turkish word order cues while reading Dutch, we predicted that the revision processes would differ from those of the controls. Given that in Turkish broad focus sentences the nuclear accent falls on the preverbal constituent, contrastive S would lead to fewer processing difficulties than contrastive PP. The postverbal region in Turkish is associated with unaccented, given information, and therefore the bilinguals might not expect contrastive focus on the PP. Thus, an effect of Turkish would be reflected in the bilinguals if they showed more difficulties with contrastive focus on the final word in the main clause (the PP) than with contrastive focus on the preverbal subject, whereas the L1 speakers of Dutch showed the opposite pattern.

The processing of sentences like (12) and (13) was compared to that of control sentences, which were similar, but included the focus particle *enkel*, "only". In these sentences no revisions were expected, because *enkel*, "only" indicated the focus structure of the main clause (Stolterhoft et al., 2007), see (14) and (15). By comparing ambiguous and non-ambiguous sentences, we can rule out the possibility of confounding factors. For example, length differences in the disambiguating phrase (i.e. two words for contrastive S and three words for contrastive PP) might lead to differences in reading times.

(14) *Enkel* de barman rookt zijn sigaretten in het steegje, niet de tiener die niet rookt.
"*Only* the barkeeper smokes his cigarettes in the alleyway, not the teenager who does not smoke."

(15) De barman rookt zijn sigaretten *enkel* in het steegje, niet in het zaaltje waar dat verboden is.
"The barkeeper smokes his cigarettes *only* in the alleyway, not in the party room in which it is prohibited."

In sum, there were four experimental conditions. The sentences in the first condition were ambiguous and involved contrastive ellipsis on S (ambiguous S). The sentences in the second condition were unambiguous: They included *enkel*, "only" before S, and also involved contrastive S (non-ambiguous S). The sentences in the third condition were ambiguous and had contrastive ellipsis on PP (ambiguous PP). Finally, the sentences in the fourth condition were unambiguous (i.e. with *enkel*, "only" before the prepositional phrase), and involved contrastive PP (non-ambiguous PP). The relative difficulty that the participants had with the disambiguating phrase (i.e. the difference between the ambiguous and non-ambiguous counterparts) would reflect which constituent (S or PP) they expected to be in contrastive focus.

There were two differences between Stolterfoht et al.'s sentences and our Dutch sentences. First, Stolterfoht et al. used subjects and direct objects, whereas we used subjects and prepositional objects. Unlike German, Dutch does not have case marking, and the NP in the contrastive ellipsis could either refer to the subject or the object. To avoid this issue, we used prepositional phrases instead of direct objects. The presence or

absence of a preposition in the disambiguating phrase helped the reader to infer the grammatical function of the constituent in contrastive focus, without relying on semantic information. Second, all disambiguating phrases were followed by a short subordinate clause to disentangle general wrap-up effects from reanalysis of the preceding sentence (Rayner, Kambe, & Duffy, 2000).

All target words in the disambiguating phrase consisted of two syllables, with stress on the first syllable. The target words were non-cognates in Turkish and Dutch, because cognate status might affect processing (e.g. Bultena et al., 2014). All target words were matched for word frequency using the SUBTLEX-NL database on Dutch film and television subtitles (Keuleers, Brysbaert, & New, 2010). Finally, half of the subjects in the stimuli were human agents and half were animals, adding more variation to the lexical items (see Appendix B for an overview of the experimental stimuli).

2.3. Pretest

A pretest of the materials was conducted to (a) verify that the focus particle *enkel*, "only" helped to disambiguate the sentences, and (b) investigate whether Turkish-Dutch bilinguals showed a preference for a preverbal contrast over a clause-final contrast in an off-line task. We created an electronic survey in Dutch using NETQ (NETQ Internet Surveys), with the sentences described above. The respondents were asked to complete the disambiguating phrase by choosing one of two options: (A) a subject or (B) a prepositional phrase. This resulted in ambiguous (16), non-ambiguous S (with *enkel*, "only" before S), and non-ambiguous PP (with *enkel*, "only" before PP) sentences. The order of options A and B was counterbalanced.

(16) De barman rookt zijn sigaretten in het steegje, niet …
"The barkeeper smokes his cigarettes in the alleyway, not … "
A. de tiener.
"the teenager."
B. in het zaaltje.
"in the party room."

We created 2 lists, with 96 sentences each: 40 ambiguous, 20 non-ambiguous S, 20 non-ambiguous PP, and 16 distractor sentences (20%). These lists contained the same 40 ambiguous sentences, but different non-ambiguous sentences. Thus, each respondent saw 20 (out of 40) non-ambiguous S sentences and 20 (out of 40) non-ambiguous PP sentences, so that each respondent saw 1 ambiguous and 1 non-ambiguous version (either S or PP) of a sentence. There were minimally 20 different sentences in between the 2 versions of a sentence. The distractors had the same structure with a subject, verb, object, and prepositional phrase, but contained different lexical items with varying numbers of syllables and varying stress positions. Moreover, they were followed by a subordinate clause without *niet*, "not" (17).

(17) De miljonair drinkt dure wijn in het restaurant, waar …
"The millionaire is drinking expensive wine in the restaurant, where … "
A. hij vaak komt.
"he often comes".
B. hij nooit komt.
"he never comes."

We predicted that if *enkel*, "only", helped to disambiguate the focus structure, the respondents would choose S in non-ambiguous S sentences, and PP in non-ambiguous PP sentences. For the ambiguous sentences, the controls would select PP more often than S. If the bilinguals had a preference for a preverbal contrast, they would select S in the ambiguous sentences more often than controls.

2.4. Results of the pretest

Twenty Turkish-Dutch bilinguals and a control group of 21 L1 speakers of Dutch completed the task. Of these respondents, two Turkish-Dutch bilinguals and one L1 speaker of Dutch were excluded from the analysis because they always chose a contrast with PP, even when *enkel*, "only", preceded S. The mean age was 24 in both groups, and the education level varied to the same extent in both groups.

Regarding the non-ambiguous sentences, both groups of respondents selected the option that contrasted with the constituent that was preceded by the focus particle *enkel*, "only", more often than the other option (Figure 1). However, the bilinguals chose the prepositional phrase significantly more often than the Dutch L1 speakers when *enkel*, "only", preceded the subject ($\chi^2(1) = 15.93$, $p < .0001$), whereas they chose the subject significantly more often than the Dutch L1 speakers when *enkel*, "only", preceded the prepositional phrase ($\chi^2(1) = 12.37$, $p < .001$). This indicates that the bilinguals were significantly less sensitive to the use of the focus particle *enkel*, "only", than the Dutch L1 speakers. Yet, Figure 1 shows that both groups of speakers selected the more logical option in these conditions substantially more frequently, which indicates that *enkel*, "only", sufficiently disambiguates the focus structure for both the bilinguals and the Dutch L1 speakers and can therefore be used to address our research question in the eye-tracking study.

