

Definite objects in the wild

A converging evidence approach to scrambling in the
Dutch middle-field

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Dutch middle-field

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Chapter 1

Introduction

This thesis is about the placement of definite objects relative to adverbials in the Dutch middle-field. Direct objects can surface on either side of an adverbial, or in between two adverbials, as demonstrated by Vanden Wyngaerd's (1989) example in (1) with the definite object *de directeur* 'the manager'. This type of word order variation is referred to as *scrambling*.

- (1) *dat ik (de directeur) morgen (de directeur) over die zaak (de directeur) in Kopenhagen (de directeur) ontmoet.*
that I the manager tomorrow the manager about that matter the manager in Copenhagen the manager meet
'that I will meet the manager about that matter tomorrow in Copenhagen.'

The type of object plays an important role in Dutch scrambling. Scrambling has clear semantic effects when the direct object is indefinite (de Hoop 1996, Unsworth 2005). The direct object *een roos* 'a rose' in (2), for example, can be interpreted as specific or non-specific when it appears on the right side of the clause adverb *waarschijnlijk* 'probably', but loses its non-specific reading when it appears on the left side of the adverb. The example in (3) shows that when the direct object takes a pronominal form, scrambling is almost obligatory under neutral stress (Bouma & de Hoop 2008).

- (2) a. *Cécile heeft waarschijnlijk een roos geplant.*
Cécile has probably a rose planted
'Cécile probably planted a(ny) rose.'
b. *Cécile heeft een roos waarschijnlijk geplant.*
Cécile has a rose probably planted
'Cécile probably planted a (certain) rose.'
- (3) a. *#We moesten eerst hem voeren.*
we had.to first him feed
b. *We moesten hem eerst voeren.*
we had.to him first feed
'We had to feed him first.'

The behavior of definite objects in scrambling clauses has been the topic of lively debate for several decades. Dutch linguists are quite resolute in their judgments about scrambling clauses with a definite object. The claim in most literature is that definite objects must appear to the left of the adverb, in *scrambled* position, when it is presuppositional (i.e. anaphoric and/or topical), and to the right of the adverb, in *unscrambled* position, when it is non-presuppositional (i.e. non-anaphoric and/or focused).¹ However, not everyone agrees with this “discourse template” (see e.g. de Hoop 2016). Some researchers claim instead that scrambling of definite objects is more optional than is generally assumed. In fact, researchers do not only disagree about whether scrambling is an optional or an obligatory operation, they also disagree about which conditions motivate the variation in the first place (that is, when exactly scrambling of definite objects is felicitous in a particular discourse context). The elusive scrambling behavior of definite objects, such as *de directeur* ‘the manager’ in (1), will be the main topic of investigation in this thesis. The thesis will be concerned with two key factors which arguably influence preferences regarding scrambling of definite objects in the Dutch middle-field: the type of adverb and the information status of the definite object. Before I turn to these factors, however, a word is in order on the chosen research methodology.

Studies on Dutch scrambling which report empirical data, other than researcher intuitions, are scarce. These are limited to experimental studies investigating the L1 and L2 acquisition of scrambling (Schaeffer 1997, 2000, Unsworth 2005), and the influence of the object’s referentiality and its lexical connectedness with the verb (de Swart & van Bergen 2011, 2014). Furthermore, van Bergen & de Swart (2009, 2010) report on a large-scale corpus study of spontaneous speech in which they investigate the scrambling behavior of different types of direct objects in the Dutch middle-field. The results from these empirical approaches do not corroborate the claims in most of the theoretical literature; moreover, there are discrepancies between the findings of the individual studies. By collecting experimental data (and historical corpus data in Chapter 6), this thesis explores the characteristics of definite object placement in Dutch, gauging the well-formedness of various scrambling clauses and the existence of putative word order preferences in constrained language production. These findings are then related to the existing evidence. The work thus advocates a “converging evidence” approach to scrambling, through which we can improve our understanding of a disputed and seemingly intangible phenomenon.

Let me clarify and provide some support for such an approach. The past two decades have seen vigorous discussion about the way in which (generative) linguists often collect and use linguistic data. The traditional approach, characterized by a heavy reliance on introspection to model the human language capacity, has been accused of oversimplifying assumptions about “actual language”, building on

¹Another issue that has been extensively discussed in the Dutch literature concerns the question whether or not scrambling involves syntactic movement. Researchers traditionally assume that it does, but this assumption is not uncontroversial (see Neeleman 1994a: Chapter 3, Broekhuis & Corver 2016: §13.2 for discussion). An alternative analysis, which assumes variation in the base-generated order of the constituents, is advanced in Neeleman (1994a,b) and Neeleman & van de Koot (2008a,b). Throughout this thesis, I will assume that scrambling involves movement, providing a more detailed analysis in Chapter 6, but the experiments presented in this thesis do not test this assumption.

data-sets with relatively few informants and items, and being generally unreliable due to potential cognitive biases (e.g. Featherston 2007, Gibson & Fedorenko 2010, 2013). This backlash incited a resounding endorsement of more formal methods to handle linguistic data, and consequently instigated the proliferation of sentence judgment experiments with participant samples large enough to permit statistical analysis (Schütze 1996, Cowart 1997). Before proceeding, let me stress that I do not reject the traditional method of data collection. In many cases, a contrast between two sentences is obvious (so-called “sledgehammer effects”, see Schütze 2011) and does not require further investigation (see also Phillips 2010). Such endeavors can sometimes even be considered a waste of time and resources. What I argue in favor of, is a more versatile approach to linguistic research, building on data from various sources (see Chapter 5 for more discussion).

The value of methodological diversity can be illustrated with the following example. The theoretical literature has birthed a number of notorious cases of “questionable judgments” (Labov 1996, Wasow & Arnold 2005, Featherston 2007, Gibson & Fedorenko 2013). But the linguists who first reported the contested sentences are usually adamant about their well- or ill-formedness. As a case in point, Gibson & Fedorenko (2013) discuss Bresnan & Nikitina’s (2009) study about the dative alternation in English. In the linguistic literature (e.g. Pinker 1989, Levin 1993, Krifka 2001), sentences with a manner-of-speaking verb are often claimed to be grammatical with dative PP syntax (e.g. *Susan whispered the news to Rachel*), but ungrammatical with dative DP syntax (e.g. **Susan whispered Rachel the news*). Bresnan & Nikitina, however, find numerous examples of the latter sort in documents available on the internet, casting doubt on their presumed ungrammatical status. The use of naturalistic language data, or experimental methods, can thus instigate debate about claims made in the theoretical literature and bring to light new perspectives on linguistic phenomena. And in doing so, a converging evidence approach can advance linguistic theorizing by raising new questions of which we were previously unaware (Phillips et al. 2021).

As noted, expert judgments about Dutch scrambling clauses with a definite object are also matter of debate (see Broekhuis 2016 and de Hoop 2016), and the limited amount of empirical data that have been reported does not paint an unequivocal picture of object placement in the middle-field either. It is the aim of this thesis to demonstrate the advantages of using a versatile toolkit in linguistic theorizing, thereby seeking to build a bridge between theoretical and experimental linguistics (see also the articles in Goodall 2021).

1.1 Scrambling in the Dutch middle-field

The main factors under investigation here are the type of adverb and the information status of the definite object in Dutch scrambling clauses. To get a better understanding of the potential impact these factors may have on the placement of definite objects in the middle-field, I will first provide the background information that inspired the experiments in this thesis.

1.1.1 Adverbial hurdles in Dutch scrambling

Notice that the example sentence in (1) above contains three different types of adverbial: a time-point adverb *morgen* ‘tomorrow’, an event-internal adverbial *over die zaak* ‘concerning that matter’, and a location adverbial *in Kopenhagen* ‘in Copenhagen’. Schaeffer (1997, 2000) argues that the scrambling behavior of definite objects is in part dependent on the type of adverb. It has been claimed that different types of adverbs occupy different positions in the syntactic tree (Jackendoff 1972, Cinque 1999, Ernst 2002). Schaeffer (1997, 2000) distinguishes between “higher” adverbs, which modify the full clause, and “lower” adverbs, which modify the predicate (*S-adverbs* and *VP-adverbs* in Jackendoff 1972). She proposes that higher adverbs are located in specifiers within the TP domain, whereas lower adverbs are located in specifiers of functional projections adjoined to VP (cf. Cinque 1999). The syntactic distance between an object’s base and target position is therefore increased if the intervening adverb belongs to the higher category (see Broekhuis 2008 for a similar analysis). Schaeffer hypothesizes that an increased number of movements is a complicating factor in scrambling. This hypothesis is tested in Chapter 2.

The choice for a second adverbial contrast in Chapter 2 is motivated by a discrepancy between the experimental results of Unsworth (2005) and de Swart & van Bergen (2011). Unsworth finds that (adult) speakers of Dutch scramble definite objects almost categorically, whereas de Swart & van Bergen report that in their experiment only ~20% of definite objects were produced in scrambled position. A crucial difference between the experiments is that the definite objects in de Swart & van Bergen’s stimuli were scrambled over time-point adverbs (e.g. *gisteren* ‘yesterday’), whereas in Unsworth’s stimuli they were scrambled over negation. De Swart & van Bergen (2014) suggest that this difference may be the cause of the deviating scrambling preferences. One property that sets negation apart from time-point adverbs is that the interpretation of negation is related to focus placement, as described by e.g. Jackendoff (1972: 254ff.). In (4a), for example, it is denied that it was the judge that Maxwell killed, while (4b) denies that Maxwell used a silver hammer to kill the judge (note that the sentences are in principle ambiguous, with their interpretations possibly differentiated by alternating stress patterns).

- (4) a. Maxwell didn’t kill [the judge]_{F_{OC}} with a silver hammer.
b. Maxwell didn’t kill the judge with [a silver hammer]_{F_{OC}}.

The high scrambling rates in Unsworth (2005) may well be due to the use of negation in her stimulus material. Consider the example in (5). When the object *het kozijn* ‘the window frame’ appears in unscrambled position (to the right of negation), the default interpretation is constituent negation, as in (5i). When the object scrambles, however, the sentential negation interpretation in (5ii) is triggered. The unscrambled word order thus evokes an alternative object that has been painted by Roos, which contrasts with the window frame (e.g. the door). The truth-conditional effects of negation do not emerge in sentences with a time-point adverb, see (6).

- (5) *Roos heeft (het kozijn) niet (het kozijn) geverfd.*
 Roos has the frame not the frame painted
 ‘Roos did not paint the window frame.’
 i. It is not the window frame that Roos painted.
 ii. It is not true that Roos painted the window frame.
- (6) *Roos heeft (het kozijn) gisteren (het kozijn) geverfd.*
 Roos has the frame yesterday the frame painted
 ‘Roos painted the window frame yesterday.’

Scrambling clauses with a definite object and negation, or another focus sensitive expression, are compared to the same clauses with a time-point adverb in Chapters 2 and 3.

1.1.2 Freedom in the Dutch middle-field

In addition to the distinction between higher and lower adverbs, Schaeffer (1997, 2000) maintains that scrambling of definite objects is determined by their referentiality and their status in the discourse. Consider the partial structure in (7). Schaeffer claims that referential definite object DPs must move to a position on the left side of negation (in the specifier of RefP), and definite objects whose referents are known by both the speaker and hearer (i.e. discourse-given objects) must appear in a position on the left side of higher adverbials (in the specifier of DiscP).

- (7) [_{DiscP} (het boek) [misschien [_{RefP} (het boek) [_{NegP} [...
 the book perhaps the book

The claim that discourse packaging conditions influence scrambling of definite objects is not new. Verhagen (1986) already provided a detailed description of Dutch scrambling and claimed that definite objects generally appear to the right of “comment modifiers” when they provide information that is new to the discourse (i.e. when they belong to the “comment”). When definite objects provide discourse-given information, the claim goes, they must appear on the left side of such an adverbial. Neeleman & Reinhart (1998) further this hypothesis by analyzing scrambling in terms of stress patterns. The unscrambled position (i.e. to the right of an adverbial) is the most deeply embedded position in VP, which is where the main stress of the clause is assigned (Cinque 1993). Given that the main stress is related to focus assignment (e.g. Chomsky 1971, Jackendoff 1972, Cinque 1993), Neeleman & Reinhart (1998) argue that scrambling is a syntactic operation that regulates information structure. Definite objects in unscrambled position receive the main stress and are consequently identified as (part of) the focus (or “discourse-new”); definite objects in scrambled position (i.e. to the left of an adverbial) are destressed (cf. Reinhart 2006) and are consequently interpreted as discourse-given. This same “discourse template”, which reserves the scrambled position for presuppositional (topical and/or anaphoric) information and the unscrambled position for non-presuppositional (focused and/or non-anaphoric) information, is later adopted in more elaborate

analyses of the phenomenon by Broekhuis (2008) and Neeleman & van de Koot (2008a) as well.

The intuitions reported in the literature about this discourse template are rather uncompromising. For example, Neeleman & Reinhart (1998: 325) maintain that the unscrambled position is “highly disfavored” for presuppositional definite objects, and Neeleman & van de Koot (2008a: 60) refer to anaphoric definite objects in this position as “decidedly awkward”. De Hoop (2016) explicitly disagrees with similar judgments reported in Broekhuis & Corver (2016), reiterating her earlier claim in van der Does & de Hoop (1998) and de Hoop (2000, 2003) that definite objects do not scramble obligatorily—not even when they are anaphoric. Van der Does & de Hoop (1998) provide the example in (8) to illustrate this, and propose that “a proper analysis of scrambling should not be based on a difference in properties of the objects, such as familiarity, anaphoricity, topicality and/or focus” (van der Does & de Hoop 1998: 397). Moreover, van Bergen & de Swart (2009, 2010) and de Swart & van Bergen (2011) do not find evidence for an effect of anaphoricity in their corpus and experiment data; instead, they find a general preference to keep definite objects in unscrambled position.

- (8) *Paul heeft een kat die een gespannen indruk maakt.*
Paul has a cat that a stressed impression makes
'Paul has a cat that seems to be under stress.'
- a. *Misschien komt dat omdat Paul zelden de kat aait.*
maybe comes that because Paul seldom the cat pets
'That's maybe because Paul hardly ever pets the cat.'
- b. *Misschien komt dat omdat Paul de kat zelden aait.*
maybe comes that because Paul the cat seldom pets
'That's maybe because Paul hardly ever pets the cat.'

The influence of information structure (topicality and/or anaphoricity) on scrambling of definite objects is investigated in Chapters 4 and 5.

Finally, the information structural partitioning of Dutch clauses between the 13th and 19th century is investigated in Chapter 6. In the earliest (documented) stages of the language, Dutch allowed direct object DPs to appear not only in preverbal position (OV), as in the modern variety of the language, but also in postverbal position (VO). This option was lost after the 16th century. OV/VO variation in pre-16th century Dutch has been linked to information structure: discourse-given information favors a preverbal position, whereas discourse-new information favors the postverbal position (e.g. Burridge 1993, Blom 2002, Coussé 2009). This information structural partitioning is reminiscent of the claims we have seen about scrambling in Present-day Dutch, as discourse-given information is claimed to favor an earlier position in the sentence than discourse-new information. Crucially, we find that the given-new partitioning in Dutch clauses was never categorical. Moreover, middle-field scrambling was already a syntactic option when VO was a productive option in Dutch, but it did not have a clear information structural motivation. We argue that the two types of word order variation serve a similar discourse-related function, and that they are

diachronically related. But neither OV/VO variation nor scrambling is a categorical phenomenon driven by information structure.

1.2 Contributing to the discussion

The main aim of this thesis is to contribute experimental data to a discussion that has for the most part been based on researcher intuitions. To that end, **Chapter 2** reports on two sets of two experiments, consisting of a sentence judgment experiment and a sentence completion experiment, in which the type of adverb is manipulated. The first set of experiments contrasts syntactically higher adverbs with syntactically lower adverbs (cf. Schaeffer 1997, 2000). The syntactic position of the stimulus adverbs is determined through five diagnostics taken from Broekhuis & Corver (2016) and Barbiers (2018). The findings reveal a preference to scramble definite objects over the syntactically lower adverbs, which is most pronounced in the production data. Scrambling over the syntactically higher adverbs is more variable, although both word order options are accepted as grammatical options in Dutch.

The adverbial contrast in the second set of experiments is between time-point adverbs and the negation word *niet* ‘not’. The discrepancy between the previous experimental studies (Unsworth 2005, de Swart & van Bergen 2011) is replicated: definite objects are consistently scrambled over negation, and this effect is evident from the judgment data as well. Scrambling over time-point adverbs is again more variable. This adverbial contrast is elaborated on in **Chapter 3**, in a fill-in-the-blanks experiment and a speeded judgment experiment, of which the stimulus sentences contain twelve focus sensitive expressions (other than negation) or time-point adverbs. These sentences are followed by a contrastive *but*-clause, designed to identify the object in the first clause as (contrastively) focused or non-focused. The judgment and reaction time data both indicate that the preferred position for contrastively focused definite objects is within the c-command domain of focus sensitive expressions; non-contrastively focused definites are preferred outside this syntactic zone. No such effect emerged in clauses with a time-point adverb.

The sentence completion experiment in **Chapter 4** explores the influence of the definite object’s topicality and anaphoricity in scrambling clauses. As noted, most theoretical analyses of Dutch scrambling maintain that the variation is driven by information structural notions. However, these analyses differ with respect to which notions exactly are claimed to motivate scrambling. The scrambling clauses in this experiment are preceded by a discourse context, which either does or does not mention the target object (thereby manipulating its anaphoricity). If the object is mentioned, the discourse context either licenses it as topical or as focused. Thus, the experiment investigates the scrambling rate of anaphoric topics, anaphoric foci, and non-anaphoric foci. In addition, the experiment investigates the scrambling rate of (non-anaphoric) permanently available topics. The results provide evidence for the given-before-new pattern predicted by most theoretical analyses, in that topics are scrambled more often than foci, and anaphoric definites more often than non-anaphoric definites. The claims about the non-optionality of scrambling, however,

are revealed to be too rigorous. That is, the freedom in the placement of definite objects in the Dutch middle-field is much greater than commonly assumed (in line with de Hoop 2000, 2003).

Chapter 5 tests the hypothesis that Dutch scrambling adheres to a strict discourse template once again in a sentence judgment experiment. The scrambling clauses are preceded by a discourse context which serves to identify the definite object in the target sentence as topical or focused. After a discussion on the reliability of expert and “folk” judgment data, judgments are elicited from a large group of linguistically naïve participants in three scale dimensions. These dimensions are chosen specifically to elicit judgments about the linguistic system (acceptability), the linguistic reality (surface probability), and the linguistic feeling (aesthetics). Judgments are elicited for scrambling clauses as well as for three pertinent violations of the prescriptive norm. The results do not provide evidence for the discourse template; instead, definite objects are better appreciated in scrambled position, regardless of their information status. An additional key finding of this study is that the dimension of the judgment scale influences the outcome of the experiment.

Finally, **Chapter 6** reports on a corpus study of the information structural partitioning of Dutch clauses between the 13th and 19th century. The postverbal object position is still a productive option in pre-16th century Dutch. In this stage of the language, the domains in which discourse-given and discourse-new information is expressed are separated by the verb, although scrambling over adverbials in the middle-field is already a syntactic option. We propose that the boundary between the information structural domains shifts towards the middle-field as the postverbal position is gradually lost from the language. It is important to note that object placement in Dutch was never driven by information structure—it is at most influenced by it. A syntactic analysis based on Broekhuis (2008) is presented, which makes available three positions for the direct object. The position in which the direct object is spelled out depends on violable pragmatic principles, such as given-before-new.

A summary of all experimental results is presented in **Chapter 7**, as well as the general discussion and conclusions. It is proposed that a converging evidence approach to definite object scrambling in the Dutch middle-field helps us better understand the phenomenon.

Chapter 2

Adverbial hurdles in Dutch scrambling

Abstract

This chapter addresses the role of the adverb in Dutch scrambling structures with a definite object. We report on four experiments (two sentence judgment experiments, two sentence completion experiments) in which we investigate whether the structural position and the scope sensitivity of the adverb affect judgment scores of scrambling structures and native speakers' tendency to place definite objects in scrambled position. Definite objects are produced in scrambled position more often when the syntactic position of the adverb is low (predicate/VP-adverbs) than when it is high (clause/S-adverbs). This effect emerges in the judgment data as well, although all combinations are judged as highly acceptable. Regarding the adverb's scope sensitivity, we find that the unscrambled word order is avoided when the sentence contains negation, both in sentence judgment and production. We relate this finding to the meaning shift that scrambling triggers, as constituent negation only makes sense in the right discourse context. We conclude that the type of adverb plays a key role in Dutch word ordering preferences.

This chapter is based on Schoenmakers, Gert-Jan & Peter de Swart. 2019. Adverbial hurdles in Dutch scrambling. In Anja Gattnar, Robin Hörnig, Melanie Störzer & Sam Featherston (eds.), *Proceedings of Linguistic Evidence 2018: Experimental data drives linguistic theory*, 124–145. Tübingen: University of Tübingen.

2.1 Introduction

Direct object scrambling is a type of word order variation in which the direct object of a sentence moves to a more leftward position in the middle-field of the clause, i.e. the section between the auxiliary (in embedded clauses the complementizer) and the main verb.¹ The scrambling variation exists in most Germanic languages, albeit in slightly different guises (see Vikner 1994, 2006, Broekhuis 2008). This chapter is concerned with the Dutch variety only, which is sometimes also referred to as *A-scrambling* or *object shift*. For the sake of simplicity we will refer to the phenomenon as “scrambling” throughout this chapter. An example of Dutch scrambling is given in (1), in which the direct object *de cursus* ‘the course’ moves over the adverb *onlangs* ‘recently’.

- (1) a. *Jan heeft onlangs de cursus afgerond.* (unscrambled)
Jan has recently the course completed
- b. *Jan heeft de cursus onlangs afgerond.* (scrambled)
Jan has the course recently completed
‘Jan recently completed the course.’

The permissibility and optionality of Dutch scrambling have recurrently been discussed in the linguistic literature, but always with a heavy focus on properties of the direct object. Researchers agree that pronouns scramble almost obligatorily and that indefinite objects do so optionally, in which case it has a certain effect on their interpretation. The incentives for definite objects to scramble are still matter of debate. Properties that have been argued to determine the object’s position in the Dutch middle-field include its anaphoricity, familiarity, and topicality (Verhagen 1986, de Hoop 1996, 2000, 2003, Neeleman & Reinhart 1998, Broekhuis 2008, Neeleman & van de Koot 2008a, Broekhuis & Corver 2016: Chapter 13). Most of the literature on Dutch scrambling shares the intuition that scrambling of definite objects induces a pragmatic interpretation shift, in that scrambled objects must be presuppositional (topical and/or anaphoric), but van der Does & de Hoop (1998), and later de Hoop (2000, 2003), show that there is no real evidence for this. They argue instead that scrambling is truly optional for definite objects.

Van der Does & de Hoop (1998) support their view by discussing the scrambling behavior of different kinds of objects of light verbs, which do not have much semantic content of their own. Light verbs therefore combine with the object to form a semantic unit. Indefinite objects cannot scramble in sentences with a light verb, but definite objects can. The difference is illustrated in (2) and (3) below, taken from van der Does & de Hoop (1998: 396).

¹The assumption that scrambling involves movement is not uncontroversial, see Neeleman (1994a: Chapter 3) and Broekhuis & Corver (2016: §13.2) for discussion.

- (2) a. *dat ik nog **de was** moet doen.*
 that I still the laundry have.to do
- b. *dat ik **de was** nog moet doen.*
 that I the laundry still have.to do
 ‘that I still have to do the laundry.’
- (3) a. *dat ik nog **een plas** moet doen.*
 that I still a piss have.to do
- b. **dat ik **een plas** nog moet doen.*
 that I a piss still have.to do
 ‘that I still have to take a piss.’

Since the scrambled definite object in (2b) is not interpreted as familiar, anaphoric, or topical in the discourse, van der Does & de Hoop (1998) conclude that scrambling is not obligatory, nor prohibited, for definite objects by any property of the object or of the general context. Further evidence for this view is provided by a series of experiments in de Swart & van Bergen (2011). In a sentence judgment experiment, participants rated (context-free) main clause sentences with a definite object and a time-point adverb on a 7-point scale. The scrambled and unscrambled versions of these sentences received similar judgment scores at the high end of the scale, indicating that both word order variants are equally acceptable to Dutch natives (for sentences with definite objects). De Swart & van Bergen also report on a sentence completion experiment in which the anaphoricity of the definite object was manipulated. This manipulation did not yield a significant effect.

The optionality of definite object scrambling raises some questions regarding the motivations of speakers to choose either word order. If definite object scrambling is truly insensitive to factors such as anaphoricity, familiarity, and topic-focus structure, as advocated by van der Does & de Hoop (1998), perhaps there are object-external factors that give some insight into the observed variation. In this chapter, we investigate the role of the adverb in Dutch direct object scrambling. Since properties of definite objects have been shown to have little to no influence on scrambling, we limit our investigations to sentences with definite objects. It has been suggested before that properties of the adverb play a role in scrambling, but there are no dedicated investigations of their influence on scrambling in sentence production or sentence judgment.²

The chapter is organized as follows. Section 2.2 discusses previous experimental studies on the topic of Dutch object scrambling. The results from these studies imply that the adverb has an influence on scrambling patterns. We suggest that the adverb's structural position (syntax) and scope sensitivity (semantics) can affect the appreciation of scrambling sentences and the native speakers' tendency to scramble definite objects. We test our hypotheses in Section 2.3, in two sets of experiments, each consisting of a sentence judgment experiment and a sentence completion experiment. Section 2.4 and 2.5 contain the general discussion and conclusions.

²A notable exception is Jeannette Schaeffer's work on Dutch scrambling in (impaired) language acquisition (Schaeffer 1997, 2000, 2012), which we will discuss in more detail in Section 2.2.

2.2 Empirical approaches to Dutch scrambling

Van Bergen & de Swart (2009, 2010) report on a large scale corpus study, using the Corpus of Spoken Dutch (CGN 2006), to document how often direct objects occur in scrambled position in spontaneous speech. They find that definite objects (including demonstratives *die man* ‘that man’, possessives *zijn moeder* ‘his mother’, and quantifiers *alle vragen* ‘all questions’) only do so in 12% of the sentences. This finding is inconsistent with any of the claims in the theoretical work on scrambling: the true optionality account predicts a more balanced distribution of definite objects, if anything, and accounts that suggest that scrambling is driven by discourse-semantic factors are not compatible with the low numbers in the corpus either. Moreover, van Bergen & de Swart find that anaphoricity does not have a significant effect on scrambling in sentences with a definite object: 14% of the anaphoric definites scrambled in their data-set, and non-anaphoric definites only did so in 6% of the cases.

De Swart & van Bergen (2011) further explore the effect of referentiality and anaphoricity on definite object scrambling in a set of follow-up experiments. They report on a sentence judgment experiment and two sentence completion experiments (which we briefly discussed in Section 2.1), and find that, despite the low frequencies in their previous corpus studies, speakers of Dutch do accept the scrambled word order for definite objects as a grammatical option. The results from their sentence completion experiments, however, indicate that participants fail to actively produce scrambled sentences. Participants were presented with an opening phrase *Jan zei dat* ‘Jan said that’, followed by four words with which to complete the sentence: a nominative pronoun (matching the main clause subject’s number and gender), an infinitival verb, a definite DP, and a time-point adverb. As noted, the majority of objects were left unscrambled. This finding is in line with the frequencies in the Corpus of Spoken Dutch (van Bergen & de Swart 2009, 2010), but not with the results from the sentence judgment experiment. De Swart & van Bergen attribute the discrepancy to a task difference, which triggers a “grammaticality-frequency gap” (Kempen & Harbusch 2008, Bader & Häussler 2010). Two word order options can have a similar grammaticality status, but at the same time show vastly different distributions in language production. The sentence judgment experiment shows that the two word order variants are equally acceptable, while the corpus frequencies and the behavioral data indicate that there is a clear preference for the unscrambled order in language production.

The behavioral data in de Swart & van Bergen (2011) are nonetheless in sharp contrast with the scrambling patterns reported in Unsworth (2005: Chapter 5), who investigates the L1 acquisition of scrambling in Dutch. The task Unsworth administers combines truth judgment and sentence production, and prompts participants to produce sentences with a definite object and the negation word *niet* ‘not’. An example is given in (4), taken from Unsworth (2005: 217).

- (4) a. *Ernie gaat niet de giraffe natekenen!*
Ernie goes not the giraffe copy

- b. *Ernie gaat de giraffe niet natekenen!*
 Ernie goes the giraffe not copy
 'Ernie is not going to copy the giraffe!'

The adult control group of the experiment scrambled 98.5% of the definite objects, which led Unsworth (2005) to conclude that speakers of Dutch scramble definite objects consistently. However, this conclusion conflicts with the corpus frequencies in van Bergen & de Swart (2009, 2010) and the behavioral data in de Swart & van Bergen (2011).

De Swart & van Bergen (2011, 2014) later suggest that this contrast may be due to the use of negation in Unsworth's (2005) stimuli, since participants in their own production experiment scrambled only 20% of the objects over time-point adverbs such as *gisteren* 'yesterday'. The class of adverbs is notorious for being extensive and diverse (see e.g. Delfitto 2006, Morzycki 2016: Chapter 5). It is conceivable that language users have different word order preferences for scrambling sentences depending on the type of adverb. Schaeffer (1997, 2000), who also studies the L1 acquisition of scrambling in Dutch, also considers the potential influence of the type of adverb on scrambling. She makes the classical distinction between adverbs that modify the predicate and adverbs that modify the full proposition (*VP-* and *S-adverbs* in Jackendoff 1972), asserting that the latter are located higher in syntactic structure. Schaeffer argues that object movement over a syntactically high adverb is more costly than object movement over a syntactically low adverb, because the distance between the object's base and target position is larger.

Schaeffer (1997, 2000) reports on a sentence production experiment similar in design to the one in Unsworth (2005), but with an additional adverb manipulation. Participants watched the experimenter act out a scene in which a puppet performs a transitive action with an object; an example is given in (5a). Crucially, the experimenter used a high adverb (temporal/locative, e.g. *morgen* 'tomorrow'), a low adverb (manner, e.g. *mooi* 'beautifully'), or the negation word *niet* 'not' during the performance. A second puppet then responded by paraphrasing the first utterance using an antonymous adverb (e.g. *lelijk* 'in an ugly way' in (5b)), which the participant was supposed to correct. An example answer is given in (6). These examples are taken from Schaeffer (2000: 58).

- (5) a. *Kijk, een boom! [...] Die ga ik MOOI inkleuren.*
 look a tree that go I beautifully color
 'Look, a tree. [...] I'm going to color it BEAUTIFULLY.'
- b. *De boom gaat Koekiemonster LELIJK inkleuren!*
 the tree goes Cookiemonster in-an-ugly-way color
 'Cookiemonster is going to color the tree IN-AN-UGLY-WAY!'
- (6) a. *Nee, Koekiemonster gaat MOOI de boom inkleuren!*
 no Cookiemonster goes beautifully the tree color
- b. *Nee, Koekiemonster gaat de boom MOOI inkleuren!*
 no Cookiemonster goes the tree beautifully color
 'No, Cookiemonster is going to color the tree BEAUTIFULLY!'

The adult control group scrambled definite objects almost categorically, regardless of the structural position of the adverb (88% over high adverbs, 93% over low adverbs, 96% over negation). While this finding is in line with Unsworth's (2005) results, it is not in line with the corpus frequencies in van Bergen & de Swart (2009, 2010) or the behavioral data in de Swart & van Bergen (2011). The difference between Schaeffer's (1997, 2000) and de Swart & van Bergen's results is especially striking, because both experiments tested scrambling sentences with time-point adverbs. It is worth noting here, however, that the adverbs in Schaeffer's stimuli sentences were contrastive pairs (the affirmative particle *wel* was used as a counterpart to the negation word). This approach was adopted deliberately to take the focus off the object, because focus and stress are claimed to restrict the scrambling possibilities of direct objects (e.g. Verhagen 1986, Neeleman & Reinhart 1998). However, contrastive emphasis on the adverb also influences word order in Dutch (see Bouma & de Hoop 2008). It cannot be excluded that the contrastive set-up of Schaeffer's experiment interfered with her adverb manipulation; her participants may well have used the scrambled word order for prosodic reasons overruling the putative adverbial effect.

A second property that might influence scrambling is the scope sensitivity of the adverb. Adverbs can differ in whether the presence or absence of a certain element in their scope has an effect on the (discourse) meaning of the sentence (cf. Beaver & Clark 2008). Specifically, the two word order variants in scrambling may elicit a different meaning depending on whether the object falls under the scope of the adverb or not (see also Steube 2006). A prototypical example of a scope-sensitive element is the negation word *niet* 'not'. The relative order of negation and the definite object either denotes constituent or sentential negation (cf. Klima 1964). If the direct object is located in unscrambled position, a contrast is implied with another possible patient entity (especially when it is contrastively accented). The scrambled word order, on the other hand, negates the entire proposition. This is illustrated in (7).

- (7) a. *Jan heeft niet de hond geaaid.* (constituent negation)
Jan has not the dog petted
'It was not the dog that Jan petted.'
- b. *Jan heeft de hond niet geaaid.* (sentential negation)
Jan has the dog not petted
'Jan did not pet the dog.'