For the ambiguous sentences, both groups of respondents selected the PP more often than the S to complete the sentence. Thus, both groups preferred contrastive focus on the PP. However, a χ^2 test revealed that the

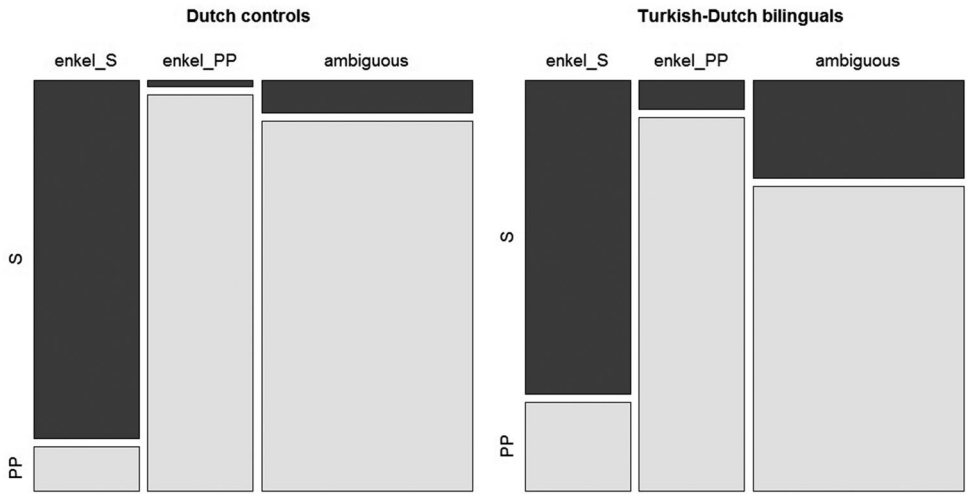

Figure 1. Mosaic plots of proportions of the choice for subject (S) and prepositional phrase (PP) in three conditions (non-ambiguous S, non-ambiguous PP, and ambiguous), by the Dutch controls and the Turkish-Dutch bilinguals.

bilinguals selected the subject significantly more often than the controls ($\chi^2(1) = 74.43$, $p < .0001$).

In sum, *enkel*, "only", helped to disambiguate focus structure, and there was a difference between the bilinguals and controls regarding the ambiguous sentences. Specifically, the bilinguals preferred contrastive S (in preverbal position) more often than the controls in our off-line task.

2.5. Design of the eye-tracking experiment

The experimental stimuli were 80 sentences * 4 conditions (ambiguous S, ambiguous PP, non-ambiguous S, and non-ambiguous PP), resulting in a total of 320 sentences (see (12)–(15) above). Each participant was shown one version of all sentences, so that they were presented 80 experimental sentences (20 sentences per condition). This resulted in four different lists of the materials. Furthermore, each list contained 80 distractor sentences, which were similar to the distractors in the pretest (see (17)). In this way, half of the material had a true broad focus reading. As in the experimental sentences, half of the subjects in the distractor sentences were human, and half were animals. The sentences included five different prepositions. One (*in*, "in") occurred in 60 sentences in each list, whereas the other four (*van*, "from", *voor*, "for", *bij*, "at", and *op*, "on") occurred in 25 sentences each.

Comprehension questions followed after 30% of the trials and were randomly distributed over the experiment. Half of the questions required the answer "yes", and the other half "no". The comprehension questions encouraged the participants to read the sentences carefully.

The 160 trials were preceded by a practice block of 12 sentences. The four lists had different pseudo-randomized orders, resulting in a different order of the materials for each participant. No more than three experimental sentences were presented in succession without a distractor in between, and no more than three distractors occurred after each other without being separated by an experimental sentence. Furthermore, no more than two experimental sentences in the same condition were presented in succession.

2.6. Procedure

Participants performed the experiment individually on a Dell Precision T3600 computer running on Windows 7, and a 22-inch Dell screen with a resolution of 1680 × 1050 pixels and a refresh rate of 60 Hz. The experiment was conducted in Presentation® software (Version 16.3, www.neurobs.com). Eye-movements were recorded with the SMI RED 500 eye-tracker at a sampling rate of 500 Hz. The distance between the participant's head and the computer screen was 70 cm.

Sentences were left-aligned in a light gray 20 pts. Lucida Console font; the background colour was black. One character (12 pixels wide) subtended to 0.28 degrees of visual angle. Prior to the task, a standard nine-point calibration was performed.

A fixation cross was presented for 1500 ms at a fixed position on the left side of the screen before each trial to indicate the location of the first word of the sentence. Participants were asked to focus on the cross before the sentence appeared. Furthermore, they were instructed to read at their normal pace and to click a button when they finished reading the sentence. Each block of 40 trials was followed by a short break. The total duration of the task was approximately 30 minutes, depending on the participants' reading pace.

3. Results

Sentences with fewer than seven fixations, due to track loss or skipping, were removed (0.83% of the dataset). Because longer fixation durations on the disambiguating part of the sentence and regressions indicate reinterpretation (Rayner, 1998), the following three dependent variables were examined: total fixation durations on the disambiguating phrase, number of regressions on S in the main clause, and number of regressions on PP in the main clause. Regressions were considered re-fixations after the first fixation on the disambiguating phrase. The ambiguous conditions were compared to their non-ambiguous counterparts, in which no revision occurred.

3.1. Total fixation durations on the disambiguating phrase

We fitted a linear mixed-effects model for the log-transformed fixation durations on the disambiguating phrase, using the *lmer* function of the lmerTest package (Kuznetsova, Brockhoff, & Bojesen Christensen, 2014) in R (R Core Team, 2014). Prior to model building, fixation durations with a standard deviation of larger than 2.5 were removed (2.13% of the total dataset). The random factors in the model were "Subject" and "Stimulus". The model included the three-way interaction between Contrast (S and PP), Ambiguity ("Ambiguous" and "Non-ambiguous"), and Group ("Dutch" (controls) and "Turkish" (bilinguals)) as its fixed effects. The average fixation time per word of the reading test in Dutch was also added as a predictor, because it improved the model fit, which was tested with the *anova* function in R. Other factors that might be relevant, such as Age, Gender, Education, List, Accuracy on the comprehension questions and the BNT scores and proficiency ratings for Dutch were also examined. For instance, variables like Age and Gender might inform us about possible differences between younger and older, and female and male participants, which can possibly be explained by variation in Dutch and Turkish language use. However, these factors were not included in the final model, because they did not lead to a better fit.

Table 4. Effects on log-transformed total fixation durations on the disambiguating phrase.

Fixed effect	Beta	*t* (df)	*p*
Contrast (intercept: PP)	−0.06489	−1.980 (846)	<.05
Ambiguity (intercept: Ambiguous)	−0.05176	−1.586 (836)	ns
Group (intercept: Dutch)	0.07913	1.111 (60)	ns
Dutch reading measure	0.001266	3.236 (46)	<.01
Contrast * Ambiguous	−0.06849	−1.479 (843)	ns
Contrast * Group	−0.1124	−2.721 (3387)	<.01
Ambiguous * Group	−0.05997	−1.452 (3385)	ns
Contrast * Ambiguous * Group	0.1183	2.026 (3388)	<.05

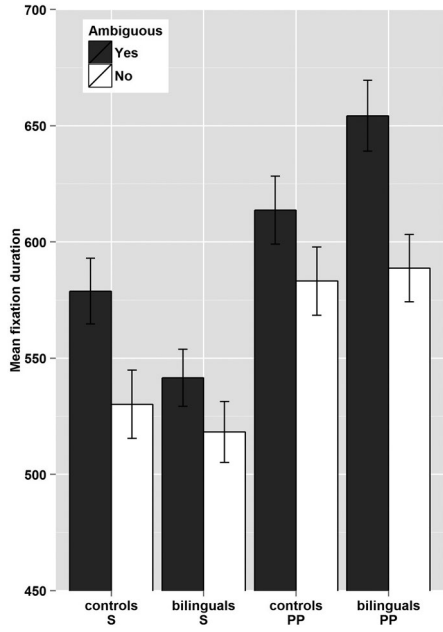

Figure 2. Total fixation durations on the disambiguating phrase in the four conditions (ambiguous S, non-ambiguous S, ambiguous PP, and non-ambiguous PP) for the Dutch controls and the Turkish-Dutch bilinguals, in ms.

The two groups did not differ regarding the non-ambiguous conditions, but showed divergent patterns in the ambiguous conditions (Table 4; Figure 2). As explained in Section 2, the comparison between ambiguous and non-ambiguous sentences is important to determine the relative difficulty that both groups of participants experienced with S and PP sentences. Therefore, we were interested in the three-way interaction between Contrast, Ambiguity, and Group. This three-way interaction was significant (Table 4).

To gain more insight in the precise nature of the three-way interaction, we conducted an additional analysis. We created four subsets of the data: Controls contrastive S (including all ambiguous and non-ambiguous S sentences by the Dutch L1 speakers), Bilinguals contrastive S (including all ambiguous and non-ambiguous S sentences by the Turkish-Dutch bilinguals), Controls contrastive PP (including all ambiguous and non-ambiguous PP sentences by the Dutch L1 speakers), and Bilinguals contrastive PP (including all ambiguous and non-ambiguous PP sentences by the Turkish-Dutch bilinguals). Within these subsets, we conducted models with "Subject" and "Stimulus" as the random effects, and Ambiguity as the fixed factor. Ambiguity had a significant effect in the subsets Controls contrastive S ($\beta = -0.12040$, $t(149.09) = -3.71$, $p < .001$) and Bilinguals contrastive PP ($\beta = -0.11309$, $t(155.47) = -3.36$, $p < .001$). On the other

hand, Ambiguity did not have a significant effect in the subsets Controls contrastive PP ($\beta = -0.05303$, $t(159.54) = -1.72$, $p > .05$) and Bilinguals contrastive S ($\beta = -0.06078$, $t(149.82) = -1.77$, $p > .05$). This indicates that the controls had significantly more difficulty with ambiguous contrastive S sentences (mean: 579 ms) than with their non-ambiguous equivalents (mean: 530 ms), and hence that they needed the focus particle *enkel*, "only" to dissolve the focus structure. Regarding the contrastive PP sentences, there was no significant difference between ambiguous (mean: 614 ms) and non-ambiguous sentences (mean: 583 ms). Thus, even when the focus particle was absent, they expected contrastive focus on the PP. The bilinguals, in contrast, showed the opposite pattern. Regarding the contrastive S sentences, they did not show a significant difference between the ambiguous (mean: 542 ms) and non-ambiguous sentences (mean: 518 ms), reflecting a preference for contrasts on the S. For contrastive PP, on the other hand, the bilinguals showed significantly more difficulty with the ambiguous sentences (mean: 654 ms) than with the non-ambiguous sentences (mean: 589 ms), indicating that contrastive focus on the PP was unexpected. This opposite pattern between the controls and bilinguals can also be seen in Figure 2.

The bilinguals had more difficulties with contrastive PP in general, as revealed by the interaction between Contrast and Group: whereas they showed shorter total fixation durations on the disambiguating phrase than the controls when S was in contrastive focus, they fixated longer than the controls on the disambiguating phrase when PP was in contrastive focus, regardless of whether the preceding sentence was ambiguous or not. However, as the three-way interaction shows, the difference was the largest in the ambiguous condition. Finally, the positive β-coefficient of the Dutch reading measure indicates that longer average fixation durations per word in the Dutch text co-occurred with longer total fixation durations on the disambiguating phrase (for both groups).

3.2. Number of regressions on the subject

For the number of regressions on S in the main clause, we used the *glmer* function of the lmerTest package (Kuznetsova et al., 2014) in R (R Core Team, 2014) to perform mixed-effects logistic regression. Data points with a standard deviation of larger than 2.5 were excluded from the data set (2.16% of the data) prior to model building. The random factors were "Subject" and "Stimulus". The model included Contrast (S and PP), Ambiguity ("Ambiguous" and "Non-ambiguous"), Number of regressions on PP and Age as its fixed

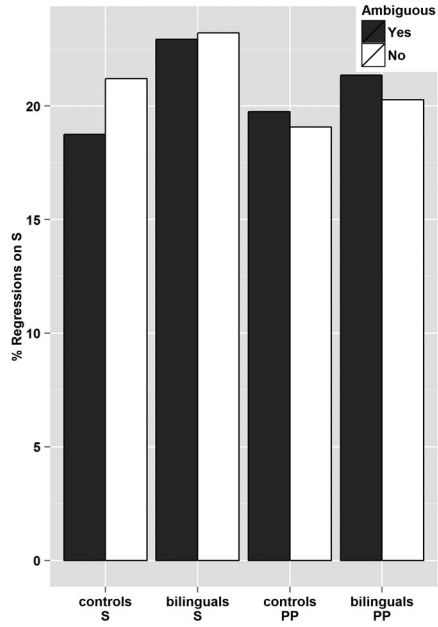

Figure 3. Proportions of number of regressions on the subject relative to the total number of fixations on the subject, in the four conditions (ambiguous S, non-ambiguous S, ambiguous PP, and non-ambiguous PP) for the Dutch controls and the Turkish-Dutch bilinguals.