It is implied in (7a) that Jan did not pet the dog, but did pet something else (e.g. the cat), whereas the petting-event is negated altogether in (7b). As a consequence, language users may be inclined to scramble the definite object out of the negation adverb's scope domain to avoid expressing the unintended contrastive meaning. No such meaning difference emerges in sentences with a time-point adverb, see (8).

- (8) a. *Jan heeft gisteren de hond geaaid.*
Jan has yesterday the dog petted
- b. *Jan heeft de hond gisteren geaaid.*
Jan has the dog yesterday petted
'Jan petted the dog yesterday.'

Both sentences in (8) express a petting event that took place yesterday, without an obvious difference in interpretation between the two (but see Broekhuis & Corver 2016: §8.2.3). This means that there is no reason to believe that one word order is to be preferred over the other in sentences with a time-point adverb because of scope concerns. Speakers of Dutch may avoid using the unscrambled word order in sentences with negation because they do not want to elicit constituent negation, yet they are free to choose either word order in sentences with a time-point adverb without triggering such an interpretation shift. The incentives to scramble definite objects may therefore in part depend on the scope sensitivity of the adverb, where true optionality in the sense of van der Does & de Hoop (1998) only exists for scrambling sentences with a scope-insensitive adverb. Moreover, this difference would explain the discrepancy between the results from de Swart & van Bergen (2011) for time-point adverbs on the one hand, and from Schaeffer (1997, 2000) and Unsworth (2005) for negation on the other.

It is hard to draw unequivocal conclusions about the optionality of definite object scrambling in Dutch from the existing empirical data without taking into account properties of the adverb. Some studies suggest that definite objects are strongly preferred in scrambled position, while others report that they generally remain unscrambled. The next section first reconsiders Schaeffer's (1997, 2000) hypothesis that the structural position of the adverb restricts scrambling preferences. Schaeffer was unable to find an effect in her experiment, but her data may well have been confounded. The next section reports on a sentence judgment experiment and a sentence completion experiment to retest this hypothesis. Then, we will explore the influence of the adverb's scope sensitivity on definite object scrambling in a second set of experiments.

2.3 Experiments

In this section, we test whether the structural position (Section 2.3.1) and/or scope sensitivity (Section 2.3.2) of the adverb influences object placement in scrambling clauses, in two sentence judgment experiments and two sentence completion experiments. The target sentences in these experiments are not preceded by linguistic context. We assume Janet Fodor's *Implicit Prosody Hypothesis*, according to which "[...] the parser favors the syntactic analysis associated with the most natural (default) prosodic contour for the construction" (Fodor 2002, see also Breen 2014). That is, we do not expect participants in the sentence judgment experiments to project a marked prosodic contour onto the stimulus items. The experiments employ the same basic designs as the experiments in de Swart & van Bergen (2011). All stimulus material can be found in the appendix.

2.3.1 Experiment set 1: Structural position

Recall that Schaeffer (1997, 2000) hypothesizes that a scrambled object has to move farther from its base position if the intervening adverb is a syntactically high sentence

modifier than if it is a syntactically low predicate modifier. The adverb can thus be regarded as some sort of syntactic hurdle that the object has to move over. It is generally assumed in the generative literature on Dutch clause structure that direct objects are generated within VP, and that adverbs subsequently adjoin to VP (see Broekhuis & Corver 2016: §13.2). Thus, Schaeffer assumes that the base order of Dutch is as in (9a). However, various researchers from Germany have advanced an alternative account for German, a language that is structurally similar to Dutch. They claim that the base position of (certain) low adverbs in the German middle-field is below that of the direct object, as in (9b) (e.g. Frey & Pittner 1998, Maienborn 2001, Frey 2003, Pittner 2004, Schäfer 2013).

- (9) a. Adv_{high} > Adv_{low} > Object > V
 b. Adv_{high} > Object > Adv_{low} > V

The assumption that (9b) is the underlying order of the German middle-field is based on a number of syntactic criteria proposed in Frey & Pittner (1998). This chapter will not go into full detail of this account; future investigations will have to determine whether Frey & Pittner's diagnostics work similarly for Dutch. Suffice it to say here that both analyses lead to the same predictions for the experiments presented in this section: i) definite objects are better appreciated in scrambled position in sentences with a low adverb than in sentences with a high adverb (Experiment 1A); and ii) definite objects are produced in scrambled position more frequently in sentences with a low adverb than in sentences with a high adverb (Experiment 1B).

Jackendoff's (1972) distinction between predicate and clause adverbs has been the basis for a large deal of the adverbial classifications that have been proposed in the linguistic literature. Predicate adverbs operate in the lower, lexical domain of the clause, comprising the main verb, its arguments, and optional modifiers. Clause adverbs operate in the higher, functional domain of the clause, in which additional information is provided about the proposition expressed in the lexical domain. The two domains are illustrated in (10), taken from Broekhuis & Corver (2016: 1121).

- (10)
$$\underbrace{[\text{CP} \dots \text{C} [\text{TP} \dots \text{T} [\text{XP} \dots \text{X} [\text{vP} \dots \text{v} [\text{VP} \dots \text{V} \dots]]]]]}_{\text{Functional Domain}}$$

$$\underbrace{\hspace{10em}}_{\text{Lexical Domain}}$$

Typical examples of low adverbs are manner adverbs, which describe the way in which an event took place. Measure adverbs and domain adverbs also occur in the lower part of the clause (see Ernst 2004). The collection of higher adverbs contains, for example, epistemic adverbs and evaluative adverbs, which express the stance of the speaker toward the proposition. Broekhuis & Corver (2016) describe a number of tests that can be used to identify whether a given adverb is a structurally high clause modifier or a structurally low predicate modifier. Consider the examples in (11) with the predicate adverb *snel* 'quickly' and the clause adverb *helaas* 'unfortunately'.

- (11) a. *Jan heeft snel de cursus afgerond.*
 Jan has quickly the course completed
 'Jan completed the course quickly.'

- b. *Jan heeft helaas de cursus afgerond.*
 Jan has unfortunately the course completed
 ‘Unfortunately, Jan completed the course.’

First, predicate adverbs can usually be recognized by using a paraphrase in which the adverb is placed in a second conjunct of the form ... *en doet dat* + ADVERB ‘... and does that + ADVERB’. The rationale is that the predicate adverb in the paraphrase is introduced as a modifier to the replacement VP *doet dat* ‘does that’. This is not possible for clause adverbs. The sentences in (12) show the desired result when this test is applied to the sentences in (11).

- (12) a. *Jan heeft de cursus afgerond en deed dat snel.*
 Jan has the course completed and did that quickly
 ‘Jan completed the course, and (he) did so quickly.’
 b. **Jan heeft de cursus afgerond en deed dat helaas.*
 Jan has the course completed and did that unfortunately

Second, predicate adverbs delimit the denotation of the verbal predicate. Broekhuis & Corver (2016) therefore propose a test based on the inferences generated by predicate adverbs, specifically of the form *John walks slowly; therefore, John walks* (cf. Thomason & Stalnaker 1973). That is, an alternative clause in which a predicate adverb is omitted generally still holds true. Clause adverbs, by contrast, perform some other function onto their complement, in that sentences with clause adverbs do not necessarily entail the alternative sentences without them.

Third, Broekhuis & Corver (2016) suggest that clause adverbs can be recognized by the scope paraphrase *het is ADVERB zo dat...* ‘it is ADVERB the case that...’, exemplified in (13). The scope paraphrase is not felicitous for the sentence with the predicate adverb *snel* ‘quickly’ in (13a), but it works for the clause adverb *helaas* ‘unfortunately’ in (13b).

- (13) a. **Het is snel zo dat Jan de cursus heeft afgerond.*
 it is quickly so that Jan the course has completed
 b. *Het is helaas zo dat Jan de cursus heeft afgerond.*
 it is unfortunately so that Jan the course has completed
 ‘It is unfortunately the case that Jan completed the course.’

A fourth test is proposed in Barbiers (2018), who observes that clause adverbs can, but predicate adverbs cannot, follow the main verb in Dutch. The sentences in (14) illustrate this difference for the predicate adverb *hard* ‘hard’ and the clause adverb *misschien* ‘perhaps’.

- (14) a. **Elsa heeft gewerkt hard.*
 Elsa has worked hard
 ‘Elsa worked hard.’
 b. *Elsa heeft gewerkt misschien.*
 Elsa has worked perhaps
 ‘Elsa worked perhaps.’

Finally, Broekhuis & Corver (2016) note that one can turn to the generalization that clause adverbs usually precede predicate adverbs in sentences with multiple adverbs, because of their relative structural positions (cf. Cinque 1999). According to Barbiers (2018), the cut-off point between clause and predicate adverbs in Dutch is negation, which is located low in the functional domain of the clause (Broekhuis & Corver 2016: 1628), but does not behave like a clause or predicate adverb itself. Barbiers summarizes the properties of clause adverbs and predicate adverbs as in Table 2.1.

	clause adverb	predicate adverb
... and does this ADV	-	+
Entailment	-	+
It is ADV the case that...	+	-
Precedes negation	+	-
Extraposition	+	-

Table 2.1: Overview of diagnostics for clause and predicate adverbs (taken from Barbiers 2018: 79)

In the following, we first test whether there is a difference in sentence judgments for scrambling sentences with high and low adverbs, in Experiment 1A. Next, we investigate whether an effect of the structural position of the adverb exists in sentence production, in Experiment 1B. We expect on the basis of the findings in de Swart & van Bergen (2011) that the two word orders receive similarly high scores in the sentence judgment experiment. In case there is a difference in the judgment scores, Dutch natives are expected to have a slight preference for the scrambled word order in sentences with a low adverb, and for the unscrambled word order in sentences with a high adverb. We expect much stronger effects in the sentence completion experiment, and predict that definite direct objects occur in scrambled position in sentences with a low adverb considerably more frequently than in sentences with a high adverb.

Experiment 1A: A sentence judgment experiment

Participants

62 native Dutch students (56 female, mean age = 18.93, age range 17–24, SD = 1.26) participated in an online questionnaire distributed via the SONA participant recruitment system of Radboud University in Nijmegen for course credit. Data from eight participants were discarded because they systematically gave high judgment scores to ungrammatical sentences. Data from 54 participants were entered into statistical analysis.

Materials

The experiment contained 28 scrambling sentences with a subject (all proper nouns), an auxiliary, an adverb, and a transitive lexical verb with a definite object (all inanimate and singular). Four high and four low adverbs were used, which were matched

with the object for length to control for effects of grammatical weight (cf. Wasow 1997). The adverbs were selected on the basis of the adverbial tests in Table 2.1. Half the stimuli were adapted from those used in the sentence judgment experiment in de Swart & van Bergen (2011), the other half were newly created. Objects were placed in scrambled (OBJ – ADV) or unscrambled (ADV – OBJ) position. A sample item is given in (15).³

- (15) a. *Roos heeft inderdaad **het kozijn** geverfd.*
 Roos has indeed the window.frame painted
- b. *Roos heeft **het kozijn** inderdaad geverfd.*
 Roos has the window.frame indeed painted
 ‘Indeed, Roos painted the window frame.’
- c. *Roos heeft vakkundig **het kozijn** geverfd.*
 Roos has skillfully the window.frame painted
- d. *Roos heeft **het kozijn** vakkundig geverfd.*
 Roos has the window.frame skillfully painted
 ‘Roos painted the window frame skillfully.’

The items were distributed over four experimental lists to ensure that participants would see each condition equally often and would not see more than one variant of each item. Each list contained 56 fillers, most of which were adjusted from the stimulus material of de Swart & van Bergen (2011). Fillers consisted of transitive and ditransitive sentences without adverbs. Half of the filler items were ungrammatical in either gender agreement (e.g. **de spijkertje* ‘the little nail’)⁴ or in erroneous inflection (e.g. **Richard hebben* ‘Richard have’). Half the filler items had a proper noun in subject position, the other half a definite noun phrase. Fillers were controlled for scrambling possibilities and were identical in each list. Each list contained 84 sentences in total. The lists were presented in six randomized blocks, each starting with three filler items of which at least one was ungrammatical. The experiment was conducted in Qualtrics.

Procedure

The experiment was an online questionnaire in which participants were asked to rate sentences for acceptability. Acceptability was defined as how native-like a friend would sound if they would utter the sentences. This definition was based on Schütze & Sprouse’s (2014) chapter on judgment task design, who suggest that this wording simulates spoken language to a large extent and, crucially, guides participants to re-

³An anonymous reviewer remarks that *vakkundig* ‘skillfully’ is not a pure manner adverb (Geuder 2000, Schäfer 2013) in the sense that it is ambiguous between a manner and a subject-oriented reading. The subject-oriented interpretation is taken to correspond to a higher structural position than the manner adverb interpretation (Frey & Pittner 1998, Frey 2003). We agree that *vakkundig* ‘skillfully’ is not an ideal candidate for the class of low adverbs, but stress that it passes all the tests in Table 2.1 corresponding to predicate adverbs and fails those corresponding to clause adverbs. The remaining stimulus adverbs were not ambiguous to the best of our knowledge.

⁴Dutch distinguishes between common and neuter gender, which is expressed on the article. Diminutives invariably take the neuter gender article *het*.

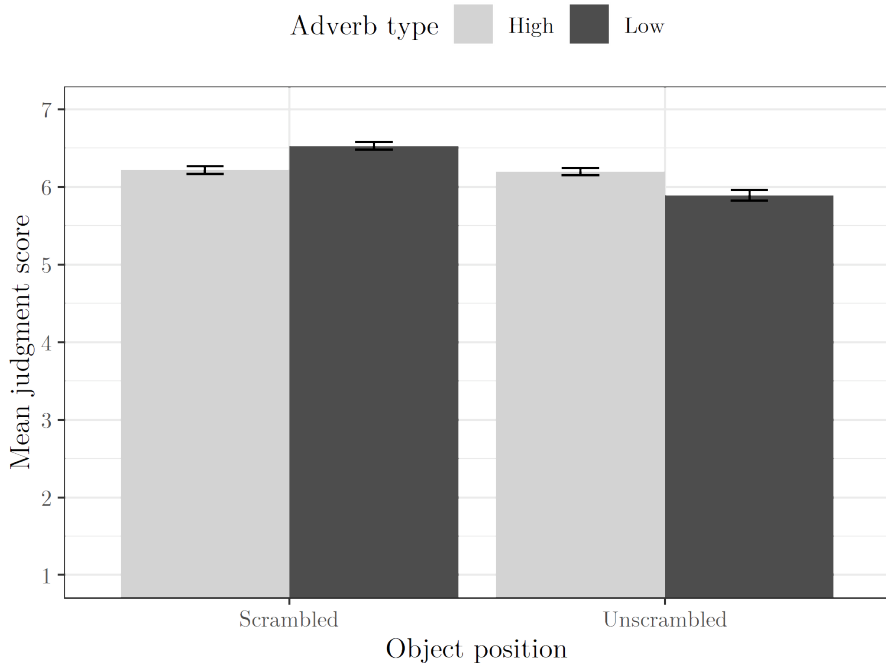


Figure 2.1: Mean judgment score per condition (error bars indicate the within-subjects standard error of the mean)

spond to the target items in terms of native speaker ability rather than plausibility or frequency. Judgment scores were given on a 7-point scale, with a score of 1 meaning “completely not (acceptable) Dutch” and a score of 7 “completely (acceptable) Dutch”.

Results

The results from the sentence judgment experiment are visually presented in Figure 2.1. Each condition was rated at the high end of the scale (with judgment scores of 5.1 or above). The mean judgment scores and standard deviations of the conditions were as follows: high/scrambled ($M = 6.22$, $SD = 1.02$); low/scrambled ($M = 6.53$, $SD = 0.81$); high/unscrambled ($M = 6.20$, $SD = 0.99$); low/unscrambled ($M = 5.89$, $SD = 1.35$).

We used the software R (version 3.4.3, R Core Team 2020) and the *lme4* package (Bates et al. 2015) to perform a linear mixed effects analysis of the influence of adverb type and object position on sentence judgment. Judgment scores were z -transformed prior to statistical analysis. The variables *object position* (unscrambled, scrambled) and *adverb type* (high, low) were entered into the model as fixed effects. Both variables were coded using deviation contrasts (contrasts of $-.5$, $.5$). We entered random intercepts for participants and items into the model, as well as by-

participant and by-item random slopes for the effect of both independent variables and their interaction (following Barr et al. 2013). When the model failed to converge, its random structure was simplified by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final version of the model included by-participant and by-item random intercepts, by-participant random slope for the effect of *object position*, and by-item random slopes for the effects of both variables and the interaction between them. The *p*-values were obtained by using the normal approximation to the *t*-statistic.

We did not find a significant effect of *adverb type* ($\beta = 0.003$, $SE = 0.036$, $t = 0.083$, $p = .934$), but we did find a significant effect of *object position* ($\beta = 0.160$, $SE = 0.048$, $t = 3.318$, $p < .001$) and a significant interaction effect between *adverb type* and *object position* ($\beta = 0.267$, $SE = 0.077$, $t = 3.476$, $p < .001$). Thus, the scrambled order was generally preferred over the unscrambled order, but this effect is caused especially by differences in judgments for sentences with low adverbs (see Figure 2.1).

Discussion

The results from this sentence judgment experiment are in line with our predictions, which were based on the findings in de Swart & van Bergen (2011). All conditions received judgment scores at the high end of the scale (with mean scores over 5.1), suggesting that Dutch natives happily accept both the scrambled and the unscrambled word order for sentences with high and low adverbs. Participants did have a slight preference for the scrambled order if the intervening adverb was syntactically low. This suggests that the structural position of the adverb plays a role even in sentence judgment, albeit a marginal one. Since de Swart & van Bergen found a discrepancy between scrambling preferences in sentence judgment and sentence production, we will continue to test the influence of the adverb's structural position in a sentence completion experiment. The hypothesis is once again that scrambling over low adverbs is better than scrambling over high adverbs. We expect similar effects as in Experiment 1A, but stronger. Definite direct objects are expected to occur in scrambled position in sentences with low adverbs considerably more frequently than in sentences with high adverbs.

Experiment 1B: A sentence completion experiment

Participants

24 native Dutch students (18 female, mean age = 21.38, age range 18–25, $SD = 1.82$) were recruited from the SONA participant pool of Radboud University in Nijmegen and participated for course credit. Data from one participant were discarded because they were not audible due to technical error.

Materials

The experiment was adapted from the sentence completion experiments in de Swart & van Bergen (2011), which were conducted in E-Prime 2.0 (Schneider et al. 2012). 24 sentences from Experiment 1A were minimally changed and embedded under a verb of saying (*zeggen* 'to say' or *vertellen* 'to tell'). We divided the items into an onset and

a target section. The onset always consisted of a proper noun, a verb of saying, and the complementizer *dat* ‘that’. The target section consisted of a nominative pronoun that matched the person and gender of the onset subject, an adverb, a definite NP (inanimate and singular), and an infinitive verb. 45 filler items with ditransitive and transitive verbs that did not contain an adverb and were controlled for scrambling possibilities were included (originally used in other experiments). Filler items were the same in each list and at least the first three items of each list were filler items. Each list contained 69 sentences in total.

Procedure

Participants were seated in front of a computer screen and a PST serial response box with a microphone attached that functioned as a voice key. Audio data were recorded on a separate device for later transcription. The trials started with a fixation cross in the center of the screen. The cross disappeared when participants pressed a button, followed by a 250ms blank screen. Participants were first shown the onset sentence. After 1500ms, the onset was replaced by the four target words presented below each other. The order in which the adverb and the definite object were presented was balanced and logged. Participants were asked to audibly complete the sentence using the four target words, but they were also told that they could change the word form or add words when necessary. Participants were asked to start speaking as quickly as possible, but they were also told that planning the utterance before speaking would help them to pronounce it more fluently. They were asked to speak loudly and clearly. The sound of voice would trigger a voice key, which would replace the words on the screen with a new fixation cross. The experimental lists were preceded by nine practice trials that were constructed under the same conditions as the filler items. Participants had the opportunity to ask questions after the practice trials. The experiment took approximately 30 minutes.

Results

The audio data were transcribed verbatim by the experimenter. Utterances were considered target-like when they were grammatical sentences with the direct object and adverb directly following each other in the middle-field of the clause. Sentences with more than one adverb or with an indefinite object were not considered target-like. Utterances that were not target-like were discarded prior to statistical analysis (15.22%). The remaining utterances were annotated for *object position* (unscrambled, scrambled). Figure 2.2 visually presents the scrambling proportions of the target items.

We used the software R (version 3.4.3, R Core Team 2020) and the *lme4* package (Bates et al. 2015) to perform a generalized linear mixed effects analysis of the influence of the type of adverb on the produced word order (unscrambled, scrambled), controlling for the presentation order of the constituents. The variables *adverb type* (high, low) and *presentation order* (ADV – OBJ, OBJ – ADV) were entered into the model as fixed effects. Both variables were coded using deviation contrasts (contrasts of -.5, .5). We initially entered intercepts for participants and items into the model as random effects, as well as by-participant and by-item random slopes for

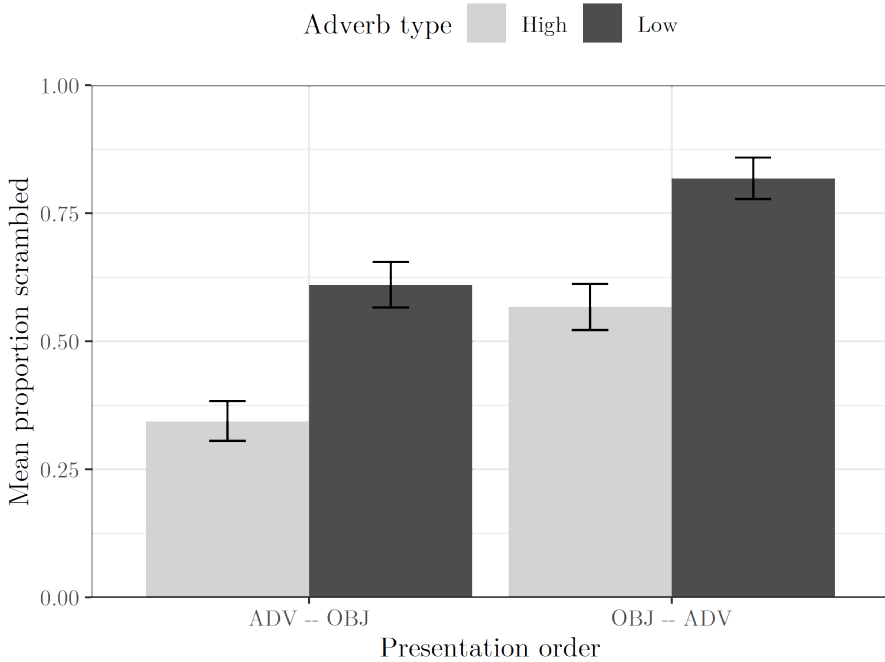


Figure 2.2: Mean proportion of produced scrambled order per condition (error bars indicate the within-subjects standard error of the mean)

the effects of both independent variables and their interaction (following Barr et al. 2013). When the model failed to converge, we simplified the random structure of the model by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final model included intercepts for participants and items, and a by-participant random slope for the effect of *presentation order*.

The model yields a significant main effect of *adverb type* ($\beta = 1.793$, $SE = 0.275$, $z = 6.512$, $p < .001$) and a significant main effect of *presentation order* ($\beta = 1.484$, $SE = 0.419$, $z = 3.545$, $p < .001$). The interaction effect between *adverb type* and *presentation order* was not significant ($\beta = -0.170$, $SE = 0.523$, $z = -0.326$, $p = .745$).

Discussion

The results from this sentence completion experiment show that the structural position of the adverb influences the scrambling behavior of definite objects in Dutch. In line with our predictions, definite objects were scrambled over low adverbs significantly more frequently than over high adverbs. The main effect of *presentation order* indicates that there was also a priming effect: participants tended to follow the order of the constituents on the computer screen in the sentences they produced. Note that the constituents disappeared from the screen the moment the participant

started talking. The strong main effect of *adverb type*, however, reveals that the structural position of the adverb had an independent effect on word order. Further, there was a general preference for the scrambled order in sentences with a low adverb and for the unscrambled order in sentences with a high adverb.

These results can be taken as evidence for Schaeffer's (1997, 2000) hypothesis that the increased syntactic distance between the object and the adverb penalizes scrambling. Schaeffer did not find such an effect in her own experiment, but recall that she used contrastive pairs of adverbs in her stimuli to keep the focus off the object. We used isolated sentences in our experiment instead. Our findings suggest that the adverb serves as a syntactic hurdle in Dutch scrambling.

2.3.2 Experiment set 2: Scope sensitivity

In Section 2.2, we compared the interpretation of the sentences in (7) and (8), repeated here as (16) and (17). Scrambling triggers an interpretation shift when the intervening adverb is negation (16). There is no such interpretation shift if the intervening adverb is a time-point adverb (17).

- (16) a. *Jan heeft niet de hond geaaid.*
Jan has not the dog petted
'It was not the dog that Jan petted.'
- b. *Jan heeft de hond niet geaaid.*
Jan has the dog not petted
'Jan did not pet the dog.'
- (17) a. *Jan heeft gisteren de hond geaaid.*
Jan has yesterday the dog petted
- b. *Jan heeft de hond gisteren geaaid.*
Jan has the dog yesterday petted
'Jan petted the dog yesterday.'

We will refer to adverbs that change the sentence meaning depending on their position relative to the object as *scope-sensitive adverbs*, although we will only test sentences with negation in the experiments. Adverbs that do not trigger an interpretation shift will be called *scope-insensitive adverbs*. The hypotheses for our next set of experiments are the following: i) definite objects are better appreciated in scrambled position in sentences with negation (Experiment 2A), and ii) definite objects appear in scrambled position more frequently in sentences with negation (Experiment 2B).

The rationale is as follows. Recall that the unscrambled word order in (16a) triggers constituent negation. This interpretation is pragmatically incomplete, so to speak, if there is no second entity to contrast with the object *de hond* 'the dog'. This incompleteness is in violation with the Gricean maxim of quantity (Grice 1975), which states that an utterance should be as informative as is required (for the current purposes of the exchange). A sentence like (16a) is therefore expected to receive lower scores in sentence judgment (Experiment 2A), and to be avoided altogether in language production (Experiment 2B). Note, however, that the unscrambled word

order is still a grammatical option. The word order options in sentences with a scope-insensitive adverb, as in (17), do not bring about an interpretation shift. We therefore do not expect a difference in sentence judgment for sentences with scope-insensitive adverbs.

De Swart & van Bergen (2011) used time-point adverbs in the stimulus material of their sentence completion experiments, whereas Unsworth (2005) and Schaeffer (1997, 2000) used the negation word *niet* ‘not’ in their experiments. To make the results from our sentence completion experiment maximally comparable to theirs, we will test our hypotheses using sentences with the scope-sensitive negation word *niet* ‘not’ and scope-insensitive time-point adverbs. We expect to replicate the findings of the studies mentioned above, that is, sentences with a time-point adverb are expected to show a preference for the unscrambled word order, and sentences with negation are expected to be produced in the scrambled word order almost categorically (Experiment 2B).

Experiment 2A: A sentence judgment experiment

Participants

60 native Dutch students (51 female, mean age = 19.75, age range 17–46, SD = 3.83) participated in an online questionnaire distributed via the SONA participant recruitment system of Radboud University in Nijmegen for course credit. Data from three participants were discarded because they systematically gave high judgment scores to ungrammatical sentences. Data from 57 participants were entered into statistical analysis.

Materials/procedure

10 stimulus sentences were adapted from those in Experiment 1A, and 18 stimulus sentences were newly created. The adverb manipulation in this experiment was between negation and time-point adverbs. A sample item is given in (18).

- (18)
- a. *Roos heeft niet **het kozijn** geverfd.*
Roos has not the frame painted
 - b. *Roos heeft **het kozijn** niet geverfd.*
Roos has the frame not painted
‘Roos did not paint the window frame.’
 - c. *Roos heeft gisteren **het kozijn** geverfd.*
Roos has yesterday the frame painted
 - d. *Roos heeft **het kozijn** gisteren geverfd.*
Roos has the frame yesterday painted
‘Roos painted the window frame yesterday.’

The filler items were the same as in Experiment 1A. The items were distributed over four experimental lists in a similar fashion as in Experiment 1A. The experiment was conducted in Qualtrics and was structurally identical to Experiment 1A.

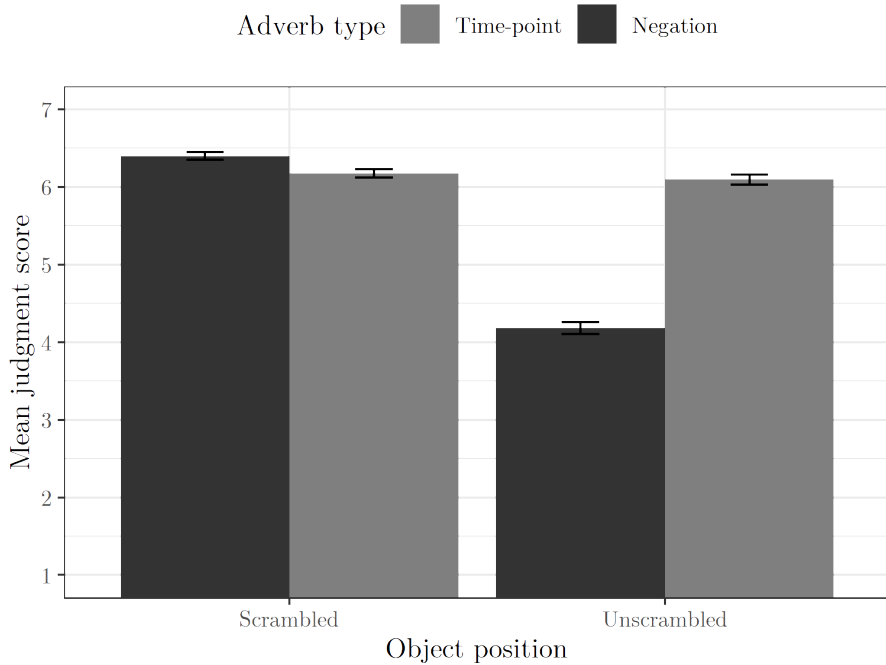


Figure 2.3: Mean judgment score per condition (error bars indicate the within-subjects standard error of the mean)

Results

The results from the sentence judgment experiment are visually presented in Figure 2.3. All but one condition were rated at the high end of the scale (with judgment scores of 5.1 or above). Sentences with negation and the object in unscrambled position were judged as “neutral” ($M = 4.18$, $SD = 1.66$). The mean judgment scores and standard deviations of the other conditions were as follows: time-point/scrambled ($M = 6.18$, $SD = 1.05$); time-point/unscrambled ($M = 6.09$, $SD = 1.22$); negation/scrambled ($M = 6.40$, $SD = 0.95$).

We used the software R (version 3.4.3, R Core Team 2020) and the *lme4* package (Bates et al. 2015) to perform a linear mixed effects analysis of the influence of adverb type and object position on sentence judgment. Judgment scores were z -transformed prior to statistical analysis. The variables *object position* (unscrambled, scrambled) and *adverb type* (time-point, negation) were entered into the model as fixed effects. Both variables were coded using deviation contrasts (contrasts of $-.5$, $.5$). We entered random intercepts for participants and items into the model, as well as by-participant and by-item random slopes for the effect of both independent variables and their interaction (following Barr et al. 2013). When the model failed to converge, its random structure was simplified by step-wise removal of the smallest

variance component (following Matuschek et al. 2017). The final version of the model included by-participant and by-item random intercepts, and a by-participant random slope for the effect of *object position*. The *p*-values were obtained by using the normal approximation to the *t*-statistic.

The models yields significant main effects of *adverb type* ($\beta = -0.377$, $SE = 0.023$, $t = -16.130$, $p < .001$) and *object position* ($\beta = 0.509$, $SE = 0.042$, $t = 12.017$, $p < .001$), as well as an interaction effect between the two ($\beta = 0.917$, $SE = 0.047$, $t = 19.661$, $p < .001$).⁵ Sentences with negation were considered significantly less acceptable than sentences with a time-point adverb, but only when the definite object appeared in unscrambled position.

Discussion

The results from this sentence judgment experiment replicate the findings in de Swart & van Bergen (2011) for sentences with time-point adverbs, as both word orders received similar judgment scores at the high end of the scale. This finding is in line with our hypothesis that scrambling does not trigger an interpretation shift if the adverb is a time-point adverb. Moreover, the present experiment reveals a difference in acceptability for scrambling sentences with the negation word *niet* 'not': sentences in which the definite object precedes negation receive higher judgment scores. This finding can be attributed to the different readings that negation elicits, depending on its position relative to the definite object. The unscrambled word order triggers a contrastive reading (constituent negation), but the experiment did not provide a (contextual) contrast. Thus, unscrambled sentences with negation may have felt incomplete and unnatural to our participants, causing them to give lower judgment scores. Note, however, that the mean judgment score of this condition was not at the very low end of the scale. This is likely due to the fact that, while these sentences sound a bit awkward, they are still grammatical and interpretable. The interpretation shift that negation elicits thus penalizes sentences in the unscrambled word order, while no such difference exists for sentences with a time-point adverb.

In the next section, we test our hypothesis again in a sentence completion experiment, and compare our results to those in Schaeffer (1997, 2000), Unsworth (2005), and de Swart & van Bergen (2011). We expect participants to show a distinct preference for the scrambled order in sentences with negation, and a slight preference for the unscrambled order in sentences with time-point adverbs.