Table 5. Effects of number of regressions on the subject.

Fixed effect	Beta	*z*	*p*
Contrast (intercept: PP)	0.12807	2.367	<.05
Ambiguity (intercept: Ambiguous)	0.10169	1.881	ns
N regressions on PP	0.34458	13.439	<.001
Age	0.04529	2.762	<.01

effects, because these predictors led to a better fit according to the *anova* function. Group or interactions with Group did not yield any significant effects and did not lead to an improved model fit, nor did the other variables listed in Section 3.1.

Although the proportions in Figure 3 indicate that the bilinguals made more regressions to S than the controls, this difference between the groups was not significant (Table 5). The significant effect of Contrast, on the other hand, indicates that there were generally more regressions to S when S was in contrastive focus (bilinguals: 23% for ambiguous sentences and 23% for non-ambiguous sentences; controls: 19% for ambiguous sentences and 21% for non-ambiguous sentences) than when the PP was in contrastive focus (bilinguals: 21% for ambiguous sentences and 19% for non-ambiguous sentences; controls: 19.75% for ambiguous sentences and 19% for non-ambiguous sentences).

Furthermore, there was a positive correlation between regressions on PP and regressions on S, i.e. more regressions on PP led to more regressions on S. Finally,

Table 6. Effects of number of regressions on the prepositional phrase.

Fixed effect	Beta	*z*	*p*
Contrast (intercept: PP)	−0.21886	−3.577	<.001
Ambiguity (intercept: Ambiguous)	−0.14899	−2.446	<.05
N regressions on PP	0.32880	12.212	<.001
Dutch BNT	0.21301	1.998	<.05

the positive *β*-coefficient of Age indicates that older participants made significantly more regressions than younger participants.

3.3. Number of regressions on the prepositional phrase

Mixed-effects logistic regression was performed to examine the number of regressions on PP in the main clause. Data removal constituted 2.11% of the data due to standard deviations that were larger than 2.5. The fixed effects in the model were Contrast (S and PP), Ambiguity ("Ambiguous" and "Non-ambiguous), Number of regressions on S and the Dutch BNT scores, because the *anova* function indicated that these predictors improved the model. Group, interactions with Group and the inclusion of other variables (described above) did not lead to significant effects or a better model.

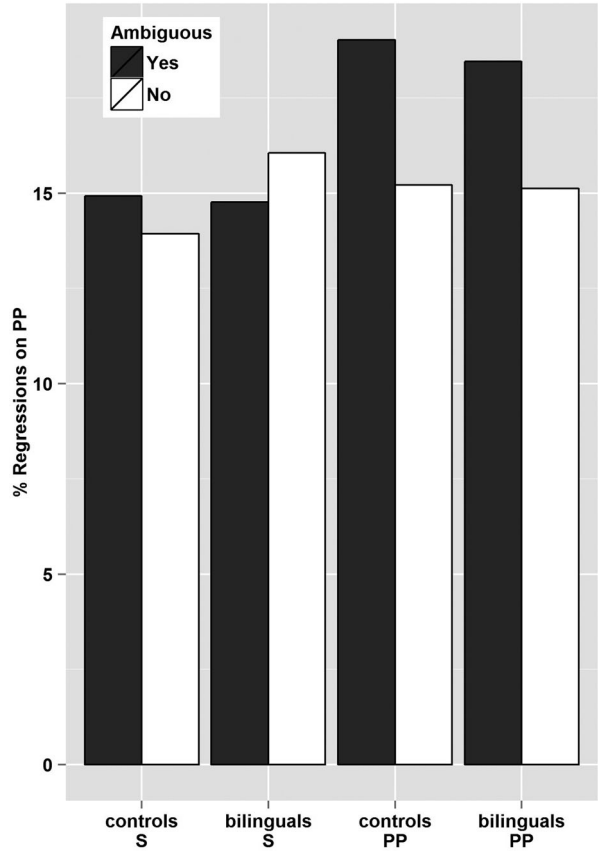

Figure 4. Proportions of number of regressions on the prepositional phrase relative to the total number of fixations on the PP, in the four conditions (ambiguous S, non-ambiguous S, ambiguous PP, and non-ambiguous PP) for the Dutch controls and the Turkish-Dutch bilinguals.

Although there were no significant differences between the bilinguals and the controls, there were significant effects of both experimental conditions (Table 6; Figure 4). The negative *β*-coefficient of Contrast shows that contrastive PP generally led to more regressions on PP (bilinguals: 18% for ambiguous sentences and 15% for non-ambiguous sentences; controls: 19% for ambiguous sentences and 15% for non-ambiguous sentences) than contrastive S (bilinguals: 15% for ambiguous sentences and 16% for non-ambiguous sentences; controls: 15% for ambiguous sentences and 14% for non-ambiguous sentences). This corresponds to the findings above for regressions on S, where contrastive S was associated with more regressions than contrastive PP. Furthermore, the negative *β*-coefficient of Ambiguity indicates that there were more regressions when the sentence was ambiguous with respect to its focus structure, suggesting that regressions may reflect reanalysis processes in the participants of the present study. However, this appears to be limited to regressions on PP, because we did not find an effect of Ambiguity for regressions on S. Moreover, there were no differences between the bilinguals and the controls.

Finally, there was a significant effect of the Dutch BNT scores: the higher the participants' proficiency in Dutch vocabulary, the higher the number of regressions.