Experiment 2B: A sentence completion experiment

Participants

50 native Dutch students (44 female, mean age = 20.40, age range 18–26, $SD = 2.27$) were recruited from the SONA participant pool of Radboud University in Nijmegen and participated for course credit. Data from two participants were not audible due to technical error and were discarded.

⁵Seven participants noticed the adverb manipulation, and in particular the awkward positioning of the negation word *niet* 'not'. A reanalysis of the data excluding these participants was qualitatively similar.

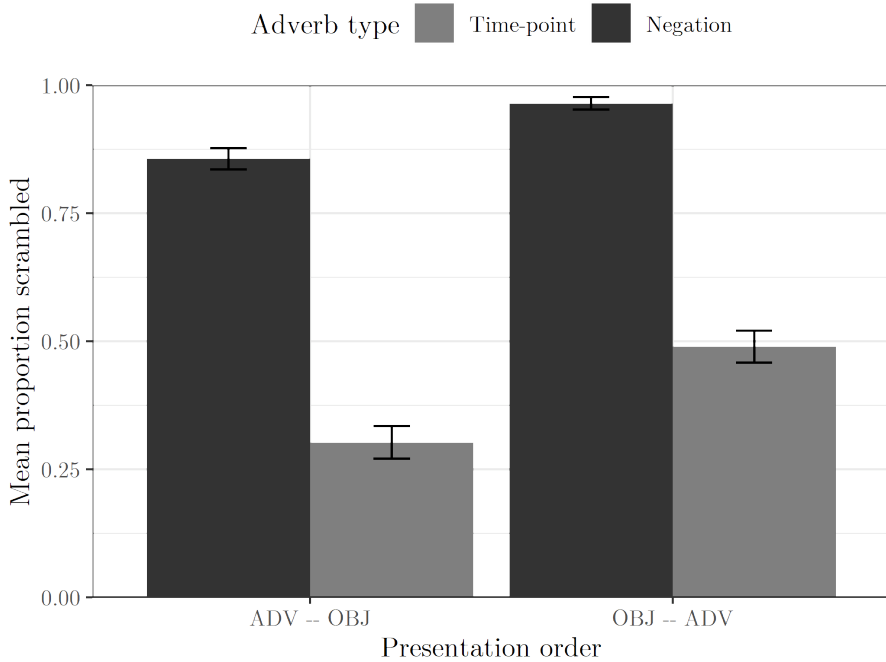


Figure 2.4: Mean proportion of produced scrambled order per condition (error bars indicate the within-subjects standard error of the mean)

Materials/procedure

The stimuli sentences were minimally changed from those in Experiment 1B, in such a way that the adverb manipulation in this experiment was between negation and time-point adverbs. The design and procedure of this experiment were identical to Experiment 1B.

Results

The audio data were transcribed verbatim by the experimenter. We used the same definition for target-like utterances as in Experiment 1B. Utterances that were not target-like were discarded from the analysis (4.3%). The remaining utterances were annotated for *object position* (unscrambled, scrambled). Figure 2.4 visually presents the scrambling proportions of the target items.

We used the software R (version 3.4.3, R Core Team 2020) and the *lme4* package (Bates et al. 2015) to perform a generalized linear mixed effects analysis of the influence of the type of adverb on the produced word order (unscrambled, scrambled), controlling for the presentation order of the constituents. The variables *adverb type* (time-point, negation) and *presentation order* (ADV – OBJ, OBJ – ADV) were entered into the model as fixed effects. Both variables were coded using deviations contrasts

(contrasts of -.5, .5). We initially entered intercepts for participants and items into the model as random effects, as well as by-participant and by-item random slopes for the effects of both independent variables and their interaction (following Barr et al. 2013). When the model failed to converge, we simplified the random structure of the model by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final model included intercepts for participants and items, and a by-participant random slope for the effect of *presentation order*.

The model yields a significant main effect of *presentation order* ($\beta = 1.545$, $SE = 0.376$, $z = 4.104$, $p < .001$). Participants thus tended to follow the order of the words on the computer screen in their speech. We also found a significant main effect of *adverb type* ($\beta = 3.865$, $SE = 0.283$, $z = 13.681$, $p < .001$). Definite objects were clearly scrambled over negation more frequently than over time-point adverbs. The interaction effect between the *adverb type* and *presentation order* was not significant ($\beta = 1.067$, $SE = 0.552$, $z = 1.935$, $p = .053$).

Discussion

Figure 2.4 shows that definite objects were scrambled over the negation word *niet* ‘not’ in the vast majority of experimental trials. The statistics further suggest that the main effect of *adverb type* was modulated by the *presentation order*, as per the near-significance of the interaction effect, but this tendency is most likely a ceiling effect. More important for the purposes of this chapter is the main effect of *adverb type*. Definite objects were scrambled over negation in about nine out of ten trials, and over time-point adverbs in approximately 30% of the trials. This finding is in line with our predictions and replicates the findings in Schaeffer (1997, 2000), Unsworth (2005), and de Swart & van Bergen (2011). We conclude that the type of adverb plays a crucial role in explaining the discrepancy between the results from these studies. Specifically, language users avoid expressing the marked meaning when the relative positioning of a definite object and an adverb influences the meaning of the sentence.

2.4 General Discussion

We have shown in a series of experiments that properties of the adverb affect the behavior of definite objects in Dutch scrambling. These results are promising, as the linguistic literature is mostly theoretically based and has focused predominantly on properties of the object, while there has not been much attention for features of the adverb.

Experiment 1A reveals that both word orders are acceptable as grammatical options in Dutch for sentences with a definite object and a predicate or clause adverb. This observation is compatible with the view that definite object scrambling in Dutch is optional (van der Does & de Hoop 1998, de Hoop 2000, 2003). However, sentences with a low adverb received slightly higher judgment scores when the object was in scrambled position. The preference for the scrambled word order in sentences with a low adverb is much clearer from the results of Experiment 1B. Dutch natives

used the scrambled word order considerably more often in a sentence completion experiment when the intervening adverb was syntactically low than when it was syntactically high. The observed discrepancy between sentence judgment and language production can be understood as a *grammaticality-frequency gap* (Kempen & Harbusch 2008, Bader & Häussler 2010, cf. de Swart & van Bergen 2011): two word order options may be equally acceptable, even though one of them is used more frequently in language production.

Our results can be taken as evidence for the hypothesis that the structural position of the adverb influences scrambling of definite objects in Dutch, in that the adverb constitutes a syntactic hurdle that constrains object movement (cf. Schaeffer 1997, 2000). Alternatively, the results can be taken as evidence for the hypothesis that manner adverbs are generated below the direct object—we refer the reader to Schäfer (2013) for more elaborate discussion of such an analysis. Either conclusion may be premature, however, since some of the adverbs in our first experiment set were arguably also scope-sensitive. Evaluative adverbs like *helaas* ‘unfortunately’, for instance, may be taken to induce an interpretation shift in the same way negation does. This effect is strengthened by intonation, which is known to be an important factor in scrambling (e.g. Neeleman & Reinhart 1998, Bouma & de Hoop 2008). Thus, scope sensitivity may have been a confounding variable in this first experiment set. Future research will have to determine to what extent the different types of adverb are scope-sensitive and whether the same effects can be observed when the prosodic contours of the stimulus items are controlled for (e.g. in an experiment with audio stimuli).

In the second set of experiments, we investigated the influence of the adverb’s scope sensitivity on scrambling of definite objects in Dutch. Experiment 2A demonstrates that sentences with a time-point adverb receive equally high judgment scores for the two word orders. We did find a difference in judgment scores for sentences with negation: unscrambled sentences received a “neutral” judgment score, whereas scrambled sentences were rated at the high end of the scale. The scope sensitivity of the adverb thus affects sentence appreciation. This effect also emerged in Experiment 2B. In this sentence completion experiment, definite objects were scrambled over negation almost categorically. Sentences with a (scope-insensitive) time-point adverb showed more variation. Our findings can explain the discrepancies between the results from Schaeffer (1997, 2000), Unsworth (2005), and de Swart & van Bergen (2011).

2.5 Conclusion

We provided initial evidence that properties of the adverb play a key role in Dutch word ordering preferences, both in sentence judgment and in sentence production. The role of adverbs in Dutch scrambling as of yet is relatively understudied, especially experimentally. Nevertheless, it is evident that the adverb’s syntactic and semantic characteristics affect object placement in the Dutch middle-field.

Chapter 3

Scrambling, focus sensitivity, and discourse restructuring

Abstract

Most researchers argue that scrambling of definite objects is not optional, but subject to a strict discourse template. This chapter reports on two experiments to gauge the existence of such a discourse template. The information structure of scrambling clauses is first probed in a fill-in-the-blanks experiment and subsequently manipulated in a speeded judgment experiment. The results of these experiments indicate that scrambling is not as restricted as is commonly claimed. Although mismatches between surface order and pragmatic interpretation lead to a penalty in the acceptability rate and a rise in reaction times, they nonetheless occur in production and yield fully acceptable structures. Crucially, the penalties and delays emerge only in scrambling clauses with an adverb that is sensitive to focus placement. I argue that scrambling does not map onto discourse structure in the strict way proposed in most literature. Instead, a more complex syntax of deriving discourse relations is proposed which submits that the Dutch scrambling pattern results from two familiar processes which apply at the syntax-pragmatics interface: reconstruction and covert raising.

3.1 Introduction

Direct objects in the Dutch middle-field can appear to the left or to the right of an adverb. This phenomenon, known as *scrambling* or *object shift*, has received a lot of attention in the linguistic literature (Verhagen 1986, Vanden Wyngaerd 1989, Neeleman 1994b, de Hoop 1996, 2000, 2003, Schaeffer 1997, 2000, Neeleman & Reinhart 1998, Unsworth 2005, Broekhuis 2008, Neeleman & van de Koot 2008a, van Bergen & de Swart 2009, 2010, de Swart & van Bergen 2011, van de Koot et al. 2015, Broekhuis & Corver 2016: Chapter 13, Schoenmakers & de Swart 2019, Schoenmakers et al. 2021). An example of a scrambling clause with a definite object is given in (1). The object *de agent* ‘the officer’ is considered to be in unscrambled position in (1a) and in scrambled position in (1b).

- (1) a. *Patrick heeft onlangs de agent geslagen.* (unscrambled)
 Patrick has recently the officer punched
- b. *Patrick heeft de agent onlangs geslagen.* (scrambled)
 Patrick has the officer recently punched
 ‘Patrick recently punched the officer.’

At first sight, the word orders appear to be freely interchangeable, as the two sentences convey the same meaning. A standard assumption in the literature, however, is that this variation is not entirely free. Scrambling is taken to be closely related to discourse conditions. Most researchers claim that objects in scrambled position are interpreted as topical or discourse-anaphoric, and objects in unscrambled position as focal or discourse-new (Verhagen 1986, Neeleman & Reinhart 1998, Schaeffer 1997, 2000, Broekhuis 2008, Neeleman & van de Koot 2008a, Broekhuis & Corver 2016: Chapter 13). The rationale behind these accounts is that scrambled objects do not surface in the topological field of the clause where new information is introduced (Verhagen 1986, Neeleman & Reinhart 1998), but instead occupy a marked position that is linked to discourse-anaphoricity (Neeleman & van de Koot 2008a). Although there is some discussion about the intuitions reported in the literature (see de Hoop 2016 and Broekhuis 2016), the assumption that there is a strict “discourse template” is wide-spread. Discourse-old objects in unscrambled position are referred to as “highly disfavored” (Neeleman & Reinhart 1998: 325) and “decidedly awkward” (Neeleman & van de Koot 2008a: 60). Broekhuis & Corver (2016: 1613) claim that scrambling of definite objects “is possible only if the referent of the direct object is already part of the domain of discourse.” And while Broekhuis (2008: 218) suggests that it is “apparently optional” for definite objects to scramble, he concludes that “[scrambling] is blocked [...] when [the object] is part of the focus of the clause.” Thus, the general consensus in the literature is that the scrambled position is reserved for discourse-old (or topical) objects and the unscrambled position for discourse-new (or focused) objects.

Given these strong intuitions, it is rather surprising that van Bergen & de Swart (2009, 2010) find in a corpus study that only 14% of the anaphoric definite objects are located in scrambled position. De Swart & van Bergen (2011) do not find evi-

dence for an effect of anaphoricity in a follow-up sentence completion experiment either, and, while Schoenmakers et al. (2021) do find such an effect in their sentence completion experiment, the proportion of anaphoric definite objects in scrambled position is only from 42% to 57% (depending on the condition). These corpus and experimental data imply that the idea of a one-to-one mapping between an object's surface position and its interpretation in discourse is too strong. The current chapter investigates whether a discourse template exists for discourse-new definite objects (specifically, for contrastive foci) in Dutch scrambling structures, by collecting new experimental data. The chapter is structured as follows.

Section 3.2 discusses previous analyses of definite object scrambling in Dutch, which lead to the prediction of a strict discourse template. This prediction is tested experimentally in Section 3.3, which reports on a fill-in-the-blanks task and a speeded judgment task. The experimental results indicate that mismatches between surface order and pragmatic interpretation do exist, but come at an increased processing cost. The type of adverb also plays an important role in Dutch scrambling structures (Schoenmakers & de Swart 2019). Sentences with an adverb that is sensitive to focus placement show a pattern that closely resembles those attested in the psycholinguistic literature on scope ambiguities. Specifically, both scrambled and unscrambled definites allow for a focus as well as for a non-focus interpretation, but there is a penalty in judgment scores and a delay in reaction times for form-meaning pairs that diverge from the discourse template. Strikingly, these effects do not emerge in the items with a (focus insensitive) time-point adverb.

Section 3.4 seeks to account for the experimental findings in a formal syntactic framework. The view that I pursue here is that scrambling involves movement that is prompted by a scrambling feature (following Grewendorf & Sabel 1999, Sauerland 1999, Kawamura 2004). The scrambling feature is optionally assigned to objects that enter the derivation. Discourse relations are derived post-syntactically and may be subjected to two familiar scope-shifting operations: reconstruction and raising (Fox 1999, 2000, Reinhart 2006). An important outcome of the analysis is that definite objects in scrambled and unscrambled position both have two possible pragmatic interpretations.

Section 3.5 contains the general conclusions.

3.2 Theoretical background

The link between Dutch scrambling and effects at the interfaces is well documented in the literature. The common assumption is that the structural position of definite objects has direct repercussions for their discourse status. Neeleman & Reinhart's (1998) take on scrambling is that the variation is entirely optional in syntax and evaluated at the syntax-phonetics interface instead. Their analysis is built on observations that there is a strong relation between sentence stress and discourse structure (e.g. Chomsky 1971, Jackendoff 1972, Cinque 1993). The main stress of a clause with default accenting falls on the most deeply embedded element (Cinque's 1993 *Nuclear Stress Rule*), and the focus of a clause must contain the element bearing

the main stress. Foci are those elements that convey discourse-new information (Rochemont 1986, Vallduví 1992, Lambrecht 1994, Erteschik-Shir 1997) and contrast this information to a set of alternatives (Rooth 1992).¹ These generalizations entail that the main stress in Dutch falls on a different constituent in scrambled and unscrambled structures (see also Verhagen 1986: Chapter 4), as scrambled objects occur in a structurally higher position.

Neeleman & Reinhart (1998) maintain that scrambled and unscrambled objects must therefore have a different discourse status, and that certain objects are required to appear in scrambled position in order to escape the focus domain of the clause. They propose that the prosodic contour of a clause is used at the PF-interface to link syntactic structure to an appropriate discourse interpretation. A sentence is infelicitous for a given context if the stress pattern does not match this discourse context. Since scrambled objects are not the most deeply embedded members of VP, they do not receive main stress and consequently cannot be the focus of the sentence. Objects in unscrambled position, on the other hand, do receive main stress and are therefore located in a position that can host foci. Consider the dialogue in (2), taken from Neeleman & Reinhart (1998: 326). The question selects for the object in the answer to be in focus (or, contrastive focus). A structure like (2b) is therefore not an expected response, because the object does not surface in the syntactic position in which focus is assigned by the prosodic contour.

- (2) *Heeft je buurman gisteren de deur geverfd?*
has your neighbor yesterday the door painted
'Did your neighbor paint the door yesterday?'
- a. *Nee, hij heeft gisteren het raam geverfd.*
no he has yesterday the window painted
- b. *#Nee, hij heeft het raam gisteren geverfd.*
no he has the window yesterday painted
'No, he painted the window yesterday.'

Neeleman & Reinhart (1998) conclude that, since discourse-anaphoric object DPs are destressed (see Reinhart 2006), they must appear in scrambled position for the derivation not to yield an infelicitous configuration.

In later work, Neeleman considers a purely phonological account of scrambling "insufficiently general" (Neeleman & van de Koot 2008a: 167). While such an account may lead to the right predictions for direct objects in the scrambling structures discussed so far, Neeleman & van de Koot (2008a) argue that it does not for other displaced arguments. But the impression that there is a close connection between surface order and discourse structure is uncontroversial. They propose that certain syntactic configurations, including definite object scrambling structures in Dutch, may be licensed or blocked by operations at the interfaces (see also Neeleman & Ver-

¹Definitions attributed to notions of information structure are notoriously diverse, and sometimes a different term is used to refer to the same concept. An overview of the main distinctions can be found in de Swart & de Hoop (2000). My definition of the term *focus* is relatively restrictive, which in this meaning is sometimes referred to as *contrastive* or *identificational* focus.

meulen 2012). Neeleman & van de Koot (2008a) argue in favor of a base-generation account of scrambling. The verb is free to merge with the direct object or with the adverb first, they claim, because adverbs do not affect thematic structure. The scrambled order is syntactically marked because it requires an extra step of theta-role percolation. Neeleman & van de Koot formulate a mapping rule which projects the output of syntax onto an appropriate discourse representation; specifically, objects in the syntactically marked scrambled position are interpreted as anaphoric. The unscrambled position is linked to non-anaphoricity (or “discourse-newness”) under an Elsewhere condition that blocks the application of a general rule (i.e. all definites can be interpreted as anaphoric) where scrambling is an option. Neeleman & van de Koot suggest that their discourse template reflects the often attested given-before-new preference (see e.g. Gundel 1988), asserting that an early presentation of given information facilitates connecting this information to the foregoing discourse context. This configuration moreover makes it easier to parse upcoming new information.

The same discourse template results from Broekhuis’s (2008) analysis. Broekhuis presents an optimality theoretic account of Dutch scrambling, making use of the set of constraints defined in (3) and the constraint order in (4). According to Broekhuis, direct objects move to scrambled position to have their case features checked. This requirement is realized in (4) by having CASE outrank the economy constraint STAY. The constraint ALIGNFOCUS states that, under neutral intonation, the most deeply embedded constituent in a clause is the sentence focus. ALIGNFOCUS outranks the other constraints and, therefore, the constraint order in (4) predicts that scrambling only applies when the object refers to discourse-old information. By ALIGNFOCUS, objects that refer to discourse-new information remain in unscrambled position.

- (3) a. CASE: An NP has case (Case Filter).
 b. STAY: Avoid movement.
 c. ALIGNFOCUS: The prosodically unmarked focus is the rightmost constituent in its clause.
- (4) ALIGNFOCUS » CASE » STAY

The literature thus suggests that Dutch scrambling structures adhere to a strict mapping from syntax to discourse structure. Definite objects should refer to discourse-new (focused) information when they appear in unscrambled position, and to discourse-old (topical) information when they appear in scrambled position. The question addressed in this chapter is whether definite objects in scrambling structures are also interpretable in a position different from where they are phonetically realized. If there is indeed a strict discourse template, mismatches between surface order and pragmatic interpretation are not expected to occur. But, as noted before, corpus data in van Bergen & de Swart (2009, 2010), and experimental data in de Swart & van Bergen (2011) and Schoenmakers et al. (2021), suggest that this prediction is too strong.

Another issue concerns scope differences between the adverbs that allow for definite object scrambling. Negation, for example, is an element that has long been known to be “associated with focus” (Jackendoff 1972), and is accordingly referred to

as a *focus sensitive expression* (Beaver & Clark 2008). This means that the pragmatic interpretation of a clause containing negation depends on the location of the focus. Other types of focus sensitive expressions include quantificational adverbs (*always, usually*), exclusives (*only, merely*), and additives (*even, too, also*). By default, these expressions occur to the left of the material they modify (see Foolen et al. 2009 for some initial distributional data). The surface position of a constituent relative to a focus sensitive expression thus affects its discourse status. Scrambling preferences, then, depend in part on the focus sensitivity of the adverb.

This hypothesis is tested experimentally in Schoenmakers & de Swart (2019), who study word order preferences of native speakers of Dutch in scrambling clauses with negation (5) and time-point adverbs (6) (which are not sensitive to focus placement, cf. Ruys 2001). By default, sentence (5) triggers constituent negation if the object *het kozijn* ‘the window frame’ surfaces to the right of negation (5i), and sentential negation if it surfaces to the left of negation (5ii). No such meaning difference emerges in sentences with a time-point adverb, see (6).

- (5) *Roos heeft (het kozijn) niet (het kozijn) geverfd.*
Roos has the frame not the frame painted
‘Roos did not paint the window frame.’
i. It is not the window frame that Roos painted.
ii. It is not true that Roos painted the window frame.
- (6) *Roos heeft (het kozijn) gisteren (het kozijn) geverfd.*
Roos has the frame yesterday the frame painted
‘Roos painted the window frame yesterday.’

Schoenmakers & de Swart (2019) find in a judgment experiment that the unscrambled order in sentences with negation receives significantly lower acceptability ratings than the scrambled order. Moreover, participants in a sentence completion experiment hardly ever use the unscrambled order for sentences with negation. By contrast, when the sentence contains a time-point adverb, the two orders receive equally acceptable ratings at the high end of the scale, and the choice of word order in production is more balanced (40% scrambled). Schoenmakers & de Swart conclude that Dutch scrambling preferences are governed by whether or not the adverb is sensitive to focus placement, and propose that speakers utilize scrambling of definite objects as a tool to avoid expressing the marked contrastive reading of utterances with negation.

However, Schoenmakers & de Swart’s (2019) conclusion on the contrastive reading of an unscrambled definite object in the scope of negation as a focus sensitive expression is based on their own intuitions only, since their stimulus sentences were not disambiguated in any way. Moreover, they only tested stimulus items with the focus sensitive negation word *niet* ‘not’. The question remains whether their findings extend to cases with different focus sensitive elements, and, crucially, how the objects in structures like (5) and (6) are interpreted. This brings us back to the question whether mismatches between surface order and discourse representation are extant in Dutch scrambling structures.

3.3 Experiments

This section presents two experiments that investigate whether Dutch scrambling structures can accommodate “inverse readings” when the discourse context licenses the mismatch. In particular, the question is whether definite objects in scrambled position can be interpreted as focused, and definite objects in unscrambled position as non-focused. First, the question is addressed to what extent a strict discourse template is followed in a fill-in-the-blanks experiment in Section 3.3.1. The results suggest that while pragmatic interpretation is informed by surface order, not all unscrambled objects are focused and, conversely, some scrambled objects are. The hypothesis that Dutch scrambling allows for inverse readings is further tested in a speeded judgment experiment in Section 3.3.2. A common finding in the psycholinguistic literature on scope ambiguities is that the computation of an inverse reading in scope ambiguous sentences incurs additional processing difficulty (see Brasoveanu & Dotlačil 2019). If inverse discourse readings are indeed available in Dutch scrambling structures, they are expected to come at a higher processing cost here as well, measured in the experiment by an expected decrease in judgment scores and an increase in reaction times. An additional prediction is that, since time-point adverbs do not affect discourse structure, this effect emerges only in sentences with adverbs that are sensitive to focus placement.

3.3.1 A fill-in-the-blanks experiment

This experiment investigates the influence of word order on discourse structure, seeking evidence for the existence of mismatches between syntax and pragmatics. Participants were asked to fill in the blanks in sentences with a focus sensitive adverb (7) or a time-point adverb (8). The first clause of these sentences contained a scrambling structure. The blank was placed in a second clause, following the contrastive connector *maar* ‘but’ and negation. Participants were free to fill in the blank with any element they saw fit.

- (7) a. *Sophie heeft vaak de kok beledigd, maar niet* [BLANK].
Sophie has often the cook insulted but not
- b. *Sophie heeft de kok vaak beledigd, maar niet* [BLANK].
Sophie has the cook often insulted but not
- (8) a. *Sophie heeft toen de kok beledigd, maar niet* [BLANK].
Sophie has then the cook insulted but not
- b. *Sophie heeft de kok toen beledigd, maar niet* [BLANK].
Sophie has the cook then insulted but not

Conjuncts in contrastive stripping structures such as (7) and (8) must be structurally similar, but semantically dissimilar, to each other (see Umbach 2005). The rationale of this experimental design is that the syntactic category of the participant’s response reflects their selection of the (contrastive) focus in the first conjunct (cf. Winkler 2005). That is, if the blank is filled with a DP, the participant selected the object DP

as the focus of the first conjunct. But if the blank is filled with a verb, the participant selected the verb (phrase) as the focus of the first conjunct. The hypothesis tested in this experiment is that scrambling directly affects discourse structure in case the adverb is sensitive to focus placement, specifically, that the default focus placement in such sentences is on (part of) the content of the adverb's c-command domain. Thus, DP responses are expected to be penalized after scrambled clauses in sentences with a focus sensitive adverb, such as (7b), because the object *de kok* 'the cook' in the first conjunct is not located within the adverb's c-command domain. This penalty does not apply to sentences with a time-point adverb, such as (8b), because these adverbs are not sensitive to focus placement. Verb responses are not penalized after either word order, as the lexical verb is located within the adverb's c-command domain regardless of the scrambling manipulation.

DP responses may moreover be disfavored because of a structural priming effect. The first and second conjunct both involve a scopal element (an adverb or negation). Participants may want to mimic the word order used in the first conjunct in their response, regardless of putative interpretative effects. However, the negation in the second conjunct is already given in the stimulus sentences, rendering the scrambled word order impossible in the second conjunct. DP responses are therefore expected to be disfavored when the scrambled word order is used in the first conjunct, as this would violate structural priming preferences. This priming effect is independent of the adverb type. The penalties for each condition are presented in Table 3.1, and lead to the following predictions:

- i. Verb responses are expected in every condition;
- ii. More DP responses are expected after unscrambled structures than after scrambled structures (in line with a strict discourse template and structural priming preferences);
- iii. This effect is stronger in sentences with a focus sensitive expression than in sentences with a time-point adverb (in line with Schoenmakers & de Swart 2019).

Example	Condition	DP	Verb
(7a)	Focus sensitive, unscrambled		
(7b)	Focus sensitive, scrambled	##	
(8a)	Time-point, unscrambled		
(8b)	Time-point, scrambled	#	

Table 3.1: Expected response penalties per condition

Participants

39 native Dutch students (35 female, mean age = 19.59, age range 18–26, SD = 1.68) were recruited from the SONA participant pool of Radboud University to take part in an online experiment, receiving course credit for their participation.

Materials

Two factors were crossed in a 2x2 within-participants, within-items design: *object position* (unscrambled, scrambled) and *adverb type* (focus sensitive, time-point). The experiment contained twelve target items like (7) and (8), consisting of a first clause containing the subject (all proper nouns), an auxiliary, an adverb, and a transitive lexical verb with a definite object. Care was taken that both the verb and the object had readily available alternatives (as judged by two independent researchers), and each lexical adverb was used in only one item. The item set was rather small as a result of these conditions. All stimulus sentences can be found in the appendix. The second conjunct was always a *but*-clause with negation followed by an ellipsis (...). This design was adopted deliberately to limit response possibilities. The items were distributed over four experimental lists according to a Latin Square. 48 filler sentences were added to the lists, designed in such a way that they could only elicit responses with either a verb that was not a participle, or a noun that was not a singular definite. At least the first three items of each list were filler items and the lists had no consecutive target items. The experiment was conducted in Qualtrics.

Procedure

The experiment was an online questionnaire in which participants were asked to complete sentences using one or a few words. After the last item was presented, participants were asked whether they had ideas about the experiment's purpose, and, if so, what they were. None of the answers were close to the true motivation of the experiment. There was no clear structure in the participants' answers, nor is there reason to believe that participants were able to identify the target sentences.

Analysis and results

Text responses of each participant were annotated as DP (contrasting with the direct object), V (contrasting with the lexical verb), or "other". This last category included responses with contrasting adverbs (4.91% of all responses; e.g. *yesterday – today*) and responses that contrasted with the full VP (0.43% of all responses; e.g. *fed the dog – water the plants*). It is worth noting here that participants performed very well in the task. Open production tasks often lead to a large variety of responses, yet only few responses in this experiment were not target-like. These responses were excluded from statistical analysis. Figure 3.1 visually represents the mean proportion of DP responses per condition. The vast majority of responses were verbs, but this preference is clearly stronger following scrambled structures. The adverb type manipulation did not elicit a noticeable difference in responses.

A generalized mixed-effects logistic regression was performed on the data using the software R (version 4.0.3, R Core Team 2020) and the *lme4* package (Bates et al. 2015) with response type as the binary dependent variable in the model. The variables *object position* (unscrambled, scrambled) and *adverb type* (focus sensitive, time-point) were entered into the model as fixed effects. Both two-level factors were coded using deviation contrasts (contrasts of -.5, .5). The initial model had

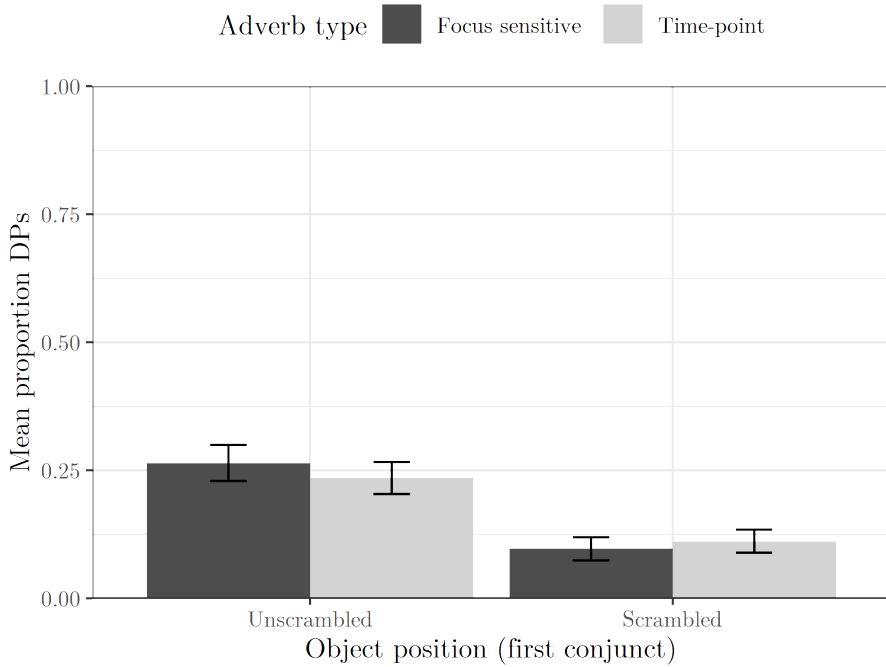


Figure 3.1: Mean proportion of DP responses per condition (error bars indicate the within-subjects standard error of the mean)

the maximum random structure with intercepts for participants and items, and by-participant and by-item random slopes for the effect of both independent variables and the interaction between them (following Barr et al. 2013). When the model failed to converge, the random structure was simplified by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final model included intercepts for participants and items, and a by-participant random slope for the effect of *object position*.

The data indicate that more DP responses were given when the stimulus sentence contained an unscrambled structure in the first conjunct than when it contained a scrambled structure ($\beta = -4.334$, $SE = 1.748$, $z = -2.480$, $p = .013$). Whether the adverb was focus sensitive or not did not affect the DP/V ratio in a significant manner ($\beta = 0.112$, $SE = 0.451$, $z = 0.248$, $p = .804$). The interaction between the two variables did not reach significance ($\beta = 0.739$, $SE = 0.909$, $z = 0.812$, $p = .417$).

Discussion

The grand majority of responses in this task comprises verbs. This finding is not unexpected, since the lexical verb in the first conjunct invariably surfaces on the

right side of the adverb. Verb responses do not violate discourse parallels or priming preferences in any of the conditions. Moreover, the number of accessible candidate antonyms was possibly considerably smaller for the verbs than for the objects, making it easier to choose one of them quickly. There is, for example, only a limited number of antonyms for the verb *insult* (e.g. *compliment*, *praise*, *admire*), whereas the list of alternatives for objects like *the cook* is much more open-ended. This may render certain verb responses easier to access than DP responses, a possibility supported by the fact that participants tended to respond with the same verbs. The accessibility of DP alternatives was possibly restricted further by the discourse prominence of definite objects and the lack of a preceding discourse context.

Nevertheless, DP responses were given after both scrambled and unscrambled structures. That is, scrambled objects in the first conjunct were sometimes selected as the (contrastive) focus, and, since the majority of responses were verbs, most unscrambled objects in the first conjunct were not. This pattern diverges from the discourse template assumed in most literature, and the results of this task are therefore an indication that this discourse template is too strict. Still, unscrambled structures were followed by a DP continuation more often than scrambled structures, despite the huge verb bias. This finding might simply reflect a structural priming preference, but it could also be taken to suggest that even though discourse relations are not *determined* by the order of constituents at the surface, they might still be *informed* by it (see also Schoenmakers et al. 2021).