4. Discussion and conclusion

We used eye-tracking to examine whether Turkish heritage speakers process ambiguous focus structures in written sentences in their dominant L2 (Dutch) differently from L1 speakers of Dutch, possibly due to an effect of Turkish. We hypothesised that, if the Turkish-Dutch bilinguals showed an effect of Turkish, the largest difference between the bilinguals and controls would occur in sentences with contrastive PP. Because in Turkish accented, focused information is not allowed after the verb, bilinguals would be more likely to interpret the PP as background information. In Dutch, the final accent is commonly placed on the rightmost constituent, leading to a broad focus interpretation. Contrastive PP would therefore lead to only a focus revision for L1 speakers of Dutch (from broad to contrastive focus), whereas both a focus and a prosodic revision would occur for bilinguals. We expected to find the opposite pattern for the ambiguous sentences with contrastive S: the contrastive ellipsis would lead to only a focus revision (from broad to contrastive focus) for the bilinguals,

whereas both a focus and a prosodic revision would take place for the controls.

Although the number of regressions did not reflect any differences, the total fixation durations on the disambiguating phrase showed differences between the bilinguals and controls. As predicted, controls had longer processing times for ambiguous contrastive S than for ambiguous contrastive PP when compared to their non-ambiguous counterparts, whereas bilinguals showed the opposite: less difficulty with ambiguous contrastive S than controls, and more difficulty with ambiguous contrastive PP, again when compared to their non-ambiguous counterparts. Notably, our pretest of the ambiguous sentences with a comparable group of Turkish-Dutch bilinguals and controls indicated that bilinguals preferred a contrast with the preverbal subject more often than controls. Our findings in both the off-line and on-line task follow the predictions that we made based on an effect of Turkish. The findings can therefore be explained by an effect of the weaker L1 on the dominant L2 at the syntax–discourse interface. The longer fixation durations on the disambiguating phrase for contrastive PP suggest that bilinguals, unlike controls, did not associate focus with this clause-final constituent, but rather interpreted this position as background information.

An alternative explanation for the findings might be related to general processing difficulties in bilinguals (e.g. Sorace, 2011). This account is not very likely for the present study, because it is unclear how general processing difficulties can explain our findings. In particular, the bilinguals encountered more difficulties with contrastive PP than with contrastive S, whereas the L1 speakers of Dutch showed the reverse. These findings correspond to the specific predictions we made based on their L1 (i.e. Dutch for the control group and Turkish for the bilinguals). Moreover, both groups of participants patterned together regarding the processing of non-ambiguous focus structures. To examine the potential effect of general processing difficulties in interpreting focus structures, the findings might be compared to a different group of L2 speakers of Dutch, whose L1 resembles Dutch regarding focus marking. For an example of a study comparing bilingual groups and revealing both general processing difficulties and L1 transfer, see Roberts et al. (2008).

Likewise, the explanation offered by Sorace et al. (2009), that difficulties at the syntax–discourse interface may also arise due to insufficient language exposure, cannot account for our data, although it may be a valid explanation for other groups of bilinguals. First, Dutch is the dominant language of the adult bilinguals in our study, to which they have had more exposure than to Turkish. Second, the findings in Sorace et al. (2009) concern acceptability patterns, whereas our findings are related to focus structural interpretations. As stated above, these findings are in line with the specific predictions that we made based on Turkish, and are qualitatively different from the interpretations of the Dutch L1 speakers.

Our findings have implications for theories on bilingualism, involving language dominance, language modality, optionality at the syntax–discourse interface, reading comprehension, and predictive processing. First, our findings inform us about the role of language dominance in bilinguals. Most previous studies only found transfer from the dominant to the weaker language, suggesting a crucial role for language dominance (Argyri & Sorace, 2007; Daller et al., 2011; Montrul & Ionin, 2010; Serratrice, 2007). The bilinguals in our study were second-generation heritage speakers of Turkish. Their self-rated language proficiency and vocabulary scores show that Dutch was their dominant language. Specifically, the bilinguals rated themselves to be significantly better at reading and writing in Dutch than in Turkish (Section 2.1), which may be explained in part by the fact that Dutch is the school language. Because our study concerns reading in Dutch, our findings are in line with transfer from the weaker L1 to the dominant L2 at the syntax–discourse interface, contrary to Argyri and Sorace (2007) and Serratrice (2007), who claimed that exposure to the weaker language was possibly not sufficient in their participants to cause transfer to the dominant language. There are considerable differences between the bilinguals in our study and the bilingual children in Argyri and Sorace and in Serratrice concerning language exposure. First, the Italian-English bilinguals in Serratrice were relatively balanced in their languages, as most of them lived in Italy, but received education in their non-dominant language, English. By contrast, the bilinguals of our study mainly received education in Dutch, the language of the society, enhancing their dominance in this language. Yet, only our findings correspond to transfer from the non-dominant language to the dominant language. Perhaps the more balanced bilinguals in Serratrice, who received more comparable amounts of input in both their languages than the less balanced bilinguals in our study, were better able to separate their two linguistic systems.

Another difference in language exposure between these studies concerns the parents' language use. All bilinguals in Serratrice and all Greek-dominant bilinguals in Argyri and Sorace had only one parent with a different L1 than the language of the society, which mostly led to the one-parent one-language strategy. The parents of

our bilinguals were all born in Turkey. Most participants indicated that their parents only spoke Turkish to them, and some indicated that they spoke Turkish and Dutch. Thus, the home language of our bilinguals was predominantly the heritage language. This difference might explain why our findings are in line with an effect of the weaker L1 on the dominant L2, whereas Serratrice's and Argyri and Sorace's findings are not. Our bilinguals had more exposure to their L1 in early childhood than other bilinguals, leading to a firm foundation in this language, but received more exposure to the L2 than the L1 after this short (though important) period. Our study thus seems to uncover the strength of an L1 acquired in early childhood, against an L2 prevalent in adulthood. This corresponds with some other studies concerning L1 transfer in heritage speakers at different linguistic levels (e.g. Blom & Baayen, 2013; Van Meel et al., 2013, 2014).

As a second theoretical implication, our findings indicate that difficulties at the syntax–discourse interface are not necessarily visible in all modalities (i.e. speaking and reading): a production experiment on focus marking in Dutch involving the same type of Turkish-Dutch bilinguals as in the current study showed no word order changes to mark focus (Van Rijswijk et al., in press). This indicates that the bilinguals had knowledge of the grammatical constraints of Dutch word order. Moreover, they had prosody at their disposal to mark focus. In the written sentences of the present study, however, the absence of explicit prosody led to optionality, because both the preverbal subject and the clause-final prepositional object could be in (contrastive) focus. This optionality might explain why online processing while reading revealed difficulties in the bilinguals.

Third, our study is in agreement with previous studies in which optionality explained bilinguals' difficulties at the syntax–discourse interface (e.g. Hopp, 2009; Roberts et al., 2008; Sorace, 2000). This optionality is, for example, related to the overt expression or drop of pronouns (Montrul, 2011; Sorace & Filiaci, 2006), or to word order differences (e.g. Argyri & Sorace, 2007). In particular, Argyri and Sorace found transfer from English to Greek word order, but not vice versa, which they explained in terms of optionality: whereas in English there is only one position for the subject, in Greek this position depends on the discourse. Because of the high proportion of preverbal subjects in English, the English-dominant bilinguals extended this option to pragmatically inappropriate contexts in Greek. These bilinguals were thus not able to make the appropriate connection between word order and discourse. In our study, optionality may have arisen from differences between Dutch and Turkish regarding the position of focused constituents, in the absence of explicit prosody. In this scenario, the bilinguals were not able to make the same connections between sentence position and discourse as L1 speakers of Dutch, possibly due to the availability of syntactic cues from Turkish. The study thus further demonstrates that the syntax–discourse interface is a difficult domain for bilinguals.

Fourth, the finding that Turkish-Dutch bilinguals in our study determined focus in Dutch differently from L1 speakers of Dutch points towards potential difficulties regarding general reading comprehension in Turkish-Dutch bilinguals, because determining the focus structure of a sentence is important for comprehension (Birch & Rayner, 1997; Osaka et al., 2002). In fact, research on reading comprehension in children has revealed that Turkish-Dutch bilingual children lag behind their L1 Dutch speaking peers (Droop & Verhoeven, 2003; Statistics Netherlands, 2014). Further research is needed to explore whether this delay in reading comprehension may be explained by difficulties in interpreting focus and L1 transfer. For instance, research might examine the effect of enhancing bilingual children's metalinguistic awareness concerning the differences in focus marking between Turkish and Dutch, through explicit instruction.

Fifth, our study suggests that bilinguals do not only experience processing difficulties due to having two languages, but that they even make specific predictions based on cues from their L1. Studies on predictive processing in bilinguals generally show that bilinguals are slower in formulating predictions or are not capable of making predictions at all, partly because they activate more information during processing than monolinguals (e.g. Kaan, 2014). Moreover, it has been shown that anticipatory ability improves with increasing language proficiency (e.g. Dussias, Valdés Kroff, Guzzardo Tamargo, & Gerfen, 2013). We found predictive behaviour in highly proficient bilinguals, who appeared to revise their predictions of the focus structure. However, their predictions differed from those by L1 speakers of Dutch.

Our study could be extended using different methodologies and participants. Regarding methodology, our eye-tracking method did not distinguish between the underlying processes of accent placement and defining focus structure, which were revealed for German in the EEG-experiment by Stolterhoft et al. (2007). A future EEG-study could investigate the ERP-correlates of these underlying processes. This would clarify whether the bilinguals in our study (implicitly) placed the nuclear accent on the preverbal constituent when they interpreted sentences as broad focus sentences, or whether

the differences in interpretation can be accounted for in terms of the association between the preverbal position for (contrastive) focus, and the postverbal position for unaccented background information. As a second methodological point, the present experimental paradigm could be adapted to test whether the heritage speakers only experience reading difficulties at the syntax–discourse interface (i.e. when information from the syntactic domain needs to be integrated with information from another linguistic domain, in this case discourse), or whether the narrow or core syntax is equally problematic. This would give us more insight in the relative complexity of the syntax–discourse interface (e.g. Sorace, 2011).

Concerning participants, the comparison between Turkish-Dutch bilinguals and L1 speakers of Dutch allowed us to reveal differences in interpretations, but future research should include L1 speakers of Turkish in Turkey to explore the on-line processing of focus in Turkish. In addition, future research could examine how Turkish heritage speakers process focus in Turkish to determine to what extent transfer plays a role in the other direction as well.

In conclusion, our aim was to examine the on-line processing of focus in written Dutch by second-generation heritage speakers of Turkish in the Netherlands and L1 speakers of Dutch, to improve our understanding of the interaction between the languages of heritage speakers. The differences in interpretations between bilinguals and controls suggest that bilinguals relied on word order cues from their L1 to determine focus structure. Specifically, we tentatively argue that the association in Turkish with the preverbal position for contrastive focus and the postverbal position for background information played a role in determining focus structure in Dutch. Heritage speakers, who are highly proficient in their L2, seemingly exhibited L1 transfer in the on-line processing in L2 at the syntax–discourse interface. Moreover, our study concerns reading, the language modality in which these bilinguals were particularly dominant in their L2. As such, our study reveals the strength of an L1 that was only prevalent in early childhood, and clarifies how interpreting focus comes about in the special situation that a weaker L1 is processed in the context of a dominant L2.

Acknowledgements

We are grateful to all participants, who dedicated their time to contribute to this study. We would also like to thank Hülya Şahin for help with the Turkish reading tasks, Ümmü Gülsüm Alkan for help with the analysis of the Turkish Boston Naming Test data, Pascal de Water for technical support, and Louis ten Bosch for help with the statistical analysis.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This project was funded by the Centre for Language Studies at the Radboud University.

References

Argyri, E., & Sorace, A. (2007). Crosslinguistic influence and language dominance in older bilingual children. *Bilingualism: Language and Cognition*, *10*, 79–99. doi:10.1017/S1366728906002835

Ashby, J., & Clifton, C., Jr. (2005). The prosodic property of lexical stress affects eye movements during silent reading. *Cognition*, *96*, B89–B100. doi:10.1016/j.cognition.2004.12.006

Belletti, A., Bennati, E., & Sorace, A. (2007). Theoretical and developmental issues in the syntax of subjects: Evidence from near-native Italian. *Natural Language & Linguistic Theory*, *25*, 657–689. doi:10.1007/s11049-007-9026-9

Benmamoun, E., Montrul, S., & Polinsky, M. (2013). Heritage languages and their speakers: Opportunities and challenges for linguistics. *Theoretical Linguistics*, *39*, 129–181. doi:10.1515/tl-2013-0009

Birch, S. L., & Garnsey, S. M. (1995). The effect of focus on memory for words in sentences. *Journal of Memory and Language*, *34*, 232–267. Retrieved from https://ru.idm.oclc.org/login?url=http://search.proquest.com/docview/1297342460?accountid=11795

Birch, S. L., & Rayner, K. (1997). Linguistic focus affects eye movements during reading. *Memory & Cognition*, *25*, 653–660. doi:10.3758/BF03211306

Blom, E., & Baayen, H. R. (2013). The impact of verb form, sentence position, home language, and second language proficiency on subject–verb agreement in child second language Dutch. *Applied Psycholinguistics*, *34*, 777–811. doi:10.1017/S0142716412000021

Bouma, G. J. (2008). *Starting a sentence in Dutch: A corpus study of subject- and object-fronting* (PhD dissertation). University of Groningen.