Finally, it is rather striking that the data do not reveal a difference between sentences with a focus sensitive or a time-point adverb. This finding does not corroborate previous findings in the experimental literature in which the negation word *niet* ‘not’ was tested (see Schoenmakers & de Swart 2019). However, it is possible that an off-line task is simply not sensitive enough to capture early effects of the experimental manipulation. Participants in this experiment could make use of an extended period of time to resolve anomalies in form–meaning mapping and, moreover, were able to change their initial answers at any given time. Speeded decision experiments, by contrast, delimit and/or measure the time window of a participant’s response, and can potentially capture cognitive processes that occur prior to more conscious decision making. Participants in speeded judgment experiments read stimulus sentences in an auto-paced, word-by-word fashion and, at the end of each sentence, judge it either as acceptable or unacceptable as quickly as possible. Their reaction times are measured from the moment the sentence ends until the moment a judgment is given. An advantage of using a speeded judgment experiment to investigate scrambling is that both reaction times and acceptability judgments are recorded. Therefore, such an experiment provides insight in how suitable the two word orders are for the available discourse interpretations as well as an index of the cognitive effort associated with each combination.

The next section reports on a speeded judgment experiment in which the relation between scrambling, discourse structure, and focus sensitivity in language comprehension is investigated, using stimulus material adapted from the fill-in-the-blanks experiment. But first, a word is in order on how exactly this task taps into sentence processing. Given that language comprehension proceeds incrementally

(Phillips 2003), and on the assumption that the parser does not generate multiple representations in parallel when processing ambiguous sentences (e.g. Warner & Glas 1987, Meng & Bader 2000), participants must make certain syntactic commitments during the experimental trial based on the information they already have. In case the parsed structure turns out to be incorrect at the point of disambiguation, it must be revised to save the derivation or to accommodate the intended interpretation. Reanalysis is a cognitively costly operation, as the parser has to detect the error and find a way to resolve it (Ferreira & Henderson 1991, Fodor & Inoue 1994, 1998, Sturt et al. 2001). Researchers generally agree that processing difficulty is reflected in increased reaction times, but it has also been shown to affect judgment scores (Fanselow & Frisch 2006, Hofmeister et al. 2014).

The experiment presented in the next section investigates what happens when a structure computed for a scrambling clause is incompatible with the later disambiguated discourse representation. Note that the disambiguation in the experiment presented here is at the very last word of the clause, which is directly followed by the moment of judgment. If sentences with a mismatch between syntax and pragmatics are indeed acceptable, as suggested in Schoenmakers & de Swart (2019) and by the fill-in-the-blanks data, effects of reanalysis are expected to emerge in the reaction time data as well as in the judgment scores. Hence, data from a speeded judgment task are potentially informative about the cognitive processes that take place in the comprehension of scrambling clauses.

3.3.2 A speeded judgment experiment

This section investigates whether Dutch scrambling adheres to a strict discourse template in a speeded judgment experiment. The type of adverb is again predicted to influence scrambling preferences, in that focus sensitive adverbs affect discourse structure whereas time-point adverbs do not. Participants read sentences like (9) through (12) in an auto-paced, word-by-word fashion. In addition to the manipulations of *object position* (unscrambled, scrambled) and *adverb type* (focus sensitive, time-point) in the first conjunct, there was a manipulation of *continuation type* (DP, VP). Specifically, the second conjunct determines whether the focus of the first conjunct is the direct object, as in (9) and (11), or the verb, as in (10) and (12). Participants were asked whether or not the sentence had likely been produced by a native speaker of Dutch at the end of each sentence. This definition of acceptability was chosen because it helps simulate spoken language and it guides participants towards judgments of native-speaker ability, rather than frequency or plausibility (Schütze & Sprouse 2014), and, as Schütze (1996: 184) puts it, “certainly [...] one cannot hope for the terms *grammatical* or *acceptable* to have their intended meanings for naive subjects.” The judgment scores were logged and reaction times were measured during the participant’s decision-making.

- (9) a. *Sophie heeft vaak de kok beledigd maar niet* [_{DP} *de ober*].
Sophie has often the cook insulted but not the waiter
b. *Sophie heeft de kok vaak beledigd maar niet* [_{DP} *de ober*].
Sophie has the cook often insulted but not the waiter
'Sophie often insulted the cook, but not the waiter.'
- (10) a. *Sophie heeft vaak de kok beledigd maar niet* [_{VP} *geslagen*].
Sophie has often the cook insulted but not punched
b. *Sophie heeft de kok vaak beledigd maar niet* [_{VP} *geslagen*].
Sophie has the cook often insulted but not punched
'Sophie often insulted the cook, but did not punch (him).'
- (11) a. *Sophie heeft toen de kok beledigd maar niet* [_{DP} *de ober*].
Sophie has then the cook insulted but not the waiter
b. *Sophie heeft de kok toen beledigd maar niet* [_{DP} *de ober*].
Sophie has the cook then insulted but not the waiter
'Sophie insulted the cook then, but not the waiter.'
- (12) a. *Sophie heeft toen de kok beledigd maar niet* [_{VP} *geslagen*].
Sophie has then the cook insulted but not punched
b. *Sophie heeft de kok toen beledigd maar niet* [_{VP} *geslagen*].
Sophie has the cook then insulted but not punched
'Sophie insulted the cook then, but did not punch (him).'

Participants

80 native speakers of Dutch (55 female, mean age = 25.59, age range 17–65, SD = 9.95) were recruited from the SONA participant pool of Radboud University to take part in the experiment, receiving a five euro gift card or course credit for their participation. Data from six participants were discarded because they systematically rated ungrammatical filler items as grammatical or vice versa (with a 70% threshold), or responded incorrectly to more than one third of the comprehension questions.

Materials

Three factors were crossed in a 2x2x2 design: *object position* (unscrambled, scrambled), *continuation type* (DP, VP), and *adverb type* (focus sensitive, time-point). The stimulus items were the same as in the fill-in-the-blanks task, supplemented with continuations based on the responses with the highest cloze values. These were verbs or definite DPs contrasting with the corresponding constituents in the first conjunct. The first conjunct of the target items again appeared in either scrambled or unscrambled order. The variable *adverb type* was added as a between-subjects factor due to the small size of the item set.² The test items were distributed over

²The participant groups did not differ in their reaction times on the shared filler sentences ($t = -0.826$, $p = .411$) or in their accuracy on the comprehension questions ($z = 0.058$, $p = .954$). There was a significant difference between the groups in terms of their endorsement rates of the shared filler sentences ($z = 2.279$, $p = .0227$). Participants in the group with focus sensitive adverbs were slightly more permissive of

four experimental lists (per group) according to a Latin Square. 48 grammatical and ungrammatical filler sentences based on the filler items in the fill-in-the-blanks task were added to the lists. Twelve grammatical filler items were followed by a comprehension question that could be answered with *yes* or *no*. At least the first three items of each list were filler items and the lists had no consecutive target items. The experiment was conducted in PsychoPy (version 1.90.3, Peirce et al. 2019).

Procedure

The experiment was a speeded judgment task in which participants were seated in front of a computer screen to read sentences in an auto-paced, word-by-word fashion. Each word appeared on the screen for 300ms, followed by a 300ms blank screen. A presentation time of 300ms is common in this type of experiment and is claimed to be “long enough to complete all normal comprehension processes like lexical access, syntactic integration, and semantic interpretation, but too short to engage in any kind of deliberate reasoning” (Bader & Häussler 2010: 275–276). After the last word of the sentence was presented, a red question mark appeared on the screen. Participants were asked to judge the sentences on the screen for acceptability (yes/no) using the outer buttons on a button box while the red question mark was presented on the screen. Participants were urged to respond as quickly as possible and their reaction times were measured during judgment. In case a participant failed to respond within 2000ms, the experiment skipped to the next sentence logging a late response, because such long reaction times are unlikely to reflect online processing events. These late responses were discarded prior to statistical analysis, resulting in a loss of 5.41% of all trials. Late responses were distributed evenly across the target conditions.

Results and analysis

Judgment data

The mean acceptability rates and standard deviations per condition are given in Table 3.2. In every condition, the grand majority of items were accepted as constructions of Dutch. These data were compared in a generalized linear mixed-effects model with the judgment scores (yes, no) as the binary dependent variable. The variables *object position* (unscrambled, scrambled), *adverb type* (focus sensitive, time-point), and *continuation type* (DP, VP) were added to the model as fixed effects. All variables were coded using deviation contrasts (contrasts of -.5, .5). The model included by-item and by-participant random intercepts; inclusion of additional random slopes led to singularity and convergence problems.

fillers items than participants in the group with time-point adverbs (with respective acceptability rates of 96.5% vs. 92.5% for grammatical fillers and 8.8% vs. 7.5% for ungrammatical fillers). Considering the general pattern, however, it seems safe to presume that the two groups used comparable criteria in their judgments.

	Scrambled		Unscrambled	
	DP	VP	DP	VP
Focus sensitive adverbs	87.0% (33.7)	93.5% (24.8)	95.5% (20.9)	88.3% (32.2)
Time-point adverbs	88.3% (32.2)	97.1% (16.7)	87.6% (33.1)	94.1% (23.8)

Table 3.2: Mean acceptability rates and standard deviations (between brackets) per condition

The data do not provide evidence for a difference in judgments between unscrambled and scrambled structures ($\beta = 0.090$, $SE = 0.304$, $z = 0.297$, $p = .767$), or between items with a focus sensitive expression or a time-point adverb ($\beta = 0.253$, $SE = 0.450$, $z = 0.563$, $p = .574$). Moreover, unscrambled and scrambled structures received similar judgments across the two adverb types ($\beta = 0.669$, $SE = 0.609$, $z = 1.099$, $p = .272$). Further, there was an overall preference for verbal continuations ($\beta = 0.625$, $SE = 0.307$, $z = 2.035$, $p = .042$), which was stronger in sentences with a time-point adverb than in sentences with a focus sensitive expression ($\beta = 1.571$, $SE = 0.615$, $z = 2.553$, $p = .011$). The significance of this interaction effect is not surprising, as only focus sensitive expressions are assumed to affect discourse structure.

Finally, unscrambled structures were accepted more often than scrambled structures with DP continuations, and scrambled structures were accepted more often than unscrambled structures with verbal continuations ($\beta = 1.465$, $SE = 0.612$, $z = 2.393$, $p = .017$). This pattern either reflects the hypothesized effect of an erroneous mapping between syntax and pragmatics, or a structural priming effect. Although the non-significance of the three-way interaction ($\beta = -1.443$, $SE = 1.221$, $z = -1.181$, $p = .237$) hints that the observed pattern is due to a priming effect, a closer look at the data indicates that this cannot be the case: verbal continuations in sentences with time-point adverbs were accepted more often than DP continuations, regardless of the object's position in the first conjunct. Hence, participants did not accept sentences more often if the relative order of object and adverb was identical in the two conjuncts. The conclusion must be that the strong overall preference for verbal continuations overshadows a possible three-way interaction effect. The reaction time data reported in the next subsection provide a more fine-grained measure to examine a mapping effect that is sensitive to the type of adverb.

Most importantly, the judgment data indicate that utterances in all four conditions are considered highly likely to be produced by a native speaker of Dutch. This finding does not corroborate the claim that Dutch scrambling adheres to a strict discourse template.

Reaction time data

The reaction time data in milliseconds were log-transformed to reduce a skew in the distribution prior to statistical analysis. A linear mixed-effects analysis was

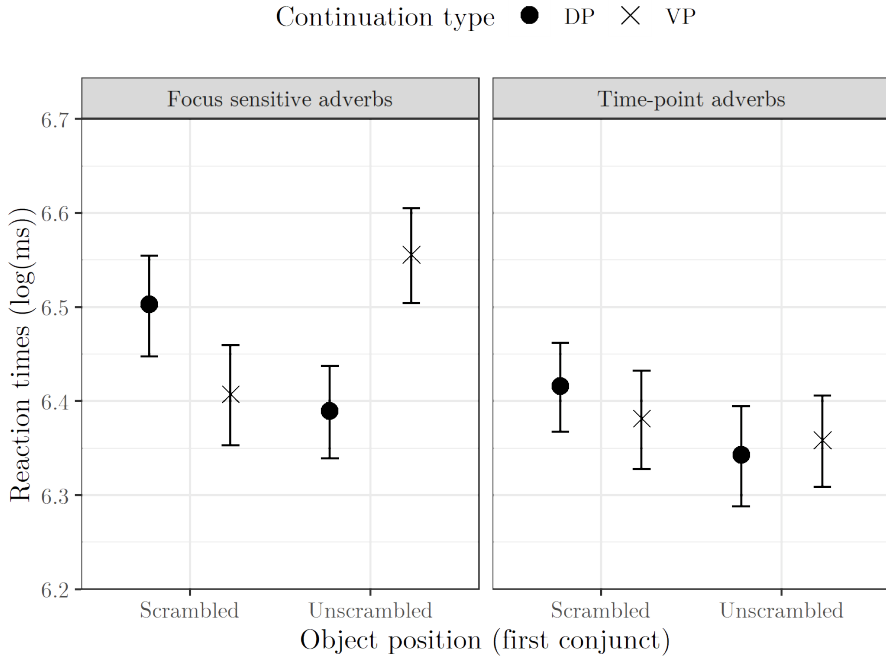


Figure 3.2: Condition means for log-transformed reaction times (error bars indicate the within-subjects standard error of the mean)

performed on the log-transformed data.³ Only reaction times of trials which were judged as acceptable were entered into the model, which was designed as follows. The log-transformed reaction times constituted the dependent variable, with the variables *object position* (unscrambled, scrambled), *adverb type* (focus sensitive, time-point), and *continuation type* (DP, VP) entered as fixed effects. All factors were coded using deviation contrasts (contrasts of -.5, .5). The initial model had the maximum random structure (following Barr et al. 2013). When the model failed to converge, the random structure was simplified by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final model included intercepts for participants and items, and a by-participant random slope for the effect of *continuation type*. The mean log-transformed reaction times are presented in Figure 3.2.

Reaction times did not differ significantly between unscrambled or scrambled items ($\beta = 0.005$, $SE = 0.029$, $t = 0.162$, $p = .871$), between items with a focus sensitive or time-point adverb ($\beta = -0.090$, $SE = 0.076$, $t = -1.185$, $p = .240$), or between items

³Some researchers argue that log-transformations of data do not improve statistical power or Type I error control (e.g. Schramm & Rouder 2019). Here, an lmer model on the untransformed reaction time data yields qualitatively identical results.

with a DP or verbal continuation ($\beta = -0.001$, $SE = 0.052$, $t = -0.028$, $p = .978$). The interaction effects between *object position* and *adverb type* ($\beta = 0.054$, $SE = 0.059$, $t = 0.917$, $p = .360$), and between *continuation type* and *adverb type* were not significant ($\beta = -0.017$, $SE = 0.059$, $t = -0.283$, $p = .777$). The interaction effect between *object position* and *context type* was significant, indicating that there were significant delays for syntax–pragmatics mismatches ($\beta = -0.207$, $SE = 0.059$, $t = -3.532$, $p < .001$). Crucially, this mismatch only led to a significant slowdown in items with a focus sensitive adverb ($\beta = 0.245$, $SE = 0.117$, $t = 2.087$, $p = .037$), which indicates that the effect is not due to a purely syntactic mismatch (i.e. a priming effect).^{4,5}

Discussion

The main findings of the speeded judgment experiment are that Dutch scrambling structures are perfectly acceptable even if there is a mismatch between syntax and discourse structure, and that, although these mismatches were hardly ever rejected, they did cause lower judgment scores as well as a delay in reaction times as compared to the matched conditions. This was only the case when the adverb was sensitive to focus placement, which means that there was no “hidden” interaction effect among the items with a time-point adverb that is merely harder to notice by intuition because time-point adverbs are not truth-conditional (as suggested in Ruys 2001). Since the processing difficulty associated with scrambling is affected by the focus sensitivity of the adverb, the effect cannot be attributed to a structural priming effect either. Moreover, the results indicate that the object’s discourse status is not determined by a mapping rule like the one proposed in Neeleman & van de Koot (2008a), as it is sensitive to the object’s syntactic environment. In particular, it is sensitive to whether or not the object is located in the c-command domain of a focus sensitive expression. Lexical information about the nature of the adverb is therefore crucial to the behavior of definite objects in Dutch scrambling structures. Clearly, definite objects in Dutch scrambling structures can be interpreted at a position different from where they are phonetically realized. Mismatches between syntax and pragmatics are a genuine option in Dutch scrambling structures.

3.4 Discourse relations in Dutch scrambling

This section presents a syntactic account for the experimental data presented in Section 3.3. It is important to note that the account proposed here is just one possible grammatical system for capturing the new facts. The experiments in the previous section do not test this proposal; instead, the experimental data are logically prior

⁴Separate 2x2 models on items with a focus sensitive or a time-point adverb confirm that the interaction effect between *object position* and *continuation type* reaches significance in the former model only. Such cross-over interactions cannot be “transformed away” (Loftus 1978), so the absence of one in the items with a time-point adverb is striking.

⁵Five of the focus sensitive expressions in this experiment can be analyzed as being part of the object instead of as independent parts-of-speech (see Broekhuis 2021). Exclusion of these items did not lead to a qualitative difference in the statistical analysis.

to it and therefore feed it. The main claim of the proposal presented here is that the locus of scrambling is in syntax, while discourse-interpretive effects are derived post-syntactically at the syntax-pragmatics interface.

Building on the finding that mismatches between syntax and pragmatics are available in Dutch scrambling structures, I argue that such mismatches are derived by familiar scope-shifting operations that render movement invisible to interpretation or to phonetics. These operations allow constituents to be interpreted at a position different from where they are phonetically realized (Fox 1999, 2000, Reinhart 2006). It follows that this analysis requires scrambling to involve movement (following e.g. Vanden Wyngaerd 1989, Schaeffer 1997, 2000, Broekhuis 2008). I further assume that discourse relations are uniquely represented at a distinct grammatical level dedicated to information structure (e.g. Vallduví 1992, Lambrecht 1994, Bailyn 1995, 2012, Erteschik-Shir 1997, Zubizarreta 1998), which I will refer to as Functional Form (or FF, after Bailyn 1995, 2012), and that discourse relations are derived from c-command (cf. Neeleman & van de Koot 2012). Specifically, focus sensitive expressions by default accommodate the focus within their scope, but some freedom is allowed in their relative placement (see Foolen et al. 2009).

A definite object's discourse status depends in part on its syntactic environment. The default discourse reading of a definite object is focused (discourse-new) when located within the c-command domain of a focus sensitive expression, and non-focused (discourse-old) when located outside of this domain. However, this discourse template can be overruled by contextual factors, as demonstrated in the experiments presented in Section 3.3. Additional processing difficulty is incurred when this happens, reflected in the behavioral data as a decrease in the acceptability rate and a rise in reaction times. No such effect emerged in sentences with a time-point adverb; here definite objects can be interpreted as focused (discourse-new) or non-focused (discourse-old) without incurring additional processing difficulty, regardless of their position relative to the adverb. We can conclude from this that time-point adverbs do not affect discourse structure.⁶ I will exclude these adverbs from further analysis and concentrate on scrambling structures with a focus sensitive adverb instead. Importantly, an analysis of scrambling must adequately represent the cognitive consequences associated with revisions of the discourse structure, given that the processor has as one of its tasks to identify discourse relations. In this section, I argue that the processing difficulty associated with mismatches in scrambling structures is a reflection of scope-shifting operations that are required to achieve the inverse reading.

The data presented in the last section closely resemble patterns attested in the experimental literature on scope ambiguities. Consider the ambiguous sentence and its possible readings in (13).

⁶Time-point adverbs are known to have a rather free distribution in the universal hierarchy of adverb types (Cinque 1999). Therefore, another possible explanation for the absence of a significant effect among these items in the experimental data is that the time-point adverbs were generated in (or moved to) different positions in the clause (see Broekhuis & Corver 2016: Section 8.2.3).

- (13) A kid climbed every tree.
- i. $\exists x, x$ a kid, such that $\forall y, y$ a tree, x climbed y . (surface-true)
 - ii. $\forall y, y$ a tree, $\exists x, x$ a kid, such that x climbed y . (inverse)

A well-established finding in the psycholinguistic literature is that the parser initially favors a reading that follows the linear order of elements when determining scope relations, as in (13i), and that computation of the inverse reading in (13ii) comes at an increased processing cost (e.g. Tunstall 1998, Anderson 2004, Reinhart 2006). Various theories of scope relations have been proposed to account for these behavioral effects (see Brasoveanu & Dotlačil 2019 for an overview). Neeleman & van de Koot (2012), for instance, propose that the inverse reading is computed by means of scope extension (after Williams 1994).

Another analysis of scope ambiguous structures argues that the inverse reading is derived by covert scope-shifting operations (Fox 1999, 2000, Reinhart 2006). In what follows, a version of this analysis will be adopted to account for Dutch scrambling structures. Scope-shifting operations come in two flavors, *reconstruction* and *Quantifier Raising*, and create a configuration for which the structural representations at LF and PF do not match. These operations are subject to economy principles and apply only when an interpretation cannot otherwise be derived. Fox (1999) argues that sentences such as (14) demonstrate the availability of scope reconstruction. This sentence is ambiguous with regard to the content of the quantifier's scope. The sentence has a reading in which a specific person from New York is very likely to win the lottery, but also a broader reading in which the city of New York is very likely to yield a winner.

- (14) [_{QP} Someone from New York] is very likely ~~someone from New York~~ to win the lottery.

According to Fox, the ambiguity in (14) is due to the fact that QP's scope can be construed at its base position or at its landing site. In the former case, the quantifier is interpreted at a position that is different from where it is phonetically realized, and, as Fox (1999: 158) puts it, "the semantic effects of movement are 'undone'."

Quantifier Raising is a scope-shifting operation that yields the exact opposite effect. As noted, scope-ambiguous sentences such as (13), repeated here as (15), are normally interpreted in linear fashion, see (15i). In order to derive the inverse reading, the QP *every tree* raises to a position to the left of *a kid* at LF. This covert operation is illustrated in (15ii).

- (15) A kid climbed every tree.
- i. [a kid [every tree [a kid climbed every tree]]]
 $\exists x: x$ a kid $\forall y: y$ a tree (x climbed y)
 'There is a kid who climbed every tree.'
 - ii. [every tree [a kid [every tree [a kid climbed every tree]]]]
 $\forall y: y$ a tree $\exists x: x$ a kid (x climbed y)
 'For every tree, there is a kid who climbed it.'

The interpretation site of the quantified phrase in (15ii) is again different from where it is phonetically realized, although this time the movement is invisible at PF, while it does trigger a semantic effect. I propose that the experimental data from Section 3.3 can be explained by incorporating pragmatic equivalents of scope reconstruction and Quantifier Raising into the analysis.

Having established that mismatches between syntax and pragmatics are grammatical but marked in Dutch scrambling structures, I now proceed to present a syntactic account for them. I assume that scrambling is movement prompted by a scrambling feature $[+\Sigma]$ (Grewendorf & Sabel 1999, Sauerland 1999, Kawamura 2004), which is optionally assigned to lexical items that enter the derivation. Crucially, the $[+\Sigma]$ feature does not have any (discourse-)semantic content (see Haider 2020); that is, it only triggers scrambling by fiat. Definite objects that are equipped with the $[+\Sigma]$ feature move to a scrambled position in syntax, while $[-\Sigma]$ objects remain in unscrambled position. With the addition of pragmatic equivalents of the scope-shifting operations described above, the analysis predicts that both word orders in scrambling structures have two possible sites for pragmatic interpretation.

The structure in (16) represents the base order of a scrambling clause. I assume that direct objects are generated as complements of the verb and that (focus sensitive) adverbs adjoin to ν P. The object DP in this example does not carry the $[+\Sigma]$ feature and thus remains in unscrambled position. Because the object is located within the c-command domain of the focus sensitive adverb, it is by default interpreted as in focus (discourse-new). The mapping between syntax and pragmatics can then proceed straightforwardly: if the object is selected as the focus in discourse, its discourse status matches its syntactic environment.

- (16) $[_{\nu P}$ vaak ... $[_{VP}$ de kok $_{[-\Sigma]}$ beledigen]]
 often the cook insult

Suppose now that the context that follows requires the verb instead of the object to be in focus. In this scenario, there is a mismatch between syntax and pragmatics, because the object appears in the focus sensitive adverb's c-command domain, but is not selected as the focus in discourse. The data in Section 3.3 prove that this reading is a genuine option for the surface sequence in (16), albeit a marked one. I submit that this reading can be derived by a pragmatic equivalent of Quantifier Raising. Specifically, the object DP *de kok* 'the cook' in (16) covertly migrates to a higher position outside of the scope of the focus sensitive adverb to resolve the syntax–pragmatics mismatch, as in (17). This “anti-focus” process yields the inverse discourse reading, as the object is now interpreted in a position different from where it is phonetically realized. I will refer to this process as *Pragmatic Raising*.

- (17) **PF:** $[_{\nu P}$ vaak ... $[_{VP}$ de kok beledigen]]
 often the cook insult
- FF:** $[_{\nu P}$ de kok $[_{\nu P}$ vaak ... $[_{VP}$ ~~de~~ ~~kok~~ beledigen]]
 the cook often insult

Pragmatic Raising is subject to the same economy conditions as Quantifier Raising

and only applies when the appropriate discourse interpretation cannot otherwise be derived. I take the cognitive effort associated with Pragmatic Raising to be reflected in the experimental data as increased reaction times and a decreased acceptability rate (see Section 3.3.2). Participants accepted sentences less often and took longer to respond to sentences when they contained a non-focused object in unscrambled position, as compared to a focused object in the same position—but such syntax–pragmatics mismatches are fully acceptable nonetheless.

Now consider the structure in (18). The object DP in this example is assigned the [+Σ] feature and consequently moves to (at least) the outer edge of *vP* (Chomsky 2001b).⁷ In this configuration, the object is not located within the focus sensitive adverb's c-command domain and therefore does not normally receive a focused (discourse-new) reading.

- (18) [_{vP} de kok_[+Σ] [_{vP} vaak ... [_{vP} ~~de kok~~ beledigen]]
 the cook often insult

However, the experimental data indicate that a focus reading is in fact possible for scrambled objects. Once again, the situation leads to a mismatch between syntax and pragmatics, which can be accounted for if scope reconstruction is taken to apply at the syntax-pragmatics interface. The object DP can be interpreted at its base position inside the focus sensitive adverb's c-command domain (i.e. at the site of its lower copy in (18)), or at its landing site outside of the focus sensitive adverb's c-command domain (i.e. at the site of its higher copy in (18)). To paraphrase Fox (1999), the discourse-semantic effect of the movement can thus be “undone”. This is demonstrated in (19).

- (19) **PF:** [_{vP} de kok [_{vP} vaak ... [_{vP} ~~de kok~~ beledigen]]]
 the cook often insult
FF: [_{vP} vaak ... [_{vP} de kok beledigen]]
 often the cook insult

Like Pragmatic Raising, reconstruction incurs additional processing difficulty. Mismatches between syntax and pragmatics are acceptable, but participants took longer to respond to sentences with a focused object in scrambled position than to sentences with a non-focused object in this position. The mismatching conditions were hardly ever rejected, but did receive lower acceptability rates than the matching conditions. I take these differences to reflect the cognitive effort associated with reconstruction.

Notice that the scope-shifting operations illustrated in (17) and (19) are each other's mirror image. An analysis that takes scope-shifting operations to apply at the pragmatics interface goes a long way in explaining the experimental data. Syntax–pragmatics mismatches yield acceptable but marked structures, which in the experi-

⁷Alternatively, it can be assumed that the Dutch middle-field has a designated position for (contrastively) focalized material (e.g. Neeleman 1994b, Barbiers 2002), Broekhuis & Corver 2016: Section 13.3.2), but such analyses cannot explain the discrepancy in the reaction time data between sentences with focus sensitive and time-point adverbs without additional stipulations.

ment led to a decrease in acceptability rates and an increase in reaction times. This section argued that these effects result from two cognitively costly scope-shifting operations: Pragmatic Raising and reconstruction. I conclude that scrambling is an optional movement that sometimes can be invisible to phonetics (Pragmatic Raising) or to discourse-interpretation (reconstruction).

3.5 Conclusion

The central claim of this chapter is that definite object scrambling in Dutch is not as restricted as commonly claimed in the literature. Sentences in which surface order and discourse structure do not match are perfectly acceptable by virtue of the parser's ability to shift scope relations. These scope-shifting operations, reconstruction and Pragmatic Raising, are cognitively costly and induce additional processing difficulty. Hence, scrambling is informed, but not determined, by discourse conditions.

Chapter 4

Topicality and anaphoricity: A sentence completion study

Abstract

Direct objects in Dutch can precede or follow adverbs, a phenomenon commonly referred to as *scrambling*. The linguistic literature agrees in its assumption that scrambling of definite objects is regulated by their topicality and anaphoricity, but theories vary as to what kinds of objects exactly are predicted to scramble. This chapter reports experimental data from a sentence completion experiment. These data indicate that topics are scrambled more often than foci, and that anaphoric objects are scrambled more often than non-anaphoric objects. The results of this experiment provide support for the assumption that topicality and anaphoricity play an important role in scrambling. However, they also indicate that the discourse status of the object in and of itself cannot explain the full scrambling variation.

4.1 Introduction

Dutch is one of many languages that allows *scrambling*, a term coined by Ross (1967) referring to a “stylistic” reordering of constituents. In Dutch, one type of scrambling occurs in the middle-field of the clause and refers to the relative order of the direct object and the adverb (Vanden Wyngaerd 1989, Neeleman 1994b, Neeleman & Reinhart 1998, Broekhuis 2008, Neeleman & van de Koot 2008a).¹ An example of a scrambling construction is given in (1). The object position that follows the adverb is referred to as the unscrambled position (1a), and the object position that precedes the adverb is referred to as the scrambled position (1b).

- (1) a. *dat Jan gisteren **het boek** las.* (unscrambled)
 that Jan yesterday the book read
 ‘that Jan read the book yesterday.’
- b. *dat Jan **het boek** gisteren las.* (scrambled)
 that Jan the book yesterday read
 ‘that Jan read the book yesterday.’

A question that has surfaced in the linguistic literature is whether sentences with a definite direct object in scrambled position and sentences with a definite object in unscrambled position can be used interchangeably in any context, and, if not, which factors influence the relative order of the definite object and the adverb. The literature offers diverging answers to these questions, all highlighting the role information structure plays. That is, most accounts predict that the two structures in (1) cannot be used interchangeably *in any context*; rather, the choice depends on discourse or information packaging conditions.

The literature has reached a general consensus that the topicality and the anaphoricity (terms we will define in Section 4.2.1) of a definite object affect its placement relative to an adverb. Definites that are topical and/or anaphoric are predicted to appear in scrambled position, while non-anaphoric focused definites are predicted to appear in unscrambled position. But there is still disagreement about exactly which types of objects scramble, and about whether or not scrambling is an optional operation. Moreover, the analyses proposed in the literature are mostly based on intuitions of the researchers; experimental data are scarce. The purpose of this study is to experimentally investigate the claims about definite objects in the main bodies of literature by means of a sentence completion experiment. As such, the study aims to build a bridge between theoretical linguistics and psycholinguistics. Studies on Dutch scrambling that report experimental data so far have investigated the L1 and L2 acquisition of scrambling structures (Schaeffer 1997, 2000, Unsworth 2005), the referentiality of the object and lexical connectedness between object and verb (de Swart & van Bergen 2011, 2014), and the role that different types of adverbs and negation play (Schaeffer 1997, 2000, Schoenmakers & de Swart 2019,

¹The scrambling literature traditionally revolves around the questions whether the two orders are base-generated or derived by movement, and whether this type of scrambling involves A- or A'-positions. These questions will not be discussed in this study, which focuses instead on the extent to which different types of definite objects scramble.

Schoenmakers 2020). The influence of a definite object's topicality and anaphoricity has not yet been investigated experimentally, yet linguistic theories make precise predictions regarding the scrambling behavior of definite objects that depend on these factors. The current chapter addresses this issue by manipulating the topicality and anaphoricity of definite objects in Dutch scrambling clauses with a time-point adverb, in a sentence completion experiment.

The chapter is organized as follows. Section 4.2 introduces our definitions of the information structural notions that we will use and discusses five theoretical analyses of Dutch scrambling. Section 4.3 presents our experimental design, followed by the results in Section 4.4 and a general discussion in Section 4.5. Section 4.6 contains the conclusions.

4.2 Theoretical background

Although the literature on Dutch scrambling agrees that scrambling is dependent on discourse considerations, there is disagreement about the specific conditions that influence scrambling, and in particular, scrambling of definite objects. This section reviews the following analyses on the interaction between Dutch scrambling and information structure:

- i. Scrambling as an obligatory process for topics (Neeleman & Reinhart 1998);
- ii. Scrambling as an obligatory process for anaphoric objects (Schaeffer 1997, 2000);
- iii. Scrambling as an obligatory process for continuous topics (Erteschik-Shir 2007);
- iv. Scrambling as a preferred (but not obligatory) process for anaphoric objects (de Hoop 2000, 2003);
- v. Scrambling as an optional, but undesirable process for all objects (van Bergen & de Swart 2009, de Swart & van Bergen 2011).

Before discussing the literature, however, we must explain the terminology that we will use throughout the chapter. This is done in Section 4.2.1.

4.2.1 Terminology

We refer to an entity as *anaphoric* if there it has been explicitly mentioned in the preceding discourse. That is, anaphoric entities convey discourse-given information, whereas non-anaphoric entities convey discourse-new information. An example is given in (2). *The man* in (2b) is anaphoric, because he is already mentioned in (2a). The pronouns *he* and *his* in (2b) are anaphoric as well.

- (2) a. I spoke to a man and a woman yesterday.
b. The man is a dentist, and he really likes his job.

We must also clarify our usage of the notions of *topic* and *focus*, especially because the literature on information structure is notoriously convoluted with alternative

definitions for the same terms and, conversely, no agreed upon appellation for specific definitions (see de Swart & de Hoop 2000 for an overview). In this chapter we will use the following definitions. Foci represent the informative or contrary-to-expectation part of the sentence (Vallduví 1992, Vallduví & Engdahl 1996), or, as (Lambrecht 1994) puts it, they are the semantic component of a pragmatically structured proposition where the assertion differs from the presupposition. An example to illustrate this is given in (3), in which speaker A's question licenses *flowers* in speaker B's answer as the focus.

- (3) **Speaker A:** What did Mary buy?
Speaker B: Mary bought [flowers]_{FOC}.

It is important to note that even though foci are typically non-anaphoric, because the informative part of a clause is usually new to the discourse, this is not necessarily the case, as evidenced by the example in (4). Speaker A asks about who John's wife loves, licensing *John* in speaker B's answer as the focus of the clause, even though he has been mentioned in discourse before. That is, *John* is an anaphoric (discourse-given) focus in (4).

- (4) **Speaker A:** Who does John's wife love?
Speaker B: John's wife loves [John]_{FOC}.

The (sentence) topic, by contrast, is the entity that the proposition is about (Reinhart 1981, Gundel 1988, Lambrecht 1994). The topic of a sentence is the entity that the speaker intends to increase the addressee's knowledge about, request information about, or otherwise get the addressee to act with respect to (Gundel 1988). Topics in this sense are sometimes also referred to as part of the *presupposition* or *background*: information that is shared among interlocutors. Therefore, topics typically convey known information that the sentence comments on, although they can, as Chafe (1976: 30) puts it, be present "in the consciousness of the addressee at the time of the utterance" without having been mentioned explicitly in the discourse. That is, anaphoricity is not a necessary condition for topic-hood.² De Swart & de Hoop (2000: 115, their (23)) borrow the example in (5) from Vallduví (1992) to illustrate this. Although *crack* is the topic of the sentence it appears in, it is entirely new to the discourse.

- (5) I can't find broccoli anywhere. Crack they sell at every corner, but broccoli it's like they don't grow it anymore.

Another example of a non-discourse related topic is a *permanently available topic*, the referent of which is universally known and understood. These elements often refer to the speaker, the addressee, or "permanent and temporary fixtures of our world" (Erteschik-Shir 2007: 18), that is, referential information that is always shared by the interlocutors. Examples of permanently available topics include *the sun*,

²Reinhart's (1981) definition of topics diverges from the definition used in the Prague School (e.g. Sgall et al. 1986) on this point. According to her, not all topical information is anaphoric information. We follow her definition in this chapter.

the prime minister, and *the king*. Ariel (1990) argues that this type of encyclopedic knowledge is stored in long-term memory and is therefore immediately accessible to the interlocutors, and Lambrecht (1994) maintains that permanently available topics must always convey presupposed information. Consider the sentences in (6). Even if *the Good Book* in (6a) is not mentioned explicitly in the preceding context, language users can effortlessly identify the referent (the Bible) at the time of utterance, because it is permanently available in their consciousness. This is not the case for *the thick book* in (6b), which cannot be identified without additional context.

- (6) a. The Good Book says tattooing is a witchcraft rite.
 b. The thick book was a gift from my mother.

Thus, topics do not necessarily refer to explicitly mentioned referents in the discourse, but can sometimes be identified based on long-term shared information or world knowledge. Note also that the topicality of an element is related to, but does not depend on its grammatical position (Reinhart 1981, see also Vogels & van Bergen 2017). Although topics naturally occur in subject position, they can also occur in other positions.

The present study investigates different types of (sentence) topics and foci in object position, resulting from a manipulation of the cognitive accessibility (or “aboutness”) of potential referents in the preceding discourse. Consider the short narratives in (7). In both examples, a bicycle is introduced into the discourse as a new referent, but the cognitive accessibility of this referent at the end of the two sentences differs between (7a) and (7b). The example in (7a) starts out by stating that the narrative is about a bicycle, thereby activating the referent in discourse, and then continues to provide additional information about this bicycle, such as its color and the current status of its wheel. At the end of the two sentences in (7a), the referent of the noun *fiets* ‘bicycle’ is strongly activated, i.e. it is highly cognitively accessible. The narrative in (7b), by contrast, is about Sophie and continues to provide additional information about her. While the bicycle is introduced into the discourse as a new referent here as well, at the end of the narrative it is not as accessible as the referent of the noun *fiets* ‘bicycle’ in (7a). Simply put, example (7a) is about a bicycle, and example (7b) is about Sophie.

- (7) a. *Dit gaat over een geleende fiets die Sophie heeft gesloopt. Het is een zwarte fiets met een flinke slag in het wiel.*
 ‘This is about a borrowed bicycle that Sophie wrecked. It is a black bicycle that has a buckled wheel.’
 b. *Dit gaat over Sophie die een geleende fiets heeft gesloopt. Ze maakt wel vaker per ongeluk andermans spullen stuk.*
 ‘This is about Sophie who wrecked a borrowed bicycle. She often breaks other people’s things by accident.’

The ease with which the referent of the noun *fiets* ‘bicycle’ is retrieved from working memory in later discourse (or, its cognitive accessibility, see Ariel 1990) consequently differs between (7a) and (7b). Both narratives can be continued by the sentence *So-*

phie gaat de fiets repareren ‘Sophie will repair the bicycle’. After (7a), *de fiets* ‘the bicycle’ serves as an (anaphoric) topic in this continuation clause, because the narrative is about the bicycle. The cognitive accessibility of the referent of *fiets* ‘bicycle’ is high and can easily be retrieved from working memory. The cognitive accessibility of this referent after (7b), by contrast, is considerably lower. The referent of *fiets* ‘bicycle’ cannot play the role of sentence topic in the continuation clause after (7b), because the discourse is primarily about Sophie (that is, Sophie is the sentence topic). Instead, *de fiets* ‘the bicycle’ serves as an (anaphoric) focus in this continuation clause. Besides anaphoric topics and foci, the current study also investigates non-anaphoric foci and (non-anaphoric) permanently available topics.

Now that we have explained our definitions of anaphoricity, topic, and focus, we turn to the literature on Dutch scrambling. The following subsections discuss five proposals on the interaction between scrambling and information structure. Importantly, the syntactic position of the adverb also affects scrambling preferences: different types of adverbs occupy different positions in syntactic structure (Cinque 1999), and therefore, the structural position of a scrambled object is variable as well (see Schaeffer 1997, 2000, Schoenmakers & de Swart 2019). The analyses discussed in the following subsections are by default concerned with clauses with a time-point adverb.

4.2.2 Neeleman and Reinhart

Neeleman & Reinhart (1998) provide an analysis of Dutch scrambling in terms of “destressing”. It has long been known that the main stress of a clause correlates with focus identification. Since the main stress of a clause is assigned to its most deeply embedded constituent (Cinque’s 1993 *Nuclear Stress Rule*), Neeleman & Reinhart argue that Dutch scrambling serves as a mechanism to avoid the assignment of stress (and therefore focus) to definite objects that are not supposed to be the focus. Although Neeleman & Reinhart initially discuss destressing as an anaphoric process, they later link the scrambled position to the topicality and accessibility of a discourse referent instead (in the sense of Ariel 1990, cf. *D-linkedness* in Pesetsky 1987). They assert that anaphoricity itself cannot sufficiently explain scrambling patterns; for instance, if an entity has been mentioned too far back in the discourse, it may not scramble. The scrambled position is consequently reserved for highly accessible referents, i.e. anaphoric topics, and the unscrambled position for non-anaphoric foci. Neeleman & Reinhart’s (1998) analysis is not concerned with anaphoric foci or permanently available topics.

Consider the dialogues in (8) and (9). The phrase *het boek* ‘the book’ is the focus in (8), and the topic in (9).³ Neeleman & Reinhart’s (1998) analysis predicts that the scrambled answer in (8b) is disfavored compared to the unscrambled answer in (8a), because the (non-anaphoric) focused object does not surface in the position that is associated with foci. By contrast, the unscrambled variant in (9a) is disfavored

³For the sake of simplicity, we took the liberty to refer to what Neeleman & Reinhart (1998) call “semantically uninformative” elements as topical elements (see also Neeleman & van de Koot 2008a).

compared to the scrambled variant in (9b), because the (anaphoric) topical object appears in a stressed position.

- (8) *Hoe zit het met de voorbereidingen van je examen?*
 how goes it with the preparations for your exam
 'How are you progressing with your exam preparations?'
 a. *Ik ga morgen het boek lezen.*
 I go tomorrow the book read
 b. *#Ik ga het boek morgen lezen.*
 I go the book tomorrow read
 'I will read the book tomorrow.'
- (9) *Hoe zit het met je review van dat boek?*
 how goes it with your review of that book
 'How are you progressing with your review of that book?'
 a. *#Ik ga morgen het boek lezen.*
 I go tomorrow the book read
 b. *Ik ga het boek morgen lezen.*
 I go the book tomorrow read
 'I will read the book tomorrow.'

In Neeleman & Reinhart's (1998) view, scrambling is obligatorily driven by destressing and information structure: topical (accessible, anaphoric) definite objects must be in scrambled position in order to avoid stress assignment, whereas focused (non-anaphoric) definite objects must be in unscrambled position, where they can receive focal stress.⁴ Thus, the linear order in scrambling clauses predicted by Neeleman & Reinhart is that anaphoric topics appear to the left of the adverb, and non-anaphoric foci to their right.

4.2.3 Schaeffer

Schaeffer (1997, 2000) agrees with Neeleman & Reinhart (1998) that scrambling is an obligatory process triggered by discourse conditions, but argues that it is the anaphoricity of the definite object that determines its surface position. She distinguishes between anaphoric and non-anaphoric objects: anaphoric objects scramble, while non-anaphoric objects remain unscrambled. The main difference between the predictions of her account and Neeleman & Reinhart's can be illustrated by scrambling clauses with a permanently available topic. These topics are inherently accessible to the interlocutors, but not necessarily anaphoric. Schaeffer therefore predicts that they do not scramble if they have not been explicitly mentioned in the discourse (but note that Neeleman & Reinhart do not discuss permanently

⁴Information structural and stress properties are only indirectly associated. In this chapter, we focus on information structure; for more extensive discussion on the relation between stress and (discourse) meaning we refer the reader to Beaver & Clark (2008) and Büring (2016).

available topics). Consider the dialogues in (10) and (11). *De zon* ‘the sun’ in (10) is a permanently available topic that is not mentioned in the immediately preceding discourse. According to Schaeffer, it must therefore remain in unscrambled position, as in (10a), where it naturally receives the stress it needs by virtue of being the most deeply embedded constituent in the sentence (cf. Cinque 1993).⁵ The topic *de brochure* ‘the brochure’ in (11), by contrast, is not a permanently available topic, but it is anaphoric and must therefore scramble.

- (10) *Waarom denk je dat Colette zo vroeg is opgestaan?*
 why think you that Colette so early is woke.up
 ‘Why do you think Colette got up so early?’
- a. *Ik denk dat ze toen de zon wilde zien opkomen.*
 I think that she then the sun wanted see rise
- b. *#Ik denk dat ze de zon toen wilde zien opkomen.*
 I think that she the sun then wanted see rise
 ‘I think that she wanted to see the sun rise then.’
- (11) *Wat zei je dat Saskia met de brochure gedaan heeft?*
 what said you that Saskia with the brochure done has
 ‘What did you say Saskia did with the brochure?’
- a. *#Ik zei dat ze gisteren de brochure gelezen heeft.*
 I said that she yesterday the brochure read has
- b. *Ik zei dat ze de brochure gisteren gelezen heeft.*
 I said that she the brochure yesterday read has
 ‘I said that she read the brochure yesterday.’

Thus, the linear order of definite objects and adverbs predicted by Schaeffer (1997, 2000) is that anaphoric definite objects (including anaphoric permanently available topics) must appear in scrambled position, and non-anaphoric definite objects (including non-anaphoric permanently available topics) must appear in unscrambled position. It is important to note here, however, that Schaeffer does not specifically discuss anaphoric foci.

4.2.4 Erteschik-Shir

Erteschik-Shir’s (2007) account is in line with Schaeffer’s (1997, 2000) proposal in that non-anaphoric objects must appear in unscrambled position. However, Erteschik-Shir proposes that an additional distinction between *continuous topics* and *shifted topics* better explains the scrambling data. Shifted topics are sentence topics that served as the focus in the preceding sentence(s), but serve as a topic in the

⁵The sentence in (10b) would be acceptable if (emphatic) stress were added to *de zon* ‘the sun’, which would be an additional operation and therefore less economical than (10a) (cf. Neeleman 1994b), in which the required stress on *de zon* is obtained by default under the *Nuclear Stress Rule* (Cinque 1993). We acknowledge the possibility of alternative stress patterns, but will not further discuss this in the rest of this chapter.

current dialogue. Continuous topics, by contrast, were already topical in the previous sentence(s) and simply extend their topicality status. Erteschik-Shir maintains that shifted topics, but not continuous topics, are tolerated in the domain below adverbs (but above negation). This difference is illustrated in (12), where *de dierentuin* ‘the zoo’ in (12a) is a continuous topic and *het museum* ‘the museum’ in (12b) a shifted topic.

- (12) *Toen ik op vakantie ging, raadde Johan mij het museum en de dierentuin aan. Ik ben meteen naar de dierentuin gegaan, waar ik urenlang heb rondgelopen. De dierentuin was inderdaad geweldig.*
 ‘When I went on vacation, Johan recommended the museum and the zoo. I went straight to the zoo, where I spent hours walking around. The zoo was amazing, indeed.’
- a. *Ik heb (de dierentuin) gisteren (#de dierentuin) bezocht.*
 I have the zoo yesterday the zoo visited
 ‘I visited the museum yesterday.’
- b. *Ik heb (#het museum) gisteren (het museum) bezocht.*
 I have the museum yesterday the museum visited
 ‘I visited the museum yesterday.’

Since negation is “associated with focus” (Jackendoff 1972), topics cannot appear in the scope of negation (but see Schoenmakers & de Swart 2019, Schoenmakers 2020). This is illustrated for the shifted topic *het museum* ‘the museum’ in (13).

- (13) *Toen ik op vakantie ging, raadde Johan mij het museum en de dierentuin aan. Ik ben meteen naar de dierentuin gegaan, waar ik urenlang heb rondgelopen. De dierentuin was inderdaad geweldig.*
 ‘When I went on vacation, Johan recommended the museum and the zoo. I went straight to the zoo, where I spent hours walking around. The zoo was amazing, indeed.’
- Ik heb (het museum) niet (*het museum) bezocht.*
 I have the museum not the museum visited
 ‘I haven’t visited the museum.’

Therefore, Erteschik-Shir (2007) argues, the motivation to scramble over adverbs must be different from the motivation to scramble over negation. She proposes that scrambling should be analyzed in a broader context of constituent reordering and suggests that the reordering of shifted topics in many Germanic languages, including Dutch, is caused by topicalization—not by scrambling. This proposal leaves scrambling to apply to continuous topics only. Erteschik-Shir’s analysis thus predicts that only continuous topics appear in (true) scrambled position (to the left of an adverb); shifted topics, permanently available topics, and foci are all predicted to appear to the right of an adverb.

Note that Erteschik-Shir (2007) does not address the scrambling behavior of anaphoric foci, or how exactly they can be distinguished from shifted topics. Using

the well-known file card metaphor (see Heim 1982, 1983, Vallduví 1992, Erteschik-Shir 1997), however, she claims that foci can “locate an existing card and put it on the top of the file” (Erteschik-Shir 2007: 44), which suggests that foci can sometimes be anaphoric. Erteschik-Shir (2007: 144) also claims that “[t]he motivation for scrambling across an adverb [...] seems to be to remove the topic from the focused VP domain”, which implies that foci must remain in unscrambled position, regardless of their anaphoricity.

4.2.5 De Hoop

De Hoop (2000, 2003) provides an analysis of the interaction between scrambling and discourse conditions that is slightly different from the previously discussed analyses. Instead of assuming that direct object scrambling is an obligatory process, de Hoop presents an optimality theoretic (OT) analysis, in which constraints may be violated, making the model’s predictions less categorical. Although her analysis still predicts the syntactic behavior of direct objects on the basis of their definiteness and anaphoricity, it does not completely rule out unexpected form-meaning pairs. De Hoop proposes the following constraints, of which (14b) and (14c) are revised from Choi (1996).

- (14) a. SURFACE CORRESPONDENCE (SC1): Definite objects scramble.
 b. NEW: Anaphoric objects scramble.
 c. CANONICAL ORDER (CN2): Favor unscrambled word order.

Assuming that the constraints are not ranked with respect to each other, de Hoop (2000, 2003) proposes the OT tableau in Table 4.1. An anaphoric definite in unscrambled position violates SC1, because definites should scramble, and NEW, because anaphoric objects should scramble. Anaphoric definites in scrambled position only violate CN2, because the unscrambled word order is not used.

Input	Output	SC1	NEW	CN2
Anaphoric definite	– scrambling	*	*	
Anaphoric definite	+ scrambling			*

Table 4.1: Constraint tableau for anaphoric definite objects

The possible rankings of constraints are presented in Table 4.2, as well as the corresponding predicted word order for clauses with an anaphoric definite. De Hoop (2000, 2003) follows Anttila & Cho (1998) in relating optionality to statistical preference: “If a candidate wins in n tableaux and t is the total number of tableaux, then the candidate’s probability of occurrences is n/t ” (de Hoop 2000: 164). Anaphoric definites are therefore predicted to occur in scrambled position in two out of three cases and in unscrambled position in one out of three cases (see Table 4.2).

Order	Output	Result
SC1 > NEW > CN2	+ scrambling	Anaphoric definites scramble in $\frac{2}{3}$ of the cases
SC1 > CN2 > NEW	+ scrambling	
NEW > SC1 > CN2	+ scrambling	
NEW > CN2 > SC1	+ scrambling	Anaphoric definites do not scramble in $\frac{1}{3}$ of the cases
CN2 > SC1 > NEW	- scrambling	
CN2 > NEW > SC1	- scrambling	

Table 4.2: Results of possible rankings for anaphoric definite objects

De Hoop (2000, 2003) performs a similar OT analysis for non-anaphoric definites, the constraint tableau of which is given in Table 4.3. The violations are the same as for anaphoric definites in Table 4.1, except that the constraint NEW is not violated, because this constraint targets anaphoric objects only.

Input	Output	SC1	NEW	CN2
Non-anaphoric definite	- scrambling	*		
Non-anaphoric definite	+ scrambling			*

Table 4.3: Constraint tableau for non-anaphoric definite objects

The possible constraint orders and predicted results are presented in Table 4.4. The analysis predicts that non-anaphoric definites occur in scrambled position in 50% of the cases.

Order	Output	Result
SC1 > NEW > CN2	+ scrambling	Non-anaphoric definites scramble in $\frac{1}{2}$ of the cases
SC1 > CN2 > NEW	+ scrambling	
NEW > SC1 > CN2	+ scrambling	
NEW > CN2 > SC1	- scrambling	Non-anaphoric definites do not scramble in $\frac{1}{2}$ of the cases
CN2 > SC1 > NEW	- scrambling	
CN2 > NEW > SC1	- scrambling	

Table 4.4: Results of possible rankings for non-anaphoric definite objects

De Hoop (2000, 2003) thus argues that scrambling is an optional process and predicts a probability of $\frac{2}{3}$ for anaphoric definites and a $\frac{1}{2}$ probability for non-anaphoric definites to occur in scrambled position.

4.2.6 Van Bergen and de Swart

Van Bergen & de Swart (2009) conduct a corpus study of spontaneous spoken Dutch, in which they investigate (among other things) the role of the object's anaphoricity in scrambling structures. Their results show that, even though anaphoric definites occur in scrambled position more often than non-anaphoric definites, only 22% of

anaphoric definites are in scrambled position. Van Bergen & de Swart report that in their data-set only 8% of all objects with a definite article are in scrambled position. These findings are unexpected considering the accounts discussed above.

De Swart & van Bergen (2011) later present an experimental follow-up study in which they manipulate the anaphoricity of definite objects in scrambling clauses. The experiment took the form of a sentence completion experiment with 24 stimulus items consisting of an introduction and an intermediate sentence in one of two possible conditions (anaphoric or non-anaphoric). These lead-in sentences were followed by the beginning of the target sentence (an adverbial expression followed by the auxiliary *heeft* 'has') and four constituents: a nominative pronoun that matches the subject of the introduction sentences in person and gender, an infinitival transitive verb, a time-point adverb, and a definite noun phrase. A sample item is given in (15). 40 participants were invited to a computer lab to (silently) read the lead-in sentences from a computer screen. The participants were instructed to construct a well-formed sentence, making use of the constituents on the screen, and to read the target sentence out loud. The utterances were recorded for later transcription.

(15) **Introduction sentence** (same for both conditions):

Christel had vorige week veel haast om thuis te komen.
Christel had last week much hurry to home to come
'Last week Christel was in a hurry to get home.'

Intermediate sentence (anaphoric condition):

Op de ringweg kreeg ze een bekeuring voor hardrijden.
on the ring.road got she a ticket for speeding
'On the ring road she got a ticket for speeding.'

Or:

Intermediate sentence (non-anaphoric condition):

Op de ringweg werd ze bij een stoplicht geflitst.
on the ring.road was she at a traffic.light flashed
'On the ring road she got caught running a red light.'

Target sentence (same for both conditions):

Zonder protest heeft zij (de bekeuring) meteen (de bekeuring)
without protest has she the ticket immediately the ticket
betaald.
paid
'Without complaining she immediately paid the ticket.'

De Swart & van Bergen (2011) observe an overall preference for the unscrambled order in their data, a finding that is in line with their previous corpus study. More

importantly for the purposes of our study, de Swart & van Bergen find that, although anaphoric objects occurred in scrambled position more often than non-anaphoric objects (14% vs. 8%, respectively, in the ADV – OBJ order of presentation; 34% vs. 33% in the OBJ – ADV order of presentation), this effect did not reach significance. They conclude that “[t]ogether with the findings in van Bergen & de Swart (2009) these results strongly suggest that anaphoricity has hardly any effect on scrambling in Dutch” and that “[t]hese findings contradict assumptions about the influence of this factor generally made in the theoretical literature” (de Swart & van Bergen 2011: 16).

The authors note, however, that the non-anaphoric definites in their experiment may have been inferred implicitly by virtue of the given context. For instance, the fact that Christel in (15) got caught running a red light in the non-anaphoric condition strongly implies that she got a ticket. This implication may have activated the noun *ticket* in discourse, regardless of whether or not it is overtly expressed (*bridging* in Clark 1975, Asher & Lascarides 1998). A putative effect of anaphoricity may thus have been obscured in de Swart & van Bergen’s (2011) experiment, because of the stimulus objects’ overall salience in discourse. Be that as it may, the data from the corpus study and the experimental study strongly suggest that scrambling is not obligatory or preferred for Dutch definites, even if they are anaphoric.

4.2.7 Predictions

We have established that various analyses of definite object scrambling in Dutch have been put forward in the literature that consider the topicality and anaphoricity of the object. Yet, exactly which objects are predicted to scramble differs across analyses.

Neeleman & Reinhart’s (1998) analysis predicts that anaphoric topics scramble and non-anaphoric foci do not. Schaeffer’s (1997, 2000) analysis predicts that all anaphoric objects must scramble (regardless of their topicality); non-anaphoric objects are predicted not to scramble. Erteschik-Shir’s (2007) analysis predicts that only continuous topics scramble; permanently available topics, “shifted” topics, and foci (anaphoric or non-anaphoric) are predicted not to scramble. De Hoop (2000, 2003) submits that, while there are preferences in scrambling that are informed by discourse, there is no one-to-one relationship between an object’s surface position and its discourse status. Her analysis predicts that two out of three anaphoric definite objects and half of the non-anaphoric definite objects appear in scrambled position. Finally, the corpus and behavioral data in van Bergen & de Swart (2009) and de Swart & van Bergen (2011) suggest that there is a distinct preference for all definite direct objects to appear in unscrambled position, regardless of their discourse status.

Table 4.5 schematically displays the predictions from these analyses. It is important to note, however, that Neeleman & Reinhart (1998) do not discuss permanently available topics or anaphoric foci. In their analysis, permanently available topics are either focused or topical depending on the context and stress pattern. Similarly, Schaeffer (1997, 2000) does not discuss anaphoric foci in her analysis. But since she attributes the scrambling variation to anaphoricity effects, we marked her prediction

for anaphoric foci as “+”. Erteschik-Shir (2007) discusses continuous and shifted topics. We took the liberty to translate her respective predictions to anaphoric topics and anaphoric foci in this table, because the terms appear to be conceptually similar. Finally, de Hoop (2000, 2003) does not include permanently available topics in her model. According to her, however, permanently available topics can never be anaphoric and therefore scrambling of such definites is “completely optional” (de Hoop 2000: 157–158).

	Anaphoric topics	Anaphoric foci	Permanently available topics	Non-anaphoric foci
Neeleman & Reinhart (1998)	+	NA	NA	–
Schaeffer (1997, 2000)	+	+	+ (anaphoric); – (non-anaphoric)	–
Erteschik-Shir (2007)	+	–	–	–
De Hoop (2000, 2003)	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{1}{2}$
Van Bergen & de Swart (2009), de Swart & van Bergen (2011)	–	–	–	–

Table 4.5: Overview of definite objects that are predicted to scramble according to different analyses, where + represents “scrambled”, – represents “unscrambled”, and $\frac{2}{3}$ and $\frac{1}{2}$ stand for the predicted proportions of scrambled instances

The next section reports on a sentence completion experiment to test the predictions from these accounts. Specifically, we test whether:

- i. anaphoric objects (topics and foci) occur in scrambled position more often than in unscrambled position;
- ii. non-anaphoric objects (permanently available topics and discourse-new foci) occur in unscrambled position more often than in scrambled position;
- iii. anaphoric objects are scrambled more often than non-anaphoric objects;
- iv. topics are scrambled more often than foci.

The accounts in Table 4.5 not only make diverging claims about the exact nature of the discourse conditions that influence scrambling, they also disagree about whether scrambling is obligatory (Neeleman & Reinhart 1998, Schaeffer 1997, 2000, Erteschik-Shir 2007) or optional (de Hoop 2000, 2003, van Bergen & de Swart 2009, de Swart & van Bergen 2011). Providing production data from scrambling clauses with a definite object and a time-point adverb, our experiment also addresses the question as to whether scrambling is obligatory or optional.

4.3 A sentence completion experiment

We have established that the predictions emerging from the literature on Dutch scrambling differ with respect to the influence of the object’s topicality and anaphoricity. This section describes a sentence completion experiment in which we manipulated the topicality and anaphoricity of definite objects to test which of the analyses best predicts the objects’ scrambling behavior in language production.

4.3.1 Participants

44 native speakers of Dutch (32 female, mean age = 24.48, age range 17–57, SD = 6.66) were recruited from the SONA participant pool of Radboud University in Nijmegen to take part in a sentence completion experiment. Participants received partial course credit or a gift voucher of five euros for their participation. Data from two participants were discarded due to technical error, resulting in a data-set with data from 42 participants.

4.3.2 Materials

We developed a sentence completion experiment in which participants were asked to read three-sentence preambles out loud from a computer screen, designed to determine the topicality and anaphoricity of the direct object in the target sentence, and to orally complete the target sentence using three constituents (a transitive verb, a definite object, and a time-point adverb).

The experiment consisted of two distinct sets of experimental conditions and a set of filler items. Regarding the two sets of experimental conditions, we are interested in the scrambling behavior of topics and foci, and in the influence of anaphoricity. However, while we are able to compare minimal pairs of target sentences with a “regular” topic or focus, as in (16), this is not possible for permanently available topics. Permanently available topics belong to a fixed set of lexical items, which, by definition, are permanently available to the mind of the language user. At no point are they ever non-topical (while still referring to the same referent), hence these items cannot ever serve as foci in a minimal pair. For this reason, we distributed the stimuli over two sets of items: one set with “regular” topics and foci (henceforth the T/F set), and one set with permanently available topics (henceforth the PA set).

Both experimental sets included a context-free condition, which in the T/F set served as a non-anaphoric focus condition (16c), and in the PA set as a context-free baseline condition (17b). The PA set thus tested for the scrambling behavior of (non-anaphoric) permanently available topics as well as for an effect of the general presence of linguistic context. Taken together, the experiment contained five experimental conditions. The preamble of each condition ended with a variant of the question *Wat gaat er gebeuren?* ‘What will happen?’. All experimental items can be found in the appendix. We discuss the separate conditions in more detail below.

(16) a. **Anaphoric topic condition**

Dit gaat over een geleende fiets die Sophie heeft gesloopt. Het is een zwarte fiets met een flinke slag in het wiel. Wat gaat er gebeuren met de fiets?

‘This is about a borrowed bicycle that Sophie wrecked. It is a black bicycle that has a buckled wheel. What will happen with the bicycle?’

b. **Anaphoric focus condition**

Dit gaat over Sophie die een geleende fiets heeft gesloopt. Ze maakt wel vaker per ongeluk andermans spullen stuk. Wat gaat Sophie doen?

‘This is about Sophie who wrecked a borrowed bicycle. She often breaks other people’s things by accident. What will Sophie do?’

c. **Non-anaphoric focus condition***Wat gaat er gebeuren?*

‘What will happen?’

Target sentence:*Sophie gaat (de fiets) gauw (de fiets) repareren.*

Sophie goes the bicycle soon the bicycle repair

(17) a. **Permanently available topic condition with context***Dit gaat over Jasper die een afspraak heeft met een speciaal iemand. Hij kijkt er al heel erg lang naar uit. Wat gaat er gebeuren?*

‘This is about Jasper who has an appointment with a special someone. He has been looking forward to it for a long time. What will happen?’

b. **Permanently available topic condition without context***Wat gaat er gebeuren?*

‘What will happen?’

Target sentence:*Jasper gaat (de koning) weldra (de koning) ontmoeten.*

Jasper goes the king soon the king meet

Table 4.6 presents an overview of each experimental condition in terms of the topicality and anaphoricity of the object in the target sentence. The T/F set contained 24 experimental items in three conditions. The PA set contained eight experimental items in two conditions.

Item set	Condition	Example	Topical	Anaphoric
T/F (N=24)	A. Anaphoric topic	(16a)	+	+
	B. Anaphoric focus	(16b)	–	+
	C. Non-anaphoric focus	(16c)	–	–
PA (N=8)	D. with context	(17a)	+	–
	E. without context	(17b)	+	–

Table 4.6: Overview of the discourse status conditions in terms of topicality and anaphoricity

Let us first discuss the items in the T/F set. The topicality of the objects in this item set was manipulated according to a fixed formula. The preamble in condition A (anaphoric topic) mentions the target object three times, clearly marking it as the topic of the target sentence. The preamble in (16a), for example, introduces the referent *fiets* ‘bicycle’ into the discourse and continues to provide additional information about it, such as its color and the current status of its wheel, before asking what will happen with the bicycle. Since the discourse is predominantly about the bicycle, the bicycle is licensed as the topic in the sentence to be elicited. In contrast, the preamble in condition B (anaphoric focus) mentions the target object only once. The preamble in (16b) introduces a bicycle into the discourse in the first sentence as well,

but the remainder of the preamble generally revolves around Sophie, before asking what Sophie will do. The eventual question thus licenses an information structural partitioning in which Sophie is the topic of the elicited sentence, while the bicycle is focused.⁶ Condition C (non-anaphoric focus) is a context-free condition, which only poses the question *Wat gaat er gebeuren?* ‘What will happen?’. The bicycle is not mentioned in the preamble of (16c) at all, for example, which licenses the object in the target sentence as a non-anaphoric focus.

Let us now turn to the PA set. Target sentences in this item set contained a permanently available topic, such as *de koning* ‘the king’ in (17), instead of a regular noun. The PA set comprised two experimental conditions: a condition D with context (17a) and a condition E without context (17b). Target objects in both conditions were topical by virtue of the permanent availability of the discourse referents. Target sentences in condition D were again preceded by a three-sentence preamble in which the referent of the target object was not explicitly mentioned, see (17a). In contrast, target sentences in condition E were presented free of context, where only the question *Wat gaat er gebeuren?* ‘What will happen?’ was posed, see (17b). Target objects were therefore non-anaphoric in both conditions. This allowed us to disambiguate between a putative effect of anaphoricity and an overall effect of the presence of linguistic context in a comparison with the results from the T/F item set.