Bredart, S., & Modolo, K. (1988). Moses strikes again: Focalization effect on a semantic illusion. *Acta Psychologica*, *67*, 135–144. doi:10.1016/0001-6918(88)90009-1

Bultena, S., Dijkstra, T., & Van Hell, J. G. (2014). Cognate effects in sentence context depend on word class, L2 proficiency, and task. *The Quarterly Journal of Experimental Psychology*, *67*, 1214–1241. doi:10.1080/17470218.2013.853090

Carlson, K. (2002). *Parallelism and prosody in the processing of ellipsis sentences.* New York: Routledge.

Cutler, A., Dahan, D., & Van Donselaar, W. (1997). Prosody in the comprehension of spoken language: A literature review. *Language and Speech*, *40*, 141–201. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/9509577

Cutler, A., & Fodor, J. A. (1979). Semantic focus and sentence comprehension. *Cognition*, *7*, 49–59. doi:10.1016/0010-0277(79)90010-6

Cutler, A., & Foss, D. J. (1977). On the role of sentence stress in sentence processing. *Language and Speech*, *20*, 1–10. Retrieved from http://search.proquest.com/docview/1299113948?pq-origsite=gscholar

Daller, M. H., Treffers-Daller, J., & Furman, R. (2011). Transfer of conceptualization patterns in bilinguals: The construal of motion events in Turkish and German. *Bilingualism: Language and Cognition*, *14*, 95–119. doi:10.1017/S1366728910000106

Dimitrova, D. V. (2012). *Neural correlates of prosody and information structure* (PhD dissertation). University of Groningen.

Doğruoz, S. A., & Backus, A. (2007). Postverbal elements in immigrant Turkish: Evidence of change? *International Journal of Bilingualism*, *11*, 185–220. doi:10.1177/13670069070110020301

Doğruoz, S. A., & Backus, A. (2009). Innovative constructions in Dutch Turkish: An assessment of ongoing contact-induced change. *Bilingualism: Language and Cognition*, *12*, 41–63. doi:10.1017/S1366728908003441

Droop, M., & Verhoeven, L. (2003). Language proficiency and reading ability in first-and second-language learners. *Reading Research Quarterly*, *38*, 78–103. doi:10.1598/RRQ.38.1.4

Drubig, H. B. (1994). *Island constraints and the syntactic nature of focus and the association with focus*. Tübingen: Universitäten Stuttgart und Tübingen in Kooperation mit der IBM Deutschland GmbH, University of Tübingen.

Dussias, P. E., Valdés Kroff, J. R., Guzzardo Tamargo, R. E., & Gerfen, C. (2013). When gender and looking go hand in hand. *Studies in Second Language Acquisition*, *35*, 353–387. doi:10.1017/S0272263112000915

Erickson, T. D., & Mattson, M. E. (1981). From words to meaning: A semantic illusion. *Journal of Verbal Learning and Verbal Behavior*, *20*, 540–551. doi:10.1016/S0022-5371(81)90165-1

Fodor, J. D. (1998). Learning to parse? *Journal of Psycholinguistic Research*, *27*(2), 285–319. doi:10.1023/A:1023258301588

Gussenhoven, C. (1984). *On the grammar and semantics of sentence accents*. Dordrecht: Foris.

Gussenhoven, C. (2007). Types of focus in English. In C. Lee, M. Gordon, & D. Büring (Eds.), *Topic and focus: Cross-linguistic perspectives on meaning and intonation* (pp. 83–100). Heidelberg: Springer. doi:10.1007/978-1-4020-4796-1_5

Heim, S., & Alter, K. (2006). Prosodic pitch accents in language comprehension and production: ERP data and acoustic analyses. *Acta Neurobiologiae Experimentalis*, *66*, 55–68. Retrieved from http://wvvw.ane.pl/pdf/6607.pdf

Hohenstein, J., Eisenberg, A., & Naigles, L. (2006). Is he floating across or crossing afloat? Cross-influence of L1 and L2 in Spanish–English bilingual adults. *Bilingualism: Language and Cognition*, *9*, 249–261. doi:10.1017/S1366728906002616

Holliman, A. J., Wood, C., & Sheehy, K. (2010a). The contribution of sensitivity to speech rhythm and non-speech rhythm to early reading development. *Educational Psychology*, *30*, 247–267. doi:10.1080/01443410903560922

Holliman, A. J., Wood, C., & Sheehy, K. (2010b). Does speech rhythm sensitivity predict children's reading ability 1 year later? *Journal of Educational Psychology*, *102*, 356–366. doi:10.1037/a0018049

Hopp, H. (2009). The syntax–discourse interface in near-native L2 acquisition: Off-line and on-line performance. *Bilingualism: Language and Cognition*, *12*, 463–483. doi:10.1017/S1366728909990253

İşsever, S. (2003). Information structure in Turkish: The word order-prosody interface. *Lingua*, *113*, 1025–1053. doi:10.1016/S0024-3841(03)00012-3

Jackendoff, R. (1972). *Semantic interpretation in Generative Grammar*. Cambridge, MA: MIT Press.

Kaan, E. (2014). Predictive sentence processing in L2 and L1: What is different? *Linguistic Approaches to Bilingualism*, *4*, 257–282. doi:10.1075/lab.4.2.05kaa

Kaplan, E., Goodglass, H., Weintraub, S., Segal, O., & van Loon-Vervoorn, A. (2001). *Boston naming test*. Austin, TX: Pro-ed.

Keuleers, E., Brysbaert, M., & New, B. (2010). SUBTLEX-NL: A new measure for Dutch word frequency based on film subtitles. *Behavior Research Methods*, *42*, 643–650. doi:10.3758/BRM.42.3.643

Kuznetsova, A., Brockhoff, P. B., & Bojesen Christensen, R. H. (2014). *lmerTest: Tests for random and fixed effects for linear mixed effect models (lmer objects of lme4 package)* (R package version 2.0-11). Retrieved from http://CRAN.R-project.org/package=lmerTest

Libben, M. R., & Titone, D. A. (2009). Bilingual lexical access in context: Evidence from eye-movements during reading. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *35*, 381–390. doi:10.1037/a0014875

Magne, C., Astésano, C., Lacheret-Dujour, A., Morel, M., Alter, K., & Besson, M. (2005). On-line processing of "pop-out" words in spoken French dialogues. *Journal of Cognitive Neuroscience*, *17*, 740–756. doi:10.1162/0898929053747667

Miller, J., & Schwanenflugel, P. J. (2006). Prosody of syntactically complex sentences in the oral reading of young children. *Journal of Educational Psychology*, *98*, 839–853. doi:10.1037/0022-0663.98.4.839

Montrul, S. (2008). *Incomplete acquisition in bilingualism: Re-examining the age factor* (Vol. 39). Amsterdam: John Benjamins.

Montrul, S. (2011). Multiple interfaces and incomplete acquisition. *Lingua*, *121*, 591–604. doi:10.1016/j.lingua.2010.05.006

Montrul, S., & Ionin, T. (2010). Transfer effects in the interpretation of definite articles by Spanish heritage speakers. *Bilingualism: Language and Cognition*, *13*, 449–473. doi:10.1017/S1366728910000040

Mundy, I. R., & Carroll, J. M. (2012). Speech prosody and developmental dyslexia: Reduced phonological awareness in the context of intact phonological representations. *Journal of Cognitive Psychology*, *24*, 560–581. doi:10.1080/20445911.2012.662341

NETQ Internet Surveys. [Computer software]. Utrecht: NetQuestionnaires Nederland B.V.

Osaka, M., Nishizaki, Y., Komori, M., & Osaka, N. (2002). Effect of focus on verbal working memory: Critical role of the focus word in reading. *Memory & Cognition*, *30*, 562–571. doi:10.3758/BF03194957

Özge, U., & Bozsahin, C. (2010). Intonation in the grammar of Turkish. *Lingua*, *120*, 132–175. doi:10.1016/j.lingua.2009.05.001

Queen, R. (2012). Turkish-German bilinguals and their intonation: Triangulating evidence about contact-induced language change. *Language*, *88*, 791–816. doi:10.1353/lan.2012.0078

Rayner, K. (1998). Eye-movements in reading and information processing: 20 years of research. *Psychological Bulletin*, *124*, 372–422. doi:10.1037/0033-2909.124.3.372

Rayner, K., Kambe, G., & Duffy, S. A. (2000). The effect of clause wrap-up on eye movements during reading. *The Quarterly Journal of Experimental Psychology Section A*, *53*, 1061–1080. doi:10.1080/713755934

R Core Team. (2014). *R: A language and environment for statistical computing*. Vienna: R Foundation for Statistical Computing. Retrieved from http://www.R-project.org/

Roberts, L., Gullberg, M., & Indefrey, P. (2008). Online pronoun resolution in L2 discourse: L1 influence and general learner effects. *Studies in Second Language Acquisition*, *30*, 333–357. doi:10.1017/S0272263108080480

Serratrice, L. (2007). Referential cohesion in the narratives of bilingual English-Italian children and monolingual peers. *Journal of Pragmatics*, *39*, 1058–1087. doi:10.1016/j.pragma.2006.10.001

Serratrice, L., Sorace, A., & Paoli, S. (2004). Crosslinguistic influence at the syntax–pragmatics interface: Subjects and objects in English–Italian bilingual and monolingual acquisition. *Bilingualism: Language and Cognition*, *7*, 183–205. doi:10.1017/S1366728904001610

Silva-Corvalán, C. (2008). The limits of convergence in language contact. *Journal of Language Contact*, *2*, 213–224. Retrieved from http://booksandjournals.brillonline.com/upload/jlc_thema2_complet.pdf?itemId=/content/19552629/2/1&mimeType=application/pdf#page=220

Sorace, A. (2000). Syntactic optionality in non-native grammars. *Second Language Research*, *16*, 93–102. Retrieved from http://www.jstor.org/stable/43103572

Sorace, A. (2011). Pinning down the concept of "interface" in bilingualism. *Linguistic Approaches to Bilingualism*, *1*, 1–33. doi:10.1075/lab.1.1.01sor

Sorace, A., & Filiaci, F. (2006). Anaphora resolution in near-native speakers of Italian. *Second Language Research*, *22*, 339–368. doi:10.1191/0267658306sr271oa

Sorace, A., Serratrice, L., Filiaci, F., & Baldo, M. (2009). Discourse conditions on subject pronoun realization: Testing the linguistic intuitions of older bilingual children. *Lingua*, *119*, 460–477. doi:10.1016/j.lingua.2008.09.008

Statistics Netherlands. (2014). *Jaarrapport Integratie*. Retrieved from Centraal Bureau voor de Statistiek, The Hague: http://www.cbs.nl/NR/rdonlyres/E6878ED8-0347-4ED0-8A8D-360AB79022B2/0/jaarrapportintegratie2014pub.pdf

Stolterhoft, B., Friederici, A. D., Alter, K., & Steube, A. (2007). Processing focus structure and implicit prosody during reading: differential ERP effects. *Cognition*, *104*, 565–590. doi:10.1016/j.cognition.2006.08.001

Toepel, U., Pannekamp, A., & Alter, K. (2007). Catching the news: Processing strategies in listening to dialogs as measured by ERPs. *Behavioral and Brain Functions*, *3*, 53–13. doi:10.1186/1744-9081-3-53

Van Meel, L., Hinskens, F., & Van Hout, R. (2013). Ethnolectal variation in the realization of /z/ by Dutch youngsters. *Zeitschrift für Dialektologie und Linguistik*, *80*, 297–325. Retrieved from http://www.jstor.org/stable/24547975

Van Meel, L., Hinskens, F., & Van Hout, R. (2014). Variation in the realization of /ɛi/ by Dutch youngsters: From local urban dialects to emerging ethnolects? *Dialectologia et Geolinguistica*, *22*, 46–74. doi:10.1515/dialect-2014-0004

Van Rijswijk, R., Muntendam, A. G., & Dijkstra, T. (in press). Focus marking in Dutch by heritage speakers of Turkish and Dutch L1 speakers. *Journal of Phonetics*.

Veenendaal, N. J., Groen, M. A., & Verhoeven, L. (2014). The role of speech prosody and text reading prosody in children's reading comprehension. *British Journal of Educational Psychology*, *84*, 521–536. doi:10.1111/bjep.12036

Whalley, K., & Hansen, J. (2006). The role of prosodic sensitivity in children's reading development. *Journal of Research in Reading*, *29*, 288–303. doi:10.1111/j.1467-9817.2006.00309.x