All target sentences consisted of an introductory phrase, or a prompt, which contained a subject (proper name) and the verb *gaat* ‘will’ (lit. ‘goes’), see (16) and (17). This prompt was followed by three constituents with which the participant was instructed to complete the sentence: an infinitival transitive verb, a definite noun phrase, and a time-point adverb. The target objects were presented together with the definite article. While there is a general preference to refer to topical elements with pronouns (e.g. Givón 1983, Ariel 1990), in this study we are interested in the scrambling behavior of definite noun phrases. The experiment was therefore designed in such a way that participants were encouraged to use a definite noun phrase in their responses, so as to avoid the potential preference for a pronoun. This design was also chosen to reduce the number of responses with an indefinite object, as such responses are irrelevant for the purposes of this study. Objects and adverbs were matched for length in syllables to avoid effects of grammatical weight (Wasow 1997). In order to control for possible effects of structural priming, we included the order of presentation of constituents in the experimental design, referring to the relative vertical order of the object and the adverb when the stimulus material was presented on the screen. Half of the items were presented in the ADV – OBJ order; the other half in the OBJ – ADV order. The verb was presented above or below the

⁶On the view that topics are cognitively activated and predictable elements that are available for quick retrieval from working memory (*accessible* in Ariel 1990), one could alternatively analyze *the bicycle* in (16b) as a shifted topic (cf. Erteschik-Shir 2007), instead of as an anaphoric focus, since it is not clear how long a discourse referent remains activated in the mental representation of the listener. For many grammatical phenomena it has been shown that topicality is not a notion that extends over long stretches of discourse indiscriminately (but see Marslen-Wilson et al. 1982 and Ariel 1990: 17–20). Whether we refer to these entities as *anaphoric foci* or *shifted topics* does not affect any of the predictions in Table 4.5: none of the theories differentiate between shifted topics and anaphoric foci in terms of their scrambling behavior. We therefore maintain the term *anaphoric foci* throughout.

adverb and object, or in between the two, and was presented in each position in an equal number of trials.

Finally, we created 48 filler items that exclusively elicited structures irrelevant to scrambling. The three constituents in the filler items were infinitival transitive or ditransitive verbs with (two of) their arguments. There is little to no freedom in the word order of the elicited filler sentences. Examples are given in (18) through (21). Half of the filler items were presented free of context so as to mimic the context-free experimental items; these introduced the question *Wat gaat er gebeuren?* ‘What will happen?’ with or without an adverbial expression, see (18) and (19), respectively. The adverbial expressions were added to half of the filler items to make it more difficult for participants to identify the target items. When the filler item contained an adverbial expression, the adverbial expression was the first constituent in the target sentence prompt. The other half of the filler items contained a three-sentence preamble, so as to mimic the non-context-free experimental items, see (20) and (21). The introductory phrase of the target sentence either repeated the adjunct of the preamble, as in (20), or had a DP in first sentence position, as in (21).

Fillers without context

- (18) *Wat gaat er gebeuren?*
‘What will happen?’

Intended answer:

De professor gaat de promovendus de theorie bijbrengen.
the professor goes the Ph.D.student the theory teach
‘The professor will teach the Ph.D. student the theory.’

- (19) *Wat gaat er gebeuren na enige onrust?*
‘What will happen after some clamor?’

Intended answer:

Na enige onrust gaat het medicijn de patiënt kalmeren.
after some clamor goes the medicine the patient calm
‘After some clamor, the medicine will calm the patient.’

Fillers with context

- (20) *Dit gaat over een romantisch gebaar dat regelrecht uit een film lijkt te komen. Er is een belangrijke bestelling gedaan bij de bloemist. Wat gaat er gebeuren op Valentijnsdag?*
‘This is about a romantic gesture that seems to come straight from a movie. An important order was placed at the florist’s. What will happen on Valentine’s day?’

Intended answer:

Op Valentijnsdag gaat het boeket de secretaresse verrassen.
on Valentine’s.day goes the bouquet the secretary surprise
‘On Valentine’s day, the bouquet will surprise the secretary.’

- (21) *Dit gaat over Tara die het leuk vindt om te luisteren. Haar lievelingsboek is 'Rupsje Nooitgenoeg'. Wat gaat er gebeuren?*
 'This is about Tara, who likes listening. Her favorite book is "The Very Hungry Caterpillar". What will happen?'

Intended answer:

De babysitter gaat de kleuter het verhaal voorlezen.
 the babysitter goes the toddler the story read
 'The babysitter will read the toddler the story.'

Recall that each target sentence in the T/F set was used across three conditions, and each target sentence in the PA set across two conditions. To ensure that participants would not see the same item twice and would receive an equal number of items per condition, the items were distributed across six experimental lists according to a Latin Square. Each experimental list contained eight items in the anaphoric topic condition, eight items in the anaphoric focus condition, and eight items in the non-anaphoric focus condition from the T/F set, as well as four items with context and four items without context from the PA set. In addition, each experimental list contained all 48 filler items, adding up to a total of 80 trials per experimental list. The experiment was designed and administered using OpenSesame (version 3.2.5, Mathôt et al. 2012; Python v2.7.13).

4.3.3 Procedure

Participants were seated in a sound-proof lab where the experiment took place on a computer. The experimenter was in a separate room during the experiment where they monitored the computer screen and ensured that the participant properly executed the task. The experiment started with a written introduction on a black screen and three practice trials, after which participants had the opportunity to ask questions. The introduction and practice trials were initiated by the experimenter.

The experimental trials were presented in randomized order. The preamble of an experimental item was presented as written text on a black screen. Participants read these at their own pace, but were instructed to read them out loud, to fully indulge them in the story. A button press would bring the participant to the next screen. The prompt of the target sentence was printed on this second black screen, followed by three constituents listed vertically. Participants were asked to complete the target sentence orally using these constituents. Participants' responses were recorded on a separate audio recording device for later transcription.

The order of the three constituents (verb, object, adverb) was randomized. However, the relative order of the adverbs and objects was equally distributed over the experiment, and logged in an output file, so that the order of presentation could be included in our statistical analyses as a separate factor. This was done to control for priming effects, as participants may be inclined to follow the order of constituents on the screen when producing the target sentences, which could possibly overrule the underlying competence that we intend to test. Furthermore, we ensured that the constituents were not projected on the computer screen while the participant was

articulating their response; a voice key caused the screen with constituents to be replaced by a screen with a fixation dot at voice onset. The constituent screen had a built-in six-second timer to reduce the number of late responses. This enhanced the naturalness of the responses, which hopefully represented implicit knowledge, and excluded the application of potential explicit knowledge, which usually takes more time. The screen with the fixation dot had a built-in four-second timer before the next experimental trial was presented. Four seconds turned out to be enough time to fully pronounce the short target sentences in almost all trials. The experiment included three breaks: one after every twenty trials.

4.3.4 Analysis

A total of 1344 trials (32 target sentences * 42 participants) were transcribed verbatim by the experimenter and annotated for *object position* (unscrambled, scrambled). 37 responses (2.75%) were labeled “irrelevant”, because they did not contain material relevant to scrambling (i.e. a missing adverb or object), or because the object had an indefinite article, or because the participant skipped the trial by accident. These responses were discarded from the data prior to statistical analysis. To test whether definite objects within each condition occurred in scrambled or unscrambled position more often than could be expected on the basis of chance, we first compared the observed distributions in a series of binomial tests. If scrambling of definite objects is truly optional, the observed proportions should not differ from those in a uniform distribution. Next, we tested the observed proportions to those predicted by de Hoop (2000, 2003). Recall that her analysis predicts that anaphoric definites occur in scrambled position in $\frac{2}{3}$ of trials and non-anaphoric definites in $\frac{1}{2}$ of trials. Additional statistical analysis of the data was then performed in two generalized mixed effects models, in which we entered *context* (T/F set: anaphoric topic, anaphoric focus, non-anaphoric focus; PA set: with context, without context) and *presentation order* (ADV – OBJ, OBJ – ADV) as fixed variables to predict the position of the object, using the software R (version 3.4.3, R Core Team 2020) and the package *lme4* (Bates et al. 2015). We report the results of T/F set in Section 4.4.1, and the results of the PA set in Section 4.4.2.

4.4 Results

4.4.1 Anaphoric topics and (non-)anaphoric foci

The T/F set contained experimental items in the anaphoric topic, anaphoric focus, and non-anaphoric focus conditions. The proportions of scrambled and unscrambled definite objects in these three conditions are presented in Table 4.7. This table takes responses from the two presentation orders together (ADV – OBJ, OBJ – ADV), as this factor did not influence object placement in a significant manner (we turn to the statistics below).

	Scrambled	Unscrambled	<i>p</i>
Anaphoric topic	57% (188/332)	43% (144/332)	.009 *
Anaphoric focus	42% (138/332)	58% (194/332)	.002 *
Non-anaphoric focus	34% (110/319)	66% (209/319)	<.001 *

Table 4.7: Placement of definite objects per condition in the T/F set

We conducted a series of binomial tests to test whether the observed proportions of scrambled utterances per condition differ significantly from what could be expected on the basis of chance. This difference reached significance in all conditions (see Table 4.7). These findings indicate that there is reason to assume that scrambling is not *truly* optional (defined as 50% scrambled, 50% unscrambled) for any of the definite object types tested. We then ran two more binomial test for the anaphoric topic and anaphoric foci conditions, with the probability set to $\frac{2}{3}$, which is the proportion predicted by de Hoop (2000, 2003) for anaphoric definites. This yielded a significant difference in both cases ($p < .001$), indicating that anaphoric definites were scrambled significantly less often than $\frac{2}{3}$ rd (or 66.67%) of the time.

Next, we entered the independent variables *context* (anaphoric topic, anaphoric focus, non-anaphoric focus) and *presentation order* (ADV – OBJ, OBJ – ADV) into a generalized linear mixed effects model to predict *object position* (unscrambled, scrambled). The variable *context* was encoded using two custom contrasts of (-.5, -.5, 1) and (-.5, .5, 0). This allows us to separately analyze effects of anaphoricity and topicality, respectively. The first contrast is between the two anaphoric conditions (anaphoric topics, anaphoric foci) and the non-anaphoric condition (non-anaphoric foci). We excluded the non-anaphoric focus condition in the second contrast to test for a distinct effect of topicality, which compares the scrambling pattern of anaphoric topics to that of anaphoric foci. The variable *presentation order* was encoded using deviation contrasts (-.5, .5). The initial model contained the maximal random structure (following Barr et al. 2013), but this led to singularity. We simplified the random structure by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final random structure contained by-participant and by-item varying intercepts, as well as by-participant varying slopes for *context* and *presentation order*.

We did not find a significant main effect of *presentation order* ($\beta = 0.183$, SE = 0.183, $z = 1.001$, $p = .317$), which indicates that sentences produced by participants were not structurally primed by the order of presentation of constituents on the computer screen. The two custom contrasts did reach significance, which indicates that anaphoric objects (anaphoric topics and anaphoric foci together) occurred in scrambled position more often than non-anaphoric foci ($\beta = -0.543$, SE = 0.135, $z = -4.019$, $p < .001$), and that anaphoric topics occurred in scrambled position more often than anaphoric foci ($\beta = -0.405$, SE = 0.102, $z = -3.976$, $p < .001$). The interactions between *presentation order* and the two contrasts did not reach significance (anaphoricity contrast: $\beta = 0.206$, SE = 0.239, $z = 0.861$, $p = .389$; topicality contrast: $\beta = -0.009$, SE = 0.203, $z = -0.046$, $p = .964$).

4.4.2 Permanently available topics

The PA set contained experimental items with a permanently available topic in a condition with context and a condition without context. The results are presented in Table 4.8. Note that the target objects in the two conditions were invariably non-anaphoric topics. The two presentation orders are once again taken together in Table 4.8, because this factor did not influence the results in a significant manner in this item set either (as the statistical results below demonstrate).

	Scrambled	Unscrambled	<i>p</i>
with context	26% (43/164)	74% (121/164)	<.001 *
without context	21% (34/160)	79% (126/160)	<.001 *

Table 4.8: Placement of definite objects per condition in PA set

The observed distribution of object placement in the data differs significantly from a uniform distribution in both the condition with context and the condition without context (see Table 4.8). The observed proportions of scrambled objects in this item set are significantly below chance level.

We entered the independent variables *context* (without context, with context) and *presentation order* (ADV – OBJ, OBJ – ADV) into a generalized linear mixed effects model to predict the *object position* (scrambled, unscrambled). Both independent variables were coded using deviation contrasts (-.5, .5). The initial model contained the maximal random structure, but this led to singularity. We simplified the random structure by step-wise removal of the smallest variance component. The final random structure consisted of by-participant and by-item intercepts and by-item varying slopes for *context*.

The model did not yield significant main effects of *context* ($\beta = 0.415$, $SE = 0.429$, $z = 0.969$, $p = .333$) or *order of presentation* ($\beta = 0.102$, $SE = 0.362$, $z = 0.281$, $p = .779$). The interaction effect between these factors was not significant ($\beta = 0.561$, $SE = 0.784$, $z = 0.715$, $p = .475$). Thus, permanently available topics were produced in unscrambled position more often than could be expected on the basis of chance, but we found no evidence that this preference was influenced by the presence of context or by the order of presentation of the constituents.

4.5 General discussion

Existing theories in the linguistic literature present a variety of predictions regarding the scrambling behavior of different types of definite direct objects in language production. Our experiment empirically tested these predictions (see Table 4.5). We also posed the question whether scrambling is obligatory or optional.

Let us first consider the effect of anaphoricity, which in our experiment was a contrast between on the one hand anaphoric topics and anaphoric foci, and on the other hand non-anaphoric foci. Neeleman & Reinhart (1998) predict that anaphoric topics scramble obligatorily and that non-anaphoric foci obligatorily

remain unscrambled.⁷ Schaeffer (1997, 2000) claims that definite objects must appear in scrambled position if they are anaphoric, and in unscrambled position if they are not. Recall, however, that neither Neeleman & Reinhart nor Schaeffer are concerned with anaphoric foci in their analyses. De Hoop (2000, 2003) predicts that anaphoric objects scramble more often than non-anaphoric objects. Van Bergen & de Swart (2009) and de Swart & van Bergen (2011) predict no substantial proportions of anaphoric objects in scrambled position. Our results show that anaphoric objects (topics and foci taken together) were produced in scrambled position more frequently than non-anaphoric objects (or, non-anaphoric foci). Thus, our data generally corroborate the analyses in Neeleman & Reinhart (1998), Schaeffer (1997, 2000), and de Hoop (2000, 2003), and do not replicate the findings of van Bergen & de Swart (2009) and de Swart & van Bergen (2011). However, while our data suggest that scrambling of anaphoric objects is not *truly* optional (defined as a 50-50 distribution), they also indicate that scrambling is by no means an obligatory operation: about half of the anaphoric objects (topics and foci) remained unscrambled, contra Neeleman & Reinhart (1998) and Schaeffer (1997, 2000). And while de Hoop's (2000, 2003) account accommodates a certain degree of freedom, it predicts that anaphoric objects scramble in about two out of three instances. This prediction is not borne out; the number of anaphoric definites in scrambled position in our data are much lower. None of the accounts that pertain to the anaphoricity of the direct object thus seem to make exactly the right predictions, although we did find evidence for the claim that anaphoric objects scramble more often than non-anaphoric objects.

The discrepancy between our data and the data in de Swart & van Bergen's (2011) is rather striking, since the experiments were very similar in design. However, recall that de Swart & van Bergen note that the non-anaphoric objects in their experiment were still salient in the discourse, because, despite not having been mentioned explicitly, the foregoing context mentally activated them (see Section 4.2.6). The discourse salience of the non-anaphoric objects possibly undermined de Swart & van Bergen's experimental manipulation, and the question arises whether the objects could have been sufficiently activated to render the label *non-anaphoric* as disputable. Our experiment dealt with this confounding factor by eliminating a linguistic context altogether in the non-anaphoric focus condition.

An alternative explanation for the discrepancy between de Swart & van Bergen's (2011) results and ours was suggested to us by Peter de Swart (p.c.), who noticed that participants in their experiment were faced with time pressure, while ours were not. The prompt of the target sentence in de Swart & van Bergen's experiment (consisting of an adverbial expression and the auxiliary *heeft* 'has') was presented on a first screen, which remained visible until the participant started speaking. The constituents for completion then appeared on a second screen after 1500ms. In our experiment, the constituents for completion were presented on the same screen as the prompt (consisting of a proper name and the auxiliary *heeft* 'has'). The prompt and the constituents for completion both remained visible until the

⁷The predictions from Neeleman & Reinhart (1998) actually pertain to the object's accessibility (Ariel 1990) or D-linkedness (Pesetsky 1987), rather than its anaphoricity alone, but since Neeleman & Reinhart do not explicitly discuss non-anaphoric foci, it makes sense to discuss their predictions in this paragraph.

moment the participant started speaking (or until a six-second timer ran out). The crucial difference is that our design allowed participants to construct a full sentence before voice onset, whereas de Swart & van Bergen's design did not. It is conceivable that participants who are pressurized into responding as quickly as possible have a preference for the unscrambled order, such as the one reported by de Swart & van Bergen, on the assumption that the unscrambled order is also the syntactically unmarked order (as claimed by e.g. Neeleman & van de Koot 2008a).

A possible reason for the discrepancy between our experimental data and the corpus data in van Bergen & de Swart (2009) is that we only tested for direct objects that were preceded by a definite article in clauses with a time-point adverb. The category of definite objects in van Bergen & de Swart's study, by contrast, also contains constructions with a demonstrative pronoun (e.g. *die man* 'that man'), a possessive pronoun (e.g. *zijn moeder* 'his mother'), and a definite quantifier (e.g. *alle vragen* 'all questions'). Once the corpus data are filtered for items with direct objects preceded by a (referential) definite article, only 107 items remain, as opposed to the 1317 items in our experimental data-set. Van Bergen & de Swart note that speakers are more likely to use pronouns instead of noun phrases when the referent has been mentioned in the discourse, which explains the relatively low number of anaphoric noun phrases in their data. Participants in our experiment were forced to use a noun phrase. Further, the 107 items in van Bergen & de Swart's data-set contain scrambling clauses with many different types of adverbs, including the negation word *niet* 'not' and the affirmative particle *wel*. It has been shown before that scrambling preferences in language production differ drastically depending on whether the clause contains a time-point adverb or negation, that is, the preference for definite objects to be located in scrambled position is much stronger in clauses with negation than in clauses with a time-point adverb (Schoenmakers & de Swart 2019). As such, van Bergen & de Swart's data-set is both smaller and more heterogeneous than ours, which makes it difficult to compare the two.

Finally, recall that we did not provide a linguistic context in the non-anaphoric focus condition. The effect that we found between the anaphoric and non-anaphoric conditions can therefore be interpreted in two ways: either it is a genuine effect of anaphoricity, or it is due to the presence of linguistic context. To disentangle these two factors, we manipulated the presence of linguistic context between the two conditions in the PA set. The presence of linguistic context was the only factor differentiating the items in this item set, as the objects in the two conditions were both non-anaphoric, permanently available topics. Our statistical analyses do not provide evidence for a difference between the two conditions. We conclude that the presence of linguistic context did not influence the scrambling behavior of definite objects in the PA set, and by analogy, that the effect in the T/F set (i.e. that anaphoric objects were scrambled more often than non-anaphoric objects) is a genuine effect of anaphoricity (contra van Bergen & de Swart 2009, de Swart & van Bergen 2011).

Let us now turn to the effect of topicality. It is important to keep in mind that the topics and foci in conditions A and B of our experiment (see the examples in (16)) were always anaphoric, that is, we kept the anaphoricity of the objects constant to examine the effect uniquely due to their topicality. Erteschik-Shir (2007) agrees with

Schaeffer (1997, 2000) that such objects must scramble by virtue of their anaphoricity, but she makes a distinction between *continuous* and *shifted* topics. Her analysis predicts specifically that only continuous topics scramble; shifted topics and foci are predicted to appear in unscrambled position. While, strictly speaking, we did not investigate shifted topics in our experiment, one could argue that our anaphoric foci may alternatively be analyzed as shifted topics in the sense of Erteschik-Shir, on the assumption that the activation of the object's discourse referent extends over the short middle sentence in the preamble (see footnote 6). In that case, our results provide some support for Erteschik-Shir's predictions: continuous topics (our anaphoric topics) occur in scrambled position more often than shifted topics (our anaphoric foci), and therefore, continuous and shifted topics engage in scrambling in different ways. However, it is unclear how long the activation status of a newly introduced referent extends in discourse, but note that the alternative interpretation of this condition does not affect Erteschik-Shir's predictions: shifted topics and anaphoric foci are both predicted to appear on the right side of time-point adverbs.

To summarize the effect of topicality on definite object scrambling, then, our results indicate that (anaphoric) topics were scrambled more frequently than (anaphoric) foci (*pace* Neeleman & Reinhart 1998). We repeat that the anaphoric topics in our experiment were not scrambled categorically; rather, the observed distributions indicate a high degree of freedom in object placement. The data therefore do not corroborate the claim in Erteschik-Shir (2007) that (continuous) topics scramble obligatorily.

With regard to the permanently available topics, Schaeffer (1997, 2000) and Erteschik-Shir (2007) claim that they do not scramble (as long as they are non-anaphoric). The permanently available topics in our experiment had not yet been mentioned in the discourse and therefore, Schaeffer's and Erteschik-Shir's analyses predict that these objects must remain in unscrambled position. By contrast, de Hoop's (2000, 2003) analysis predicts that non-anaphoric definite objects (including permanently available topics) scramble half of the time. The results from our experiment show that non-anaphoric permanently available topics were produced in scrambled position in about one out of four trials. These proportions were lower than could be expected on the basis of chance, that is, there was a clear preference to keep non-anaphoric permanently available topics in unscrambled position (contra de Hoop 2000, 2003). But such topics are not *obligatorily* located in this position either (contra Schaeffer 1997, 2000, Erteschik-Shir 2007).

Regarding the question whether or not scrambling is an obligatory operation, we observe the following. We already mentioned that, while the proportion of scrambled anaphoric topics is significantly different from a chance-level distribution, they do not always occur in scrambled position (only in 57% of the trials). This finding goes against the claims in Neeleman & Reinhart (1998), Schaeffer (1997, 2000), and Erteschik-Shir (2007), that scrambling is obligatory for anaphoric and/or topical objects. The results from the T/F set further show that while anaphoric foci occur in unscrambled position significantly less often than could be expected on the basis of chance, they do not always occur in unscrambled position either (only in 58% of the trials). These findings do not corroborate the findings in van Bergen & de Swart (2009)

and de Swart & van Bergen (2011), that anaphoric objects hardly scramble at all.⁸ De Hoop's (2000, 2003) analysis is different in that it involves a certain degree of freedom for anaphoric definites; specifically, they are predicted to occur in scrambled position in roughly two out of three trials. We did not find evidence for this prediction; rather, the observed proportions of scrambled objects were much lower for both anaphoric topics and anaphoric foci. Finally, all of the analyses discussed in this chapter would predict non-anaphoric foci, if anything, to occur in unscrambled position in the vast majority of cases (except for de Hoop's 2000, 2003 analysis, which instead predicts a 50-50 distribution). Our results indicate that non-anaphoric foci occur in unscrambled position more often than could be expected on the basis of chance, but still they only do so in about two out of three trials. This finding was not predicted by any of the scrambling accounts. However, note that all of our non-anaphoric focus objects were definite noun phrases, which might imply commonly shared knowledge between speaker and hearer (i.e. presuppositionality). This may have influenced the results.

Everything considered, we conclude that

- i. scrambling is not obligatory for any type of definite object;
- ii. non-anaphoric permanently available topics are preferred in unscrambled position;
- iii. anaphoric objects are produced in scrambled position more often than non-anaphoric objects;
- iv. (anaphoric) topics are produced in scrambled position more often than (anaphoric) foci.

The proportions of scrambled objects that we found in our data-set are repeated for each type of definite object in Table 4.9. The proportion for the permanently available topics is an average of the conditions with and without context.

Definite object type	Scrambling proportion	95% Confidence intervals
Anaphoric topic	57%	[51% – 62%]
Anaphoric focus	42%	[36% – 47%]
Non-anaphoric focus	34%	[29% – 40%]
Permanently available topic	24%	[19% – 28%]

Table 4.9: Proportions of scrambled objects per object type in our data-set, with 95% confidence intervals

The proportions of scrambled definites show a pattern that seems to follow a principle known as the *Given-before-New Principle* in (22), taken from Gundel (1988),⁹

⁸Again, under an alternative information structural partitioning (see footnote 6), this latter finding can also be taken as evidence against Erteschik-Shir's (2007) claim that shifted topics do not scramble. It can also be considered evidence against Schaeffer's (1997, 2000) claim that scrambling is obligatorily regulated by anaphoricity; however, Schaeffer does not explicitly discuss anaphoric foci in her analysis.

⁹Traditional grammarians were already aware of this principle (e.g. Weil 1844, Behaghel 1909). Here, we chose to represent the observation using Gundel's (1988) definition.

in that anaphoric (or given) definite objects occur in the earlier scrambled position more often than non-anaphoric (or new) definite objects.

- (22) *Given-before-New Principle* (Gundel 1988: 229)
State what is given before what is new in relating to it.

Moreover, we concluded on the basis of data from the T/F set that topics are more likely to appear in scrambled position than foci. It is therefore quite surprising to find that the category of permanently available topics shows the lowest proportion of scrambled items in our data-set—the observed proportion of scrambled permanently available topics is even lower than that of scrambled non-anaphoric foci. It has been reported before, though, that the distribution of permanently available topics cross-linguistically is not as predictable as that of other definites, and that permanently available topics often constitute exceptions to more general rules (Givón 1983: 10). We thus conclude that, while the topicality and the anaphoricity of a definite object both influence its likeliness to scramble, its anaphoricity seems a more rigid predictor (contra Neeleman & Reinhart 1998, van Bergen & de Swart 2009, and de Swart & van Bergen 2011, but in line with Schaeffer 1997, 2000, and de Hoop 2000, 2003). We argue that each type of definite object engages in Dutch direct object scrambling in its own specific way and that a definite object's topicality or anaphoricity alone does not explain the full variance in scrambling constructions with a time-point adverb.

Based on our data we conclude that scrambling is never obligatory (as even anaphoric topics were scrambled in only just over half of the trials). However, despite the relatively large degree of freedom that our data seem to display with respect to it, scrambling is not truly optional either. Scrambling is affected by the anaphoricity of the object, following the principle in (22), and by the topicality of the object. Regarding the existing scrambling theories, this means the following.

Neeleman & Reinhart (1998) do not make the information structural distinctions within the set of definite objects needed to account for the observed scrambling data (specifically, they do not address the scrambling behavior of non-anaphoric topics and of anaphoric foci). They propose that topics scramble more often than foci, but are too rigorous in their claims regarding the obligatoriness of scrambling. Schaeffer (1997, 2000) makes a distinction between anaphoric and non-anaphoric definite objects, and claims that scrambling is obligatory for the former type and prohibited for the latter type. This means that she is too rigorous in her claims regarding the obligatoriness of scrambling as well. Erteschik-Shir (2007) proposes that only continuous topics scramble, and that they scramble obligatorily, whereas shifted topics and foci must remain unscrambled. Although at this point it is not entirely clear whether our experiment tested shifted topics or anaphoric foci, Erteschik-Shir's analysis predicts that neither of them scrambles at all. This indicates that she is too rigorous in her claims regarding the obligatoriness of scrambling. In contrast, de Hoop (2000, 2003) makes a distinction between anaphoric and non-anaphoric definites, and argues that scrambling is never obligatory for either category. Her analysis predicts that two-thirds (67%) of anaphoric objects and half of non-anaphoric

objects (50%) appear in scrambled position. These predictions are too strong; the proportions observed in our data are much lower: 42–57% for anaphoric objects and 21–34% for non-anaphoric objects (across all conditions). Nevertheless, the scrambling proportions reported in the current study corroborate de Hoop's claims that scrambling is not obligatory, supporting her earlier claim that "[...] there does not seem to be a property of either the definite itself or the context in general that *forces* or *prohibits* scrambling" (van der Does & de Hoop 1998: 399, emphasis ours), and they also corroborate her claim that anaphoric objects appear in scrambled position more often than non-anaphoric objects. Finally, van Bergen & de Swart (2009) and de Swart & van Bergen (2011) do not find evidence for an effect of anaphoricity in their corpus and experimental data, nor any substantial proportions of scrambled definites. We did not replicate these findings in our study; instead, we found that the anaphoricity of a definite object influences its likeliness to be produced in scrambled position, and we report substantial scrambling proportions (see Table 4.9).

We believe that our results best corroborate de Hoop's (2000, 2003) account, who claims that scrambling of definite objects is not obligatory, but influenced by their anaphoricity. Yet, the scrambling proportions of definite objects that we find are much lower than her analysis predicts (in line with van Bergen & de Swart 2009, de Swart & van Bergen 2011). Everything considered, our data indicate that the discourse status of a definite object in and of itself cannot explain the full scrambling variation, but also that scrambling is affected by both the topicality and anaphoricity of the direct object.

4.6 Conclusion

The present study investigated the scrambling behavior of different types of definite direct objects in Dutch: anaphoric topics, anaphoric foci, non-anaphoric foci, and (non-anaphoric) permanently available topics. The results do not fully corroborate any of the existing analyses on Dutch definite direct object scrambling, but they do provide evidence for the assumption that scrambling of definite objects is influenced by their topicality and anaphoricity. Specifically, anaphoric topics scramble most often, followed by anaphoric foci, followed by non-anaphoric foci, and finally followed by (non-anaphoric) permanently available topics. Since none of the scrambling proportions in our data are close to either 0% or 100%, we conclude that scrambling is not obligatory for any type of definite. But the distribution of definites in the Dutch middle-field is not completely free either; rather, scrambling is a process that is not *determined*, but is *influenced*, by discourse conditions: the topicality and the anaphoricity of a definite direct object affect its likeliness to be produced in scrambled position.

Chapter 5

Linguistic judgments in 3D

Abstract

Linguistic judgment experiments typically elicit judgments in terms of the acceptability or surface probability of a sentence. There is evidence that the dimension of the scale on which sentences are judged influences the outcome of the experiment, but to date this evidence is only limited. This is not a trivial matter, as the elicited judgment data are increasingly considered the basis for inferences about linguistic representation. The present study investigates whether the dimension of the scale influences judgments. Sentences are judged in one of three dimensions: *acceptability*, *probability*, or *aesthetics*. These dimensions are conceptually distinct from each other, and are taken to prompt considerations of the linguistic system, the linguistic reality, and the linguistic feeling. Two sets of experimental items are tested; one with cases of stigmatized variation (violations of the prescriptive norm) and another with cases of non-stigmatized variation (middle-field scrambling in Dutch). The results indicate that participants take into account the dimension of the scale, both in cases of stigmatized and non-stigmatized variation.

5.1 Introduction

A common way in which language researchers with a penchant for experimental research collect data is through pooling sentence judgments from a large sample of linguistically naïve participants (Schütze 1996, Cowart 1997, Schindler et al. 2020). These judgment data are sometimes considered an improvement over the traditional introspective judgment data found in theoretical linguistic research, since they “cover more ground” and avoid researcher bias (e.g. Gibson & Fedorenko 2013). However, it is unclear whether non-linguists contemplate the same cognitive dimensions as linguists when judging sentences. One could argue that formally collected judgments are at most folk opinions on the “general goodness” of stimuli, based on the participants’ “linguistic feeling” (or *Sprachgefühl*, or *sentiment de la langue*) without much conscious linguistic reflection. It can certainly not be assumed that naïve participants intuitively recognize and understand the intended meaning of notions such as *grammaticality* and *acceptability* (see Chaudron 1983; Schütze 1996: §6.3.2). Some researchers therefore recommend the use of alternative scale dimensions, which measure the “naturalness” of a sentence, that is, the probability that a sentence will be uttered by a native speaker of a given language (e.g. Featherston 2008, Schütze & Sprouse 2014). However, evidence that a manipulation of the response dimension actually affects the output of judgment experiments is restricted to cases with grammatical illusions and cases of stigmatized variation (Langsford et al. 2019, Vogel 2019). Although the impact of the task instructions in cases of non-stigmatized morphosyntactic variation has not remained uninvestigated, the results of these studies are inconclusive (Cowart 1997, Langsford et al. 2019). The question remains whether experimental researchers can guide their participants towards a particular dimension in a linguistic judgment experiment and, if not, how they can make sense of their data.

The present study investigates to what extent naïve participants take into account the intended scale dimensions in a judgment experiment, using stimulus sentences which contain cases of stigmatized and non-stigmatized variation. Different participant groups are instructed to judge the same stimulus sentences on three different scales: *acceptability*, *probability*, and *aesthetics* (following Vogel 2019). These dimensions are chosen to elicit judgments that are conceptually distinct from one another, namely, judgments based on a language system, judgments about the linguistic reality, and judgments in terms of the linguistic feeling (referred to collectively as the “grammatical trinity” in Coppen 2011).

For the stigmatized variation, the experiment takes three violations of the Dutch prescriptive norm as its stimuli: comparative *als* (Hubers & de Hoop 2013, van der Meulen 2018, Hubers et al. 2020), subject *hun* (van Bergen et al. 2011, van Bree 2012, de Hoop 2020), and auxiliary *doen* (Cornips 1994, Sert 2020). These “grammatical taboos” (Vogel 2019) are expected to receive low judgment scores in the dimension of acceptability, because they are subject to strong sociolinguistic stigmatization. Such cultural pressure likely affects judgments in the aesthetic dimension as well. But native speakers of Dutch are aware that other speakers (or they themselves) occasionally violate prescriptive norms, and such violations have been acknowl-

edged in prescriptive grammars for a long time (see van der Meulen 2018, 2020). Judgments in the dimension of probability (i.e. that a sentence will be uttered by a native speaker of the language) are therefore expected to be more lenient.

The stimulus material also includes cases of Dutch (A-)scrambling to study the effect of the scale dimensions on sentence appreciation in non-stigmatized variation. Scrambling is a type of word order variation that is claimed to be motivated by information structural considerations in the theoretical literature (Verhagen 1986, Schaeffer 1997, 2000, Neeleman & Reinhart 1998, Broekhuis 2008, 2021, Neeleman & van de Koot 2008a; Broekhuis & Corver 2016: Chapter 13). No explicit social conventions exist around this type of word order variation. However, the (expert) judgments reported in the literature are matter of debate (see de Hoop 2016 and Broekhuis 2016), and experimental approaches to the phenomenon do not fully corroborate the claims made by theoretical linguists (e.g. de Swart & van Bergen 2011, Schoenmakers 2020, Schoenmakers et al. 2021). The discourse structure of the stimulus sentences in the experiment presented here are manipulated in such a way that the results are not only potentially informative about effects of the different scale dimensions; they may also contribute to an on-going discussion about a controversial type of word order variation.

The chapter proceeds as follows. Section 5.2 covers the debate on the reliability of formal and informal judgment data collection. The scale dimensions introduced above are then presented as an important factor in the interpretation of judgments collected through formal methods. The section continues with a review of three studies that report on a judgment experiment in which the scale dimension is manipulated. Section 5.3 presents a brief description of (A-)scrambling in the Dutch middle-field. The sentence judgment experiment is presented in Section 5.4. Sections 5.5 and 5.6 contain general discussion and conclusions.

5.2 Judgment data and task instructions

5.2.1 The reliability of judgment data

Schütze's (1996) seminal work on grammaticality judgments and linguistic methodology has sparked vivid discussion among linguists about which data source is best used in the formation of linguistic theory. Most of the questions involved pertain to the reliability of informally collected judgment data, i.e. to the reliability of introspective data—the type of data that has been used by most (theoretical) linguists for decades. Various researchers have sounded their concerns and argue that judgment data should instead be collected from a sample of naïve language users (i.e. “folk intuitions”), in numbers large enough to permit statistical analysis (e.g. Edelman & Christiansen 2003, Ferreira 2005, Wasow & Arnold 2005, Featherston 2007, 2019, 2020, Gibson & Fedorenko 2010, 2013, Gibson et al. 2013).¹ Their concerns include the fact

¹ See also the following threads on Greg Hickock and David Poeppel's language blog *Talking Brains*: www.talkingbrains.org/2010/06/egregious-act-of-methodological.html; www.talkingbrains.org/2010/06/weak-quantitative-standards-in.html.

that expert judgments are typically evaluations of a single sentence pair, without appropriate control conditions, and which may moreover be subject to self-priming effects due to prolonged contemplation. That is, sentences which sound awkward at first may start to sound better with long enough exposure (i.e. “syntactic satiation effects”, see Snyder 2021). Informally gathered expert judgments are also considered unreliable because of cognitive biases on the part of the researcher and/or their consulted community: as the researcher has a stake in the outcome of the experiment, they may be (subconsciously) biased. Moreover, when the researcher consults their colleagues or students, this community may (subconsciously) want to please the researcher and unknowingly take into account their non-verbal reactions in giving a judgment (the so-called “clever Hans effect” in social psychology, cf. Gibson & Fedorenko 2010). Their judgments may thus be swayed towards the expected outcome, or exaggerated to highlight a linguistic contrast. Finally, Wasow & Arnold (2005: 1482) claim that informal judgments in generative grammar about the *reason* for a sentence’s well- or ill-formedness have led to “the construction of elaborate theoretical edifices supported by disturbingly shaky empirical evidence.”

Other researchers maintain that the more traditional method of appealing to expert intuitions does in fact yield reliable data and has not held back progress in linguistic research (Phillips & Lasnik 2003, den Dikken et al. 2007, Grewendorf 2007, Phillips 2010, Sprouse & Almeida 2012, 2013, Sprouse et al. 2013, Newmeyer 2020, Sprouse 2018, 2020). Phillips (2010), for example, argues that expert intuitions have not led to widely accepted generalizations or theoretical claims that are spurious (with lasting impact). Although certain cases of questionable judgments can be found in earlier literature (see e.g. Labov 1996, Wasow & Arnold 2005, Featherston 2007, Gibson & Fedorenko 2013), they are usually widely discussed, and thereby constitute an environment for the formation of new theories. Note that many judgments reported in the literature are not in fact questionable but rather appeal to shared assumptions (see also Santana 2020). Phillips (2010) stresses that subtle contrasts in expert judgments likely remain in the gray area when presented to larger samples of non-linguistic subjects. One of the disadvantages of folk judgments, however, is that they are prone to confounding factors, or “performance effects”, which do not belong to the language system proper (e.g. Chomsky 1965, Bever 1970). Linguistically uninformed participants may also focus on aspects of the stimulus sentences that linguists are not generally interested in (Schütze 2020). Judgments collected through the formal methods will therefore not always lead to new insights, and a degree of interpretation is always necessary to incorporate these data as evidence for theoretical claims—certainly a higher degree than with introspective judgments that result from expert analysis (cf. Häussler & Juzek 2020). This raises the question how formally collected judgment data are best used to inform linguistic theory.

Various studies have tested sets of expert judgments against folk judgments collected through the formal methods. Sprouse & Almeida (2012) took the expert judgments from Adger’s (2003) textbook *Core Syntax* and collected the corresponding folk judgments using two different judgment tasks. The authors report that at least 98% of the expert judgments were replicated in the folk judgments. Sprouse et al. (2013), and later Mahowald et al. (2016), collected samples of expert judgment

contrasts from papers published in *Linguistic Inquiry* (2001–2010) and conducted series of judgment tasks to collect the corresponding folk judgments. These studies again reveal extremely high convergence rates between the two sources of data. A conclusion one might draw from these studies is that the expert judgments reported in the literature generally do not differ too much from the folk judgments collected through the formal methods. However, the above-mentioned studies only investigate the convergence rate between expert and folk judgments in clearly contrasting sentence pairs. Juzek & Häussler (2020), in contrast, tested another set of expert judgments from *Linguistic Inquiry* (2001–2010), analyzing items “at large” (i.e. without a counterpart). They still find a relatively high overall convergence rate between expert and folk judgments, but they also report cases with considerable divergence between the two.² Juzek & Häussler attribute this finding (in part) to differences in the construct measured by the two methods. They propose that folk judgments only reflect the *perceived well-formedness* of sentences in the linguistic community, whereas expert judgments are judgments about their *structural well-formedness*. That is, linguists are better trained to apply grammatical reasoning and are consequently less sensitive to confounding (extra-grammatical) factors.

5.2.2 Linguistic judgments in 3D

Another (related) issue concerns the elicited dimension of appreciation. Participants in Juzek & Häussler’s (2020) experiment were asked how natural the stimuli sounded to them with respect to their grammaticality. This formulation, eliciting responses in terms of “naturalness”, thus prompts judgments about the linguistic system. Various experimental researchers explicitly recommend this judgment scale, because it “highlights the receptive aspect and the speaking mode and, crucially, avoids confusing or leading informants with association-laden terms such as ‘grammatical’” (Featherston 2008: 74). Featherston (2021) adds that it moreover excludes associations with status and prestige. Schütze & Sprouse (2014) similarly recommend a judgment scale which asks about native speaker ability rather than frequency or plausibility.

Sometimes, however, participants are asked how likely they think it is that a stimulus sentence is produced by a native speaker of a language (see e.g. Trotzke et al. 2015 for an elaborate version of this). This formulation seems comparable to Schütze & Sprouse’s (2014) native speaker ability, except it crucially takes into account the surface probability of the string. This is an important difference, because participants are now asked to give a judgment about the linguistic reality, and not just about the grammar. But the linguistic reality sometimes meshes with the grammar linguists attempt to describe only poorly. For example, Kempen & Harbusch (2008) and Bader & Häussler (2010) report a considerable difference between folk judgments and frequency data extracted from a corpus. One possible reason for this gap is that

²These findings, and the discussion on questionable expert judgments more generally, warrant additional attentiveness to the judgments reported in linguistic papers, especially when the example sentences are complex or unusual. Expert judgments may sometimes be accepted by (expert) readers without much linguistic scrutiny on their part.

participants give low judgment scores to a particular structure when asked in an experimental setting, or claim to never use it, but in reality they use it regularly in colloquial speech (Labov 1975). As a case in point, van Bergen et al. (2011) describe a situation in which a speaker of Dutch uses the pronoun *hun* ‘them’ as a subject, in a conversation where they claim to be aware of the prescriptive rule that rejects this construction. When this error is pointed out to them, the speaker continues to express their disgust with their own error and the fact that the conversation is being recorded. Contradictions between introspection and behavior are especially problematic when the prescriptive norm is violated, because participants may feel inclined to demonstrate their knowledge of the language rules even when they are not instructed to do so. This tendency contaminates judgment scores in terms of the linguistic reality in particular. Thus, surface probability judgments may not be completely independent from the corresponding acceptability judgments, while the linguistic reality and judgments about the linguistic reality (which are based on a grammatical system) do not necessarily overlap. The choice for a given scale dimension in linguistic judgment experiments is therefore not a trivial matter.

Furthermore, even when participants are instructed to consider either of these dimensions specifically, it is conceivable that they spend as little effort as possible on processing the instructions provided to them (cf. Noordman & Vonk 1987). Some participants might even ignore the instructions altogether, especially those who are more familiar with sentence judgment experiments. Participant pools frequently exist for the most part of students, whose main reason to participate is that they receive a gift voucher or course credit upon completion of the task. One possible consequence is that these participants do not feel motivated to pay close attention to the instructions, since their “reward” does not depend on the quality of their answers. They may then attempt to use simple rules of thumb to check whether they can proceed with the experiment by relying on their previous experience with similar experiments. Their judgments will consequently reflect a dimension that they were not instructed to consult, which is based instead on their “linguistic feeling” (or *Sprachgefühl*, or *sentiment de la langue*).

The term *Sprachgefühl* is commonly used in philosophy of language, but although it is generally understood what it refers to in abstract terms, it is notoriously difficult to define in scientific terms (see Lindroth 1937, Kainz 1944, Schulte 1988). Romand (forthcoming) demonstrates moreover that the term has historically been used with different definitions in different disciplinary fields, by different authors, and even in different publications by the same authors. Siouffi (2018) suggests that the term in its current use is in some sort of *entre-deux* state between a technical and a “lay” sense.³ Essentially, it refers to subconscious opinions about the aesthetic value of an expression (Fortis 2019), or to the affective state that emerges from the interaction between a structural representation and the actual expression uttered

³Samuel Jay Keyser (p.c.) suggests that abstract or “lay” terminology may help to better understand art, in this case the linguistic feeling, because when we talk about such matters in scientific terms, the art itself may get lost. For example, the use of metaphor and impressionistic description, rather than standard technical vocabulary, is very common in music instruction and has been shown to be pedagogically effective (e.g. Barten 1992, 1998).

(Romand 2019, forthcoming). The *Sprachgefühl* thus pertains to psycho-aesthetic feelings of language users towards the form and meaning of a linguistic sequence, and is therefore “tainted with a suspicion of subjectivism” (Siouffi 2018: 98, my translation). Participants in judgment experiments are likely to perform inconsistently when instructed to judge sentences in terms of their linguistic feeling (cf. Bley-Vroman et al. 1988), and the aesthetic dimension is substantially different from the dimensions of acceptability and surface probability in that it does not necessarily entail considerations of a grammatical system or hypothetical encounters with a language. Rather, participants are encouraged to use their personal criteria when reporting judgments about their linguistic feeling, that is, the subjective component is precisely what sets it apart from more specific (quasi-)scientific dimensions. Note, however, that the relation between the linguistic feeling and the other dimensions is relatively unclear, as it is not common in linguistics to ask participants for aesthetic judgments.⁴

5.2.3 The influence of task instructions

Evidence that the scale dimension in linguistic judgment experiments impacts the outcome is limited. Cowart (1997: Chapter 4) maintains that the influence of the instructions can never be assumed, and presents an experiment in which two participant groups took part in the same task, under different instruction sets. He distinguishes “intuitive instructions”, which instruct the participants to use any grounds available (apart from prescriptive grammar rules) in judging the stimulus sentences, from “prescriptive instructions”, which were designed to invoke careful examination of their structural well-formedness. However, this distinction did not yield any differences relevant to linguistic theory. Cowart concludes with the general impression that participants are poor at intentionally adjusting their judgment criteria. Schütze & Sprouse (2014) submit that the researcher also has little control over these criteria (modulo matters of non-interest to the experiment).

However, two recent studies by Langsford et al. (2019) and Vogel (2019) provide evidence that the instructions in judgment experiments do have an impact on the outcome. Langsford et al. investigate the difference between two instruction types, measuring in the dimensions of *acceptability* and (confidence of) *grammaticality*.⁵ Their choice for these dimensions is based on the existence of so-called “grammatical illusions”, i.e. sentences which are fleetingly accepted by most participants in

⁴Romand (2019, forthcoming) distinguishes between *form feeling* and *formal feeling*. The term *form feeling* was coined by aestheticians and art historians, and principally refers to subconscious feelings about the patterning harmony within the art that is language (Fortis 2019), whereas the term *formal feeling* hails from the field of affective psychology and refers to “more abstract organizational dimensions of conscious experience” (Romand forthcoming: 22). The aesthetic judgments elicited in the current study can be regarded as representations of the *form feeling*, whereas the acceptability judgments arguably come closer to the *formal feeling*.

⁵The terms *grammaticality* and *acceptability* are sometimes used interchangeably, but refer to distinct concepts (e.g. Bard et al. 1996, Schütze 1996, Sprouse 2007, Häussler & Juzek 2020). One of the pertinent differences is that the *grammaticality* of a sentence is evaluated against a grammatical theory and is consequently a categorical notion. The *acceptability* of a sentence cannot be defined in such a way, and is a gradual notion (see Keller 2000, Sorace & Keller 2005, Fanselow et al. 2006).

judgment experiments, but turn out to be completely nonsensical on closer scrutiny (Bock & Miller 1991, Drenhaus et al. 2005, Vasishth et al. 2008, Wagers et al. 2009, Phillips et al. 2011, Parker & Phillips 2016, Wellwood et al. 2018, Leivada & Westergaard 2020). Langsford et al. (2019) include three grammatical illusions in their experiment, exemplified in (1).

- (1) a. More people have been to Russia than I have.
- b. A man who had no beard was ever thrifty.
- c. The key to the cabinets are on the table.

The experiment moreover includes sentences with multiple center embeddings (e.g. *The rat the cat the dog chased killed ate the malt*; see Chomsky & Miller 1963). Such sentences are grammatical, but typically receive low acceptability scores in judgment experiments because they are unparseable due to resource limitations of the comprehension system. The constructions in (1) and the center-embedding sentences have in common that their acceptability and grammaticality statuses diverge. In addition to these constructions, Langsford et al.'s (2019) experiment contains a subset of Sprouse et al.'s (2013) stimuli for which the expert judgments differed from the folk judgments. Langsford et al. hypothesize that their stimuli will elicit different judgment scores depending on the specific instructions participants receive.

The results of this experiment indicate that the grammaticality judgment scores are more extreme than the acceptability judgment scores, but there is no clear discrepancy in the judgment pattern between the two instruction types. The largest differences are found in the agreement attraction sentences (1c), which receive higher judgment scores on the acceptability scale than on the grammaticality scale, and in the multiple center-embedding sentences, which show the reverse pattern. These findings are in accordance with the linguistic literature. Crucially, the items drawn from Sprouse et al. (2013) receive similar judgment scores under both instruction types. Langsford et al. perform a State Trace Analysis (Kalish et al. 2016) on their data, but do not find evidence that distinct dimensions were contemplated in the judgment process under the two instruction types. However, they do find evidence that the instructions in a judgment experiment can impact the outcome, that is, the instructions can be used to guide the decision making process of the participants (to a certain extent).

Additional evidence for this is presented in Vogel (2019), in the form of a judgment experiment which takes cases of stigmatized variation, or “grammatical taboos”, as its stimuli. The experiment consists of three subexperiments, which differ only in the scale dimensions. These experiments elicit judgments in terms of *normativity*, *possibility*, and *aesthetics*. Vogel hypothesizes that prescriptive norm violations are a specific type of morphosyntactic variation, since their markedness is caused by extra-grammatical factors. Based on the historical development of the stigmatized auxiliary use of *tun* ‘do’ in German (Langer 2001, Davies & Langer 2006), he suggests that the relation between the three scale dimensions in question might be as illustrated in (2). The reason for this is that auxiliary *tun* ‘do’ was first rejected in poetic

registers; the more general grammars of (written) German only followed several decades later. Aesthetic judgments about this taboo are therefore potentially less compromising than judgments in terms of the linguistic norm. Judgments about whether an expression is possible in German at all are considered the most liberal.

(2) beautiful (poetic) language < norm-compliant language < informal language

Vogel's (2019) experiment crosses a taboo and a non-taboo variant of 32 experimental items (of four different taboo phenomena) with a grammatical and an ungrammatical variant, in which the ungrammaticality was due to an agreement error on the finite verb. A sample item is given in (3), adapted from Vogel (2019: 56, his (15)), with the different types of markedness indicated in boldface. The grammaticality manipulation was added to the design on the hypothesis that the between-participant variation in judgments about grammatical taboos is larger than in judgments about grammar-internal markedness, because the former are subject to sociolinguistic conventions.

- (3) a. *Damals hat Hans gut gelesen.* [+gramm., -taboo]
 then have.3SG Hans well read
 'In those days, Hans was a good reader.'
- b. *Damals **tat** Hans gut lesen.* [+gramm., +taboo]
 then **do**.PST3SG Hans well read
- c. *Damals **haben** Hans gut gelesen.* [-gramm., -taboo]
 then have.3PL Hans well read
- d. *Damals **taten** Hans gut lesen.* [-gramm., +taboo]
 then **do**.PST3PL Hans well read

Vogel (2019) reports that, across all sentence types (including filler items), the aesthetic scores are only slightly worse than the normativity scores. These judgment types show a comparable pattern overall, which Vogel takes to suggest that the scale dimensions of aesthetics and normativity may not be completely independent from each other. However, the difference between the two is relatively large in the grammatical taboo conditions (aesthetics: 18.7%, normativity: 24.5%), implying an additional aesthetic disadvantage for the cases of stigmatized variation. The elicited possibility scores are considerably better than the aesthetic and normativity scores, thereby providing evidence for the prediction in (2). However, the grammatical taboo phenomena still receive a relatively low average possibility score of 36.1%.

Nevertheless, the grammatical taboos receive better judgments than the cases of intra-grammatical markedness. The difference between the grammatical taboos and ungrammatical sentences is the largest in the dimension of possibility. This finding is not surprising: despite their high degree of sociolinguistic stigmatization, grammatical taboos exist in the linguistic reality. Vogel (2019) refers to this as the *paradox of grammatical taboos*; for a particular construction to be stigmatized, it

must exist in the language system and occur in the linguistic reality. His data further show larger between-participant variation in grammatical taboos than in grammar-internal markedness.⁶ The degree of variation is largest in the aesthetic scores (which highlights the subjective nature of the dimension), and decreases via the normativity scores to the possibility scores. This same pattern was found for the grammatical taboo phenomena and the grammar-internally marked sentences, except there was no decrease in variation from the normativity scores to the possibility scores in the grammatical taboos. Vogel concludes that the difference in scale dimensions cannot neutralize the high level of sociolinguistic controversy.

The findings in Langsford et al. (2019) and Vogel (2019) indicate that the instructions in linguistic judgment experiments can impact the outcome of the experiment. However, this effect is most salient with marked constructions, i.e. grammaticality illusions or violations of the prescriptive norm. The results remain inconclusive with regards to cases of non-stigmatized variation. The present chapter extends the research question to cases of non-stigmatized variation in a novel judgment experiment. The experiment elicits judgments in the dimensions of *acceptability*, *probability*, and *aesthetics*. The stimuli contain three Dutch grammatical taboos, in an attempt to replicate Vogel's findings for German, and a set of scrambling sentences, which are not subjected to sociolinguistic stigmatization.

5.3 Scrambling in the Dutch middle-field

In Dutch, definite objects may occupy various positions in the middle-field of the clause, i.e. the typological region between the finite verb, or the complementizer in embedded clauses, and the clause-final main verb. An example is given in (4), where the object *het boek* 'the book' may appear on the left or right side of the clause adverb *waarschijnlijk* 'probably'.

- (4) *Jan heeft (het boek) waarschijnlijk (het boek) gelezen.*
Jan has the book probably the book read
'Jan probably read the book.'

There is a consensus in most of the theoretical literature that scrambling is regulated by discourse packaging conditions: definite objects that appear on the left side of clause adverbs (in "scrambled" position) are claimed to be presuppositional (i.e. topical and/or anaphoric), and objects that appear to their right (in "unscrambled" position) are claimed to be non-presuppositional (i.e. focused and/or non-anaphoric) (Verhagen 1986, Schaeffer 1997, 2000, Neeleman & Reinhart 1998, Broekhuis 2008, 2021, Neeleman & van de Koot 2008a; Broekhuis & Corver 2016: Chapter 13). Deviations from this discourse template are considered highly awkward (see Schoenma-

⁶It is unclear whether this comparison was with the grammar-internally marked test items or with separate filler items with grammar-internal markedness, since the experimental lists also contain 21 ungrammatical filler items as well as nine filler items which are "syntactically marked according to the standard criteria" (Vogel 2019: 57). Vogel refers to the "marked filler items" in this discussion, and no reference is made to the ungrammatical test items until much later in the paper.

kers 2020), yet some researchers argue that scrambling is much more optional in this regard than is generally assumed (van der Does & de Hoop 1998, de Hoop 2000, 2003, 2016, van Bergen & de Swart 2009, 2010, Schoenmakers 2020, Schoenmakers et al. 2021). De Hoop (2016), for instance, expresses her disagreement with some of the judgments reported in Broekhuis & Corver (2016: Chapter 13). Consider the dialogue in (5). Broekhuis & Corver mark Speaker B's utterance as an unacceptable answer to Speaker A's question, because the direct object *de verkeerde* 'the wrong one' is new to the discourse and should thus not be able to surface on the left side of the clause adverb. Not agreeing with this judgment, de Hoop calls for efforts to collect empirical data to test such theoretical assumptions.

(5) **Speaker A:**

Ik heb het aan Peter verteld.

I have it to Peter told

'I told it to Peter.'

Speaker B:

Dan heb je de verkeerde waarschijnlijk ingelicht.

then have you the wrong.one probably informed

'Then you probably informed the wrong person.'

Such data are presented in van Bergen & de Swart (2009, 2010), who conduct a large-scale corpus study to investigate the scrambling behavior of different types of direct objects in spontaneous speech. One of the factors they investigate is the anaphoricity of direct objects. They find 7% of the non-anaphoric definite objects, and, strikingly, only 22% of the anaphoric definite objects in scrambled position. This finding indicates that anaphoricity does influence object placement in the expected direction, but also that there is a general preference for the unscrambled word order. De Swart & van Bergen (2011) find no support for the claim that non-anaphoric definite objects obligatorily surface in unscrambled position in an experimental follow-up study either: in a sentence completion task, 13.7% to 34.1% of the non-anaphoric definite objects (depending on the order of presentation of constituents) were produced in scrambled position.

Schoenmakers et al. (2021) conduct a similar sentence completion experiment in which the anaphoricity and topicality of definite objects is manipulated. They report that anaphoric definite objects were produced in scrambled position more frequently than non-anaphoric objects, and topics more frequently than foci (in line with the above-mentioned discourse template). However, the scrambling proportions are nowhere near categorical: 34% of non-anaphoric foci were produced in scrambled position, and 43% of anaphoric topics were left unscrambled. Schoenmakers et al. conclude that scrambling is relatively optional; it is influenced, but not determined, by information structure. So far, experimental studies on Dutch scrambling which report on a sentence judgment experiment have not investigated the influence of information structure, but they do show that scrambled and unscrambled sentences receive similarly high judgments scores on a scale of possibility when presented free of context (de Swart & van Bergen 2011, Schoenmakers & de Swart

2019). Thus, the question remains whether judgments change when the discourse status of the object is manipulated, as predicted in most of the theoretical literature, and to what extent this finding hinges on the scale dimension.

5.4 A sentence judgment experiment

This section presents a novel sentence judgment experiment, inspired by the experiment reported in Vogel (2019). The stimulus material contains an item set with grammatical taboos and an item set with scrambling sentences. Different participant groups are instructed to judge sentences on one of three scales, designed to elicit judgments in terms of the linguistic system (*acceptability*), the linguistic reality (*probability*), or their linguistic feeling (*aesthetics*). Based on Vogel's findings, the acceptability and aesthetic judgment scores are predicted to be worse than the probability judgment scores. A second prediction is that the difference between the acceptability and aesthetic judgment scores is more pronounced in items with a grammatical taboo than in the scrambling items, because grammatical taboos are subject to strong sociolinguistic stigmatization. Moreover, the experiment manipulates the information structure of the scrambling sentences to test the assumption of a strict discourse template. Topical definites should then show a preference for the scrambled position, and focused definites for the unscrambled position, although all combinations are predicted to receive judgment scores at the high end of the scale (cf. Schoenmakers et al. 2021), presumably independently of the dimension of the scale.

5.4.1 Participants

204 native speakers of Dutch volunteered to take part in the online questionnaire, the vast majority of which was recruited via an e-mail chain with the aim of sampling from a heterogeneous population. Data from 36 participants were discarded, because they did not complete the full survey. Data from thirteen participants were removed because they gave more than a quarter of the fillers an unexpected judgment score. Unexpected scores were defined prior to statistical analysis as scores under 40% for the grammatical fillers and scores over 60% for the ungrammatical fillers. Data from one participant were removed, because they mentioned the term *scrambling* in a follow-up question about the purpose of the experiment. Data from one participant were removed, because they did not show variance in their responses (the overall standard deviation in their responses was only 1.75). In the end, data from 153 participants (90 female, 62 male, 1 "other"; mean age = 48.51, age range = 18–91, SD = 20.89) were entered into statistical analysis.

5.4.2 Materials

The questionnaire closely followed the design of the experiment in Vogel (2019). There were three versions of the experiment, which only differed in the task instruc-

tions. The experimental items in each version were identical. The different versions of the experiment were designed to elicit judgments in the dimensions of *aesthetics*, *acceptability*, and *probability*; see (6) for the corresponding questions and scale labels. These were repeated for each experimental item.

(6) a. **Aesthetic judgment:**

Hoe mooi vind je de formulering van de bovenstaande zin?

How nice do you find the wording of the above sentence?

niet mooi Nederlands — heel mooi Nederlands

not nice Dutch — very nice Dutch

b. **Acceptability judgment:**

Hoe goed vind je de bovenstaande zin als Nederlandse constructie?

How good do you find the above sentence as a construction of Dutch?

niet goed Nederlands — heel goed Nederlands

not good Dutch — very good Dutch

c. **Probability judgment:**

Hoe waarschijnlijk vind je het dat de bovenstaande zin is uitgesproken door een moedertaalspreker van het Nederlands?

How likely do you think it is that the above sentence has been uttered by a native speaker of Dutch?

niet waarschijnlijk — heel waarschijnlijk

not likely — very likely

The experiment contained 108 experimental items, 36 of which contained a grammatical taboo, and 24 of which contained scrambling sentences. All experimental items can be found in the appendix. The grammatical taboo items were constructed in a similar way as in Vogel (2019) and contained a grammatical taboo or its prescriptively correct equivalent. Each item was then paired with ungrammatical variants which contained an agreement error on the finite verb. Every target sentence was preceded by a short preamble which served no independent function, other than establishing a degree of similarity with the scrambling items. The grammatical taboo items contained three violations of the prescriptive norm: errors in the use of the comparative particles *als* and *dan*, the use of *hun* as a subject, and the use of auxiliary *doen* in habitual or intentional contexts. A sample item for each grammatical taboo is given in (7), (8), and (9), with the causes of markedness indicated in boldface. Grammatical taboo items never contained a clause adverb or scrambling construction, to avoid priming effects with the scrambling sentences.

(7) **Comparative *als***

Vincent heeft aan een hardloophwedstrijd meegedaan. In zijn categorie deden 50 mannen mee. Vincent is als 48^e geëindigd.

‘Vincent participated in a running race. 50 men took part in his category. Vincent finished 48th.’

- a. *Vincent is langzamer dan de meeste mannen.* [+gramm., -taboo]
 Vincent is slower than the most men
 'Vincent is slower than most men.'
- b. *Vincent is langzamer **als** de meeste mannen.* [+gramm., +taboo]
 Vincent is slower **ALS** the most men
- c. *Vincent **zijn** langzamer dan de meeste mannen.* [-gramm., -taboo]
 Vincent **are** slower than the most men
- d. *Vincent **zijn** langzamer **als** de meeste mannen.* [-gramm., +taboo]
 Vincent **are** slower **ALS** the most men

(8) **Subject *hun***

Arthur is een cadeau aan het bedenken voor het jubileum van zijn ouders. Opeens heeft hij een geweldige ingeving: hij gaat ze een weekendje weg aanbieden.

'Arthur is thinking of a present for his parents' anniversary. Suddenly, he has a great idea: he is going to offer them a weekend away.'

- a. *Arthur weet dat zij naar Parijs willen.* [+gramm., -taboo]
 Arthur know.SG that they to Paris want
 'Arthur knows that they want to go to Paris.'
- b. *Arthur weet dat **hun** naar Parijs willen.* [+gramm., +taboo]
 Arthur know.SG that **HUN** to Paris want
- c. *Arthur **weten** dat zij naar Parijs willen.* [-gramm., -taboo]
 Arthur know.PL that they to Paris want
- d. *Arthur **weten** dat **hun** naar Parijs willen.* [-gramm., +taboo]
 Arthur know.PL that **HUN** to Paris want

(9) **Auxiliary *doen***

Rosa heeft een belangrijke brief ontvangen van haar makelaar. Ze weet niet goed hoe ze erop moet antwoorden. Na veel wikken en wegen vraagt ze haar moeder om hulp.

'Rosa received an important letter from her real estate agent. She doesn't quite know how to answer it. After much deliberation, she asks her mother for help.'

- a. *Rosa gaat vanavond op de brief reageren.* [+gramm., -taboo]
 Rosa go.SG tonight on the letter respond
 'Rosa will respond to the letter tonight.'
- b. *Rosa **doet** vanavond op de brief reageren.* [+gramm., +taboo]
 Rosa **do**.SG tonight on the letter respond

- c. Rosa **gaan** vanavond op de brief reageren. [-gramm., -taboo]
Rosa go.PL tonight on the letter respond
- d. Rosa **doen** vanavond op de brief reageren. [-gramm., +taboo]
Rosa do.PL tonight on the letter respond

The scrambling sentences were constructed in four variants, with the factors *object position* (scrambled, unscrambled) and *context type* (topic, focus) in a 2x2 design. Each target sentence was preceded by a brief preamble, which served to identify the object in the target sentence as the topic or focus. The object of the target sentence was always introduced in the first sentence of the preamble.⁷ The subsequent dialogue either revolved around this object, which licensed it as the topic in the target sentence, or around the subject, which licensed the object as the focus in the target sentence. In the topic condition, the preambles explicitly mentioned the target object a second time and continued to provide more information about it. In the focus condition, the target object was not mentioned again or referred to in any other way. Moreover, the subject of the target sentence in this condition took the form of a pronoun to mark it as the topic (cf. Givón 1988). Using a pronominal subject made the target sentences sound more natural and reinforced the focused status of the object. Care was taken that the preambles did not contain scrambling clauses. Each target sentence had a S-Aux-O-V structure, with the auxiliary *gaan* ‘will’ (lit. ‘go’), and a clause adverb on the left or right side of the object. All objects were referential nouns preceded by a definite article, placed in scrambled (OBJ – ADV) or in unscrambled (ADV – OBJ) position. The objects and adverbs were matched for length in syllables to avoid effects of grammatical weight. A sample item is given in (10) and (11).

(10) **Topic condition**

Nora heeft een interessant museum ontdekt. Het is een wetenschappelijk museum met een uitgebreide collectie. Binnenkort wordt een nieuwe expositie geopend.

‘Nora discovered an interesting museum. It is a science museum with an extensive collection. A new exposition will be opened soon.’

Target sentence:

Nora gaat (het museum) absoluut (het museum) bezoeken.

Nora goes the museum absolutely the museum visit

‘Nora will absolutely visit the museum.’

⁷This entails that the target objects were always anaphoric. It has been claimed that it is the object’s anaphoricity, and not its topicality, that determines its position relative to adverbs (e.g. Schaeffer 1997, 2000, Erteschik-Shir 2007). However, the distinction between anaphoric topics and anaphoric foci yielded a significant effect in the expected direction in Schoenmakers et al.’s (2021) sentence completion experiment. It is therefore anticipated that a manipulation of topicality will yield similar effects in the experiment presented here.

(11) **Focus condition**

Nora heeft een interessant museum ontdekt. Ze wil zich al een tijd meer verdiepen in de archeologie. Binnenkort heeft ze een weekendje vrij.

‘Nora discovered an interesting museum. She has been wanting to indulge more in archeology for a while. She has a weekend off soon.’

Target sentence:

Ze gaat (het museum) absoluut (het museum) bezoeken.

she goes the museum absolutely the museum visit

‘She will absolutely visit the museum.’

The grammatical taboo items and scrambling items were distributed over four experimental lists according to a Latin Square design. 48 unrelated filler items were added to each experimental list, which were identical across lists. Twelve filler items were unmarked grammatical sentences. Twelve more filler items were ungrammatical sentences and contained a violation of V2, a violation of verb-final in complex main clauses, or an error in gender agreement (e.g. **het papegaai* ‘the parrot’). 24 filler items were “marked”, in the sense that they contained an error that is not generally considered a serious (grammatical) error. These items contained anglicisms (Zenner et al. 2012), violations of the *Animate First* principle (Lamers & de Hoop 2014), and past participles in first sentence position (Schoenmakers & Foolen forthcoming). Each experimental list contained 108 items. These lists were pseudorandomized in two distinct orders, using the software Mix (van Casteren & Davis 2006). Each list started with at least three filler items (one from each category). Scrambling items were at least four items apart, as were grammatical taboos of the same type (comparative *als*, subject *hun*, auxiliary *doen*) and, within the item set with grammatical taboos, items in the same condition of either factor (\pm taboo and \pm grammaticality). The experiment was conducted in Qualtrics.

5.4.3 Procedure

The experiment was an online questionnaire in which participants were randomly assigned to one of the three versions. They were asked to carefully read the general instructions and to rate sentences in the instructed dimension. After the experiment started, participants would read brief preambles to a sentence and were asked to judge this sentence on the basis of the preceding information, using a slider bar on a scale from 0% to 100%. The slider bar was initially set to 50% for each trial and participants were forced to move it to continue to the next trial, which was presented on a new page.

5.4.4 Results

First, the mean scores of the filler items across the elicited dimensions are displayed in Table 5.1. These data confirm that the filler item categories were judged in the intended manner. Thus, participants were invested enough to follow the instructions given to them and carefully read the sentences. Grammatical filler items received

the most positive judgment scores at the high ends of the scales, and ungrammatical filler items received judgment scores at the very low ends of the scales. Marked filler items received judgment scores near 50%, which indicates that participants were indecisive about their aesthetics, acceptability, and probability.⁸ Notice that the judgment scores for the (unmarked) grammatical fillers are much lower in the aesthetic dimension than in the two other dimensions.

	Aesthetics	Acceptability	Probability
Grammatical fillers	68.80 (21.70)	78.50 (25.61)	81.03 (22.05)
Marked fillers	43.26 (31.59)	47.56 (37.26)	50.29 (35.62)
Ungrammatical fillers	13.87 (20.20)	14.94 (25.15)	14.41 (22.08)

Table 5.1: Mean judgment scores and standard deviations (between brackets) for the different categories of filler items in three dimensions

Grammatical taboos

The results for the grammatical taboo item set are visually represented in Figure 5.1. In general, the judgment patterns are similar in all dimensions, with the grammatical variants receiving the highest scores by far, and the ungrammatical variants receiving judgment scores at the very low ends of the scales. There are two deviations from the general pattern, which are related to the dimension of the scale. First, while the grammatical taboos received similarly low judgment scores in the dimensions of aesthetics (16.93%) and acceptability (17.83%), they were much better appreciated in the dimension of probability (46.38%). Second, the unmarked (grammatical non-taboo) variants are judged considerably worse on the aesthetics scale than on the two other scales. Notice finally that the two types of markedness seem to trigger an additive effect: variants that contained both a grammatical taboo and an agreement error received judgment scores visibly lower than variants with only one type of markedness. This effect emerges in all three dimensions, but is smallest in the dimension of probability (if it exists there in the first place).

The results per grammatical taboo are displayed in Table 5.2. The general pattern is the same for each grammatical taboo: they receive judgment scores at the low end of the aesthetics and acceptability scales, and much higher judgment scores on the probability scale. The cases with comparative *als* received the highest mean scores in each dimension, with a considerable margin, especially in the dimension of probability. This discrepancy may be related to the fact that the *als/dan* variation is one of the most well-known cases of stigmatized variation, and made its first appearance in prescriptive grammars as early as in the 16th century (see van der Meulen 2018). By contrast, subject *hun* was not described until 1911 (see van Bree 2012), and auxiliary *doen* is currently still mostly restricted to southern parts of the Netherlands and the Achterhoek (Sert 2020). It must therefore be noted that, while

⁸The marked filler items also have the highest standard deviations. However, this might be due to ceiling and bottom effects in the judgment scores of the other categories.

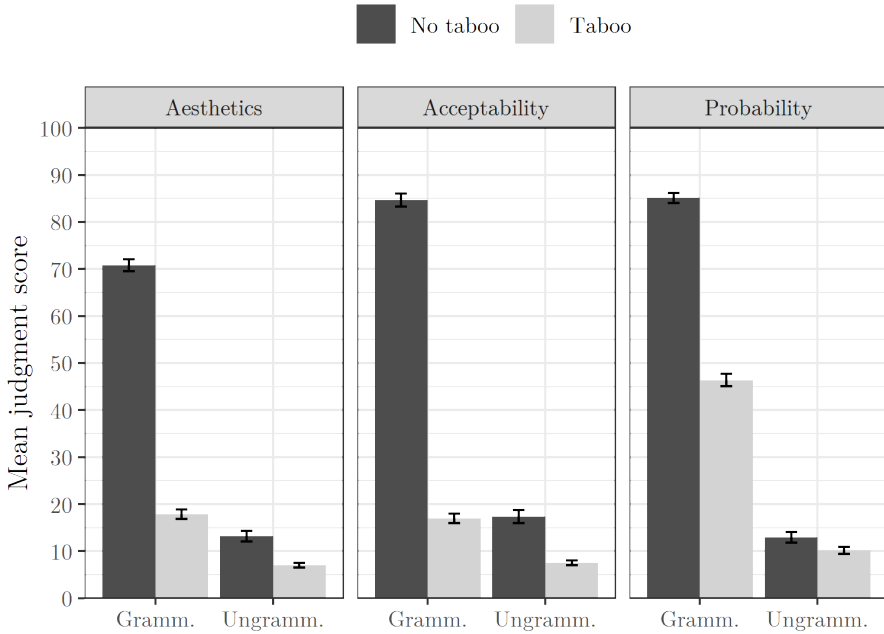


Figure 5.1: Mean judgment scores per condition for the grammatical taboo item set in three dimensions (error bars indicate within-subject standard errors from the mean)

judgments of grammatical taboos are clearly influenced by the dimension of the scale, their overall appreciation may differ per grammatical taboo.

	Aesthetics	Acceptability	Probability
Comparative <i>als</i>	24.79 (26.44)	21.18 (28.28)	61.15 (26.77)
Subject <i>hun</i>	15.71 (21.02)	14.24 (22.15)	47.48 (28.55)
Auxiliary <i>doen</i>	12.99 (17.77)	15.38 (22.16)	30.52 (27.28)

Table 5.2: Mean judgment scores and standard deviations (between brackets) per grammatical taboo in three dimensions

A linear mixed-effects model was performed on the z-transformed judgment data using the software R (version 4.0.5, R Core Team 2020) and the *lme4* package (Bates et al. 2015). The variables *judgment dimension*, \pm *taboo*, and \pm *grammaticality* were entered into the model as fixed effects. The dimension of acceptability was set as the reference category for the variable *judgment dimension*. Both two-level factors were coded using deviation contrasts (-.5, .5). The random structure of the initial

version of the model was maximal, with by-participant and by-item intercepts and by-participant and by-item slopes for the effect of both fixed factors (following Barr et al. 2013). When the model failed to converge, its random structure was simplified by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final version of the model included by-participant and by-item random intercepts, and a by-participant random slope for the effect of \pm *taboo*. The reported *p*-values were calculated with the normal approximation to the *t*-value.

The grammatical taboo model yielded a significant effect of \pm *grammaticality* ($\beta = 0.997$, $SE = 0.025$, $t = 39.255$, $p < .001$) and \pm *taboo* ($\beta = -0.997$, $SE = 0.038$, $t = -26.05$, $p < .001$). This confirms that, across all dimensions, the grammatical variants were better appreciated than the ungrammatical variants, and the non-taboo variants were better appreciated than the taboo variants. The model moreover yielded a significant interaction effect between these two factors ($\beta = -1.461$, $SE = 0.051$, $t = -28.781$, $p < .001$); this effect is likely driven by the high judgment scores of the grammatical non-taboo sentences. Further, items were judged significantly better in the dimension of probability than in the dimension of acceptability ($\beta = 0.082$, $SE = 0.023$, $t = 3.545$, $p < .001$). This effect appears to be driven by the relatively high judgment scores of items containing a grammatical taboo in the probability dimension (see Figure 5.1). This is supported by the significant two-way interaction effects between *judgment dimension* (probability) and \pm *grammaticality* ($\beta = 0.446$, $SE = 0.035$, $t = 12.730$, $p < .001$) and between *judgment dimension* (probability) and \pm *taboo* ($\beta = 0.443$, $SE = 0.053$, $t = 8.400$, $p < .001$), and the significant three-way interaction between *judgment dimension* (probability), \pm *taboo*, and \pm *grammaticality* ($\beta = 0.522$, $SE = 0.070$, $t = 7.445$, $p < .001$). The difference between judgment scores in the dimensions of aesthetics and acceptability was not significant ($\beta = -0.019$, $SE = 0.023$, $t = -0.825$, $p = .409$), nor were the two-way interaction effects between *judgment dimension* (aesthetics) and \pm *grammaticality* ($\beta = 0.069$, $SE = 0.036$, $t = 1.944$, $p = .052$) and between *judgment dimension* (aesthetics) and \pm *taboo* ($\beta = 0.102$, $SE = 0.054$, $t = 1.894$, $p = .058$), or the three-way interaction effect between *judgment dimension* (aesthetics), \pm *taboo*, and \pm *grammaticality* ($\beta = 0.025$, $SE = 0.071$, $t = 0.345$, $p = .730$). Thus, the judgment patterns, in terms of the variables \pm *taboo* and \pm *grammaticality*, did not differ significantly between the acceptability and aesthetics scales, but they did differ significantly between the acceptability and probability scales.

Scrambling

The results for the scrambling item set are visually represented in Figure 5.2. The judgment patterns are again similar across dimensions, with lower judgment scores on the aesthetics scale than on the acceptability and probability scales. The scrambled variants received higher judgment scores than the unscrambled variants on each scale, yet all four conditions received a judgment score at the high end of the scale. Definite objects are thus better appreciated in scrambled position than in unscrambled position, regardless of their topicality. But when compared to the filler items, all scrambling clauses are judged as acceptable, likely to be produced by a native speaker, and to a lesser extent aesthetically pleasing (scrambled or unscram-

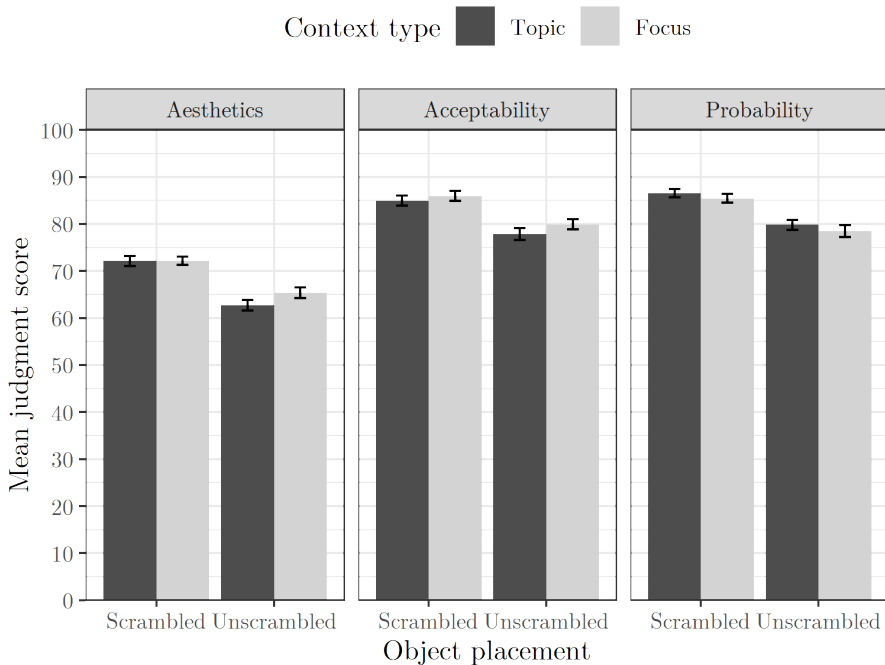


Figure 5.2: Mean judgment scores per condition for the scrambling item set in three dimensions (error bars indicate within-subject standard errors from the mean)

bled, topical or focused). The manipulation of the discourse context did not have an effect that is clearly visible from Figure 5.2.

A linear mixed-effects model was performed on the z -transformed judgment data using the software R (version 4.0.5, R Core Team 2020) and the *lme4* package (Bates et al. 2015). The variables *judgment dimension*, *object position* (unscrambled, scrambled), and *context type* (topic, focus) were entered into the model as fixed effects. The dimension of acceptability was set as the reference category for the variable *judgment dimension*. Both two-level factors were coded using deviation contrasts (-.5, .5). The random structure of the initial version of the model was maximal, with by-participant and by-item intercepts and by-participant and by-item slopes for the effect of both fixed factors (following Barr et al. 2013). When the model failed to converge, its random structure was simplified by step-wise removal of the smallest variance component (following Matuschek et al. 2017). The final version of the model included by-participant and by-item random intercepts, and a by-participant random slope for the effect of *object position*. The reported p -values were calculated with the normal approximation to the t -value.

The model yielded a significant effect of *object position* ($\beta = 0.171$, $SE = 0.041$, $t = 4.156$, $p < .001$), confirming that scrambled variants were judged better than

unscrambled items in general. The effect of *context type* did not reach significance ($\beta = 0.031$, $SE = 0.025$, $t = 1.254$, $p = .210$), nor did the interaction effect between *object position* and *context type* ($\beta = -0.017$, $SE = 0.050$, $t = -0.342$, $p = .732$). This means that the experiment did not provide evidence for a discourse template of sorts. Regarding the different scale dimensions, the difference between the acceptability and probability scores was not significant ($\beta = -0.053$, $SE = 0.031$, $t = -1.702$, $p = .089$), but the aesthetic scores were significantly lower than the acceptability scores ($\beta = -0.081$, $SE = 0.032$, $t = -2.567$, $p = .010$). The model did not yield a significant interaction effect between *judgment dimension* (aesthetics) and *context type* ($\beta = -0.006$, $SE = 0.035$, $t = -0.182$, $p = .856$) nor between *judgment dimension* (probability) and *context type* ($\beta = -0.056$, $SE = 0.035$, $t = -1.609$, $p = 0.108$). The interaction effect between *judgment dimension* (aesthetics) and *object position* was not significant ($\beta = 0.078$, $SE = 0.058$, $t = 1.357$, $p = .175$), nor was the interaction effect between *judgment dimension* (probability) and *object position* ($\beta = -0.002$, $SE = 0.057$, $t = -0.033$, $p = .964$). Neither of the three-way interactions reached significance (aesthetics: $\beta = -0.061$, $SE = 0.070$, $t = -0.869$, $p = .385$; probability: $\beta = 0.003$, $SE = 0.069$, $t = 0.042$, $p = .966$).

5.4.5 Discussion

The results of the judgment experiment demonstrate that the manipulation of scale dimensions had an effect on the outcome. In the grammatical taboo item set, judgment scores were significantly higher in the dimension of probability than in the dimension of acceptability. This effect is due to the relatively high probability scores for items that contained a prescriptive norm violation. Further, the judgment scores for grammatical non-taboo variants were considerably worse on the aesthetics scale, a penalty that also emerged in the grammatical filler items and in the scrambling sentences (where the difference was significant). These findings indicate that participants took into consideration the dimension of the judgment scale, and were more critical when instructed to judge sentences in terms of their linguistic feeling (aesthetics) than when they were instructed to judge them in terms of the linguistic system (acceptability).

The finding that the judgment scores for grammatical taboos were elevated in the dimension of probability is not unexpected, as native speakers of Dutch are aware that these stigmatized constructions exist in the linguistic reality. Arguably, however, the mean judgment score is still rather low (46.38%), considering the prevalence of grammatical taboos in colloquial language use. This suggests that participants in the probability condition did not judge the sentences independently of the dimension of acceptability, that is, they may have wanted to demonstrate their knowledge of the prescriptive grammar rules despite not being instructed to do so. The question arises whether there are similar differences in the judgment process for cases of non-stigmatized variation. The experiment presented here does not provide evidence for this. However, there is no guarantee that all elicited judgment scores are on a uniform scale.

Unexpected findings in the scrambling item set

Based on the results from Schoenmakers et al. (2021), the prediction for the scrambling sentences was that all variants would receive high judgment scores, with discourse conditions motivating object placement. Specifically, topics were expected to be better appreciated in scrambled position, and foci in unscrambled position. This is not what we find. Instead, scrambled objects received better judgment scores than unscrambled objects regardless of their topicality. This finding is unexpected, as most of the theoretical literature postulates a strict discourse template which reserves the scrambled position for topics and the unscrambled position for foci (Verhagen 1986, Schaeffer 1997, 2000, Neeleman & Reinhart 1998, Broekhuis 2008, 2021, Neeleman & van de Koot 2008a; Broekhuis & Corver 2016: Chapter 13). Deviations from this discourse template (i.e. unscrambled topics and scrambled foci) were expected to receive worse judgment scores than their information structurally better-behaved counterparts. The general preference for scrambled definite objects is also unexpected, given that van Bergen & de Swart (2009, 2010) find a preference for the unscrambled position in their corpus data, and Schoenmakers & de Swart (2019) moreover find in a sentence judgment experiment that scrambled and unscrambled sentences with a clause adverb receive similar judgment scores at the high end of the scale when presented free of context. Note, however, that the differences in judgment scores for scrambled and unscrambled items in the experiment presented here are smaller than 10%, and that the unscrambled sentences still received judgment scores at the very high end of the scale.

A possible explanation for both observations is that the objects in the present experiment were part of the common ground in both the topic and the focus conditions, because they were always anaphoric (see footnote 7). The possibility that presuppositionality (or anaphoricity) is the most important determinant in scrambling, and not discourse prominence (topicality), could explain the general preference for scrambled objects as well as the non-significant difference between the context types. Note, however, that a manipulation of topicality was enough to elicit a significant effect in Schoenmakers et al.'s (2021) experiment. The discrepancy with the findings presented here can be understood as a task difference. Recall that two sentences can be equally acceptable while there is a distinct preference for one of them in language production (e.g. Kempen & Harbusch 2008, Bader & Häussler 2010). Such a discrepancy has in fact been reported for Dutch scrambling sentences before (de Swart & van Bergen 2011, Schoenmakers & de Swart 2019).

Another possible explanation for the unexpected findings is that (some) participants were not fully engaged in the context, because of its non-evident role in (and the overall length of) the experiment. If so, the manipulation of context type was unsuccessful, and participants may have used the definite article as a proxy for information structure instead (Givón 1988, cf. also Coussé 2009). That is, participants may have interpreted the target objects as presuppositional regardless of the manipulation of context type. Note, however, that on either possibility, the relatively high judgment scores for the unscrambled sentences are unexpected on the assumption that this position is reserved for non-presuppositional (discourse-new) information.

5.5 General discussion

The main research question of this study was whether the dimension of the scale in judgment experiments can impact their outcome. Earlier studies report inconclusive results for cases of non-stigmatized variation (Cowart 1997, Langsford et al. 2019), or examined specific constructions with a grammatical illusion or grammatical taboo phenomena (Langsford et al. 2019, Vogel 2019). The findings in the current study replicate the results in Vogel (2019) for cases of stigmatized variation in Dutch. Grammatical taboo phenomena received higher judgment scores on the scale of probability than on the scale of acceptability. These results seem to reflect the fact that grammatical taboos are frequent in colloquial speech despite the prescriptive norms that reject them. The results presented here differ from Vogel's results in one crucial respect. Vogel reports that the aesthetic judgments were only slightly worse than the normative judgments even in the non-taboo variants of the stimuli, yet the difference between the aesthetic and acceptability judgments presented here was only small for grammatical taboos—not for the unmarked variants. Instead, the acceptability scores for these sentences were much higher, closer to the probability scores. One possible reason for this discrepancy is that the stimulus sentences in the experiment presented here were accompanied by linguistic context. The preambles may have influenced the aesthetic judgments in a negative way, through lack of poetic flourish. Moreover, the “P-judgments” in Vogel's experiment were judgments in terms of mere *possibility* in all varieties of German, while the experiment presented here elicited judgments in terms of *probability* (i.e. likelihood of a sentence having been pronounced by a native speaker). Judgment in terms of possibility might be more lenient than judgment in terms of probability.

The novel findings indicate that the aesthetic judgment scores were also decreased in cases of non-stigmatized variation, when compared to the acceptability judgment scores. One possible explanation for this difference is that the two judgment scales reflect Romand's (2019, forthcoming) distinction between *form feeling* and *formal feeling*. The difference between these terms is that the form feeling pertains to the psycho-aesthetic, in part socially determined, impression of a string (cf. Fortis 2019), whereas the formal feeling describes an affective state towards the mapping of the mental representation of a sentence and its structure onto the actual utterance (here, terms such as *expectation*, *satisfaction*, and *deception* are used). The instructions in the aesthetics condition possibly motivated participants to rely on their form feeling, whereas the acceptability (and probability) instructions pushed them towards judgment criteria based on their formal feeling instead. The aesthetic judgment scores were worse than the acceptability (and probability) judgment scores for grammatical sentences across the board. Although aesthetic judgments are not commonly elicited in linguistic research, here they indicate that participants in linguistic judgment experiments do take into account the dimension of the scale. The difference between the acceptability and probability judgment scores was not significantly different in the scrambling item set; they only diverged in sentences which contained a grammatical taboo. Given the prevalence of grammatical taboos in the linguistic reality, however, the probability (or possibility) scores for grammati-

cal taboos are arguably still rather low (Dutch: 46.38%; German: 36.1%, from Vogel 2019). This can be taken as an indication that participants are not just considering the instructed dimension in their judgment process; rather, their judgments represent considerations from a composite of multiple dimensions (cf. Chaudron 1983). The judgment process can then be manipulated by the experimenter through the dimension of the scale, but they cannot exclusively enforce a given dimension onto their participants.

This is an important conclusion in light of the mapping between experimental data and linguistic theory. When interpreting the results of their experiments, experimental linguists must disentangle the grammatical and extra-grammatical factors that weigh in on the judgment process, and then make inferences about the grammaticality status of a construction on the basis of explicit theoretical assumptions (cf. Häussler & Juzek 2020). This process is very intricate if the results reflect an amalgamation of non-instructed considerations on the part of the participant, especially since these considerations can be vastly different conceptually. The experimental researcher should therefore consciously make decisions about the task instructions and scale dimension prior to testing (see also Marty et al. 2020), and moreover instruct participants explicitly which factors *not* to consider (cf. Schütze & Sprouse 2014). Interpreting the data afterwards entails reflection about whether judgments are primarily judgments about the linguistic system, the linguistic reality, or the linguistic feeling (or any other dimension).

To that end, Chaudron (1983), den Dikken et al. (2007), and Schütze (2020) suggest that engaging with participants in post-judgment discussion may shed some light on their considerations in the judgment process. However, such efforts could lead to a new set of problems. Nisbett & Wilson (1977) demonstrate that participant feedback in social psychology questionnaires about the cognitive processes underlying their judgments does not show any indication of real introspection. Participants instead seem to utilize “implicit a priori theories about the causal connection between stimulus and response” (Nisbett & Wilson 1977: 233). Inquiries about grammatical taboos, for example, will simply reinforce the sociolinguistic stigma and lead participants to respond in a way they think they should or in a way they think the researcher wants them to.⁹ Participant feedback on the consulted dimension(s) after a linguistic judgment experiment can be insightful to the trained linguist to a certain extent, but this feedback will not always be reliable.

Regarding the discussion on the empirical validity of expert and folk judgments, many researchers advocate for a way forward in linguistics that involves a multi-method approach to judgment data collection (Schütze 1996, Phillips & Lasnik 2003, Phillips & Wagers 2007, Featherston 2009, Culicover & Jackendoff 2010, Lewis & Phillips 2015, Juzek & Häussler 2020, Phillips et al. 2021, see also Schindler & Bröcker 2020), in which no one method of data collection is inherently superior to another,

⁹Of course, this is by no means a phenomenon specific to linguistics. Nosek (2007) demonstrates that explicit attitudes (e.g. judgments) and implicit attitudes (i.e. subconscious reactions) to many different concepts are not always strongly correlated. His investigation included socially sensitive topics (e.g. pro-life vs. pro-choice, gay vs. straight, Asians vs. Whites) as well as socially less sensitive topics (jazz vs. teen pop, letters vs. numbers, summer vs. winter).

and theoretical and experimental syntacticians work together instead. The choice for a method then depends on the research question of the study at hand, but does not preclude consideration of insights from other methods. In my view, this approach can further advance the field in an efficient manner. I do not believe that the discussion about which linguistic method is best will ever end. This discussion is an intrinsic part of research, which keeps researchers vigilant about potential strengths and weaknesses of their method of choice.

5.6 Conclusion

The dimension of the scale in judgment experiments impacts the results, whether the stimuli contain cases of stigmatized or non-stigmatized variation. Judgments about the probability of prescriptive norm violations are better than judgments about their aesthetic value or acceptability, which likely reflects the prevalence of such constructions in the linguistic reality. However, these judgments are only at approximately 50%, which suggests that participants might take into account considerations from multiple dimensions. Regarding the scrambling item set, the experimental results did not reveal judgment patterns according to the discourse template assumed in most theoretical literature. Instead, definite objects in scrambled position were better appreciated than those in unscrambled position (by a small margin), regardless of the information structural manipulation.

The probability and acceptability scores of all grammatical sentences in the experiment presented here were considerably better than the aesthetic scores of the same sentences. Thus, participants were more critical when they were asked to judge sentences in terms of their linguistic feeling than in terms of the linguistic system or the linguistic reality. What it is exactly that such judgments quantify is matter of debate, although definitions from the field of philosophy of language highlight its subjective nature, relating it to the broader perspective of affective psychology (Romand 2019, forthcoming) or art appreciation (Fortis 2019). Linguistic research has not been concerned with this question as much; instead, judgments have for the most part been elicited in terms of acceptability and surface probability. The experiment presented here revealed a difference in judgments across the three dimensions in cases of stigmatized and non-stigmatized variation. What led participants to their eventual judgment scores can never be assumed, but the dimension of the scale can serve as a first indication and should receive special attention in the experimental design stage.

Chapter 6

OV/VO variation and scrambling in historical Dutch

Abstract

This chapter addresses the relation between two types of word order variation in two stages of Dutch: OV/VO variation in historical Dutch and scrambling in Present-day Dutch. Information structural considerations influence both types of word order variation, and we demonstrate by means of a comprehensive corpus study that they have a comparable pattern: given objects tend to appear earlier in the sentence than new objects. We infer from this that the two types of word order variation are diachronically related. Our findings support an analysis of scrambling as object movement from a uniformly head-initial base via specifier of VP to the specifier of ν P. We argue that historical Dutch allows Spell Out of the object in its postverbal base position, but that this possibility was lost due to an internal pressure to reduce the optionality in Spell Out positions. Consequently, the boundary between the given and new domains shifts from the verb to the adverbial.

6.1 Introduction

The position of direct objects in Dutch clauses has always known a certain freedom. In Middle Dutch (1150–1500) and early New Dutch (1500–1700) (henceforth referred to collectively as historical Dutch), direct object DPs appear in postverbal (VO) or preverbal position (OV), illustrated in (1). In (1a), the object *die wijzen deser werelt* ‘the wise of this world’ is placed to the right of the main verb *beschamen* ‘shame’, and the object *dat riet* ‘that reed’ in (1b) is placed to the left of the main verb *ghemaect* ‘made’.¹

- (1) a. **VO in historical Dutch**
op dat hi soude beschamen die wijzen deser werelt
 so that he would shame that wise this.GEN world
 ‘so that he would shame the wise of this world’ [Peerle_1537–38]
- b. **OV in historical Dutch**
die dat riet ghemaect hadde
 who that reed made had
 ‘who made that reed’ [Gys_1340_1294]

The postverbal position was lost from the Dutch language after the 16th century. However, Dutch clauses still allow variation with respect to the position of the object vis-à-vis the position of adverbials. This phenomenon, known as *scrambling*, is illustrated in (2). The object *het boek* ‘the book’ may appear to the left or to the right of the clause adverb *waarschijnlijk* ‘probably’.

- (2) *dat Jan (het boek) waarschijnlijk (het boek) las.*
 that Jan the book probably the book read
 ‘that Jan probably read the book.’

OV/VO variation and scrambling have both been argued to regulate the information structural partitioning of the clause. From very early on, grammarians have been aware that given information tends to precede new information (Weil 1844, Behaghel 1909). The Dutch clause is no exception in this regard. Preverbal objects in historical Dutch, and objects that appear in a position to the left of the adverbial (“scrambled” objects) in Present-day Dutch are claimed to convey given information, while postverbal objects and “unscrambled” objects, which appear to the right of the adverbial, are claimed to convey new information.

This raises the question if, and if so, how, historical Dutch OV/VO variation and Present-day scrambling are related. Based on a comprehensive corpus study of Dutch written between the 13th and 19th century, we demonstrate that OV/VO variation and scrambling serve a similar purpose, because in both cases the position of the object is (in part) dependent on information structure. However, while scrambling was already a syntactic option in historical Dutch, its information structural

¹The text references have the following format: Corpus_DocumentID_Year of publication. We refer the reader to Section 6.3 for details regarding the text selection and to the appendix for an overview of the texts included in this study.

effect only emerges as the postverbal object position loses its productivity.

We demonstrate that in earlier stages of Dutch new objects typically occur in postverbal position, although they are also attested in preverbal position. Given objects surface in preverbal position in the vast majority of cases. There are no clear indications of information structural restrictions on scrambling as long as VO is a productive option in historical Dutch (until the 16th century). Once new objects start to appear in preverbal positions more frequently, scrambling becomes sensitive to information structure. The boundary between the information structural domains in which given and new information is expressed thus shifts from the verb to the adverbial in the so-called middle-field of the clause. The loss of VO entails the loss of an important pragmatic marker, and we show that the syntax of Dutch allows enough flexibility to generate a new information structural division within the topological region to the left of the verb, with the adverbial as the novel boundary between information structural domains.

We present an analysis of Dutch object placement which allows a natural transition from a language that marks information structure by means of OV/VO variation, to a strict OV language which does so by means of scrambling. We build on the anti-symmetric analysis of Dutch scrambling proposed in Broekhuis (2008), and argue that both OV/VO variation and scrambling are the result of the same process. Specifically, we argue that objects are generated in postverbal position and consequently move to structurally higher positions in the extended projections of VP and *v*P to check structural features, leaving behind copies in each intermediate position. Which of these copies is spelled out depends on (discourse-pragmatic) interface conditions. The lowest, postverbal, Spell Out option is lost after the 16th century, which we argue is the result of structural parsimony: only two (preverbal) positions are needed to encode information structure.

The chapter is organized as follows. Section 6.2 sets out the key issues and patterns that play a role in Dutch object placement, from a diachronic and a syntactic perspective. Section 6.3 presents our approach to the corpus data. The results are presented and discussed in Section 6.4. Section 6.5 presents our analysis of Dutch clause structure. Section 6.6 concludes.

6.2 Variation in Dutch object placement

Present-day Dutch is typically considered an asymmetric SOV language, with obligatory V2 in the main clause. Koster (1975) was the first to argue, on the basis of a number of distributional tests, that the position of the finite verb in main clauses is derived from a clause-final position. Although the object follows the verb in main clauses with only a finite verb, Koster shows that this is a surface phenomenon. He demonstrates that verb particles are stranded in clause-final position (*hij belde het meisje op* 'he calls the girl up'). In main clauses with more than one verb, the non-finite verb remains in clause-final position and the object is preverbal (*hij heeft het meisje opgebeld* 'he has the girl up.called'). Since there is no V2 movement in sub-clauses, DP objects always precede the verb in these cases (*dat hij het meisje opbelt*

‘that he the girl up.calls’). From this perspective, Dutch is an SOV language, at least on the surface. These observations do not preclude an anti-symmetric (cf. Kayne 1994) approach to Dutch clause structure, however. In fact, in later work Koster argues that SOV-clauses in Dutch are derived from underlying SVO structure (Koster 1999; see also Zwart 1993, 1994).² We will pursue such an analysis in Section 6.5.

The syntax of both Present-day and historical Dutch is frequently approached from the perspective of topological fields, or a so-called *tang* ‘brace’ construction, illustrated in Table 6.1 (first applied to Dutch by Paardekooper 1955). In main clauses, the finite verb in V2 position marks the left bracket of the brace, and the non-finite verb in clause-final position the right bracket. In subclauses, the complementizer serves as the left bracket, and the verb(s) in clause-final position as the right bracket.

Prefield	Left bracket	Middle-field	Right bracket	Postfield
<i>Hij</i>	<i>moest</i>	<i>inderdaad het paper</i>	<i>inleveren</i>	<i>op woensdag</i>
he	should	indeed the paper	submit	on Wednesday
	<i>dat</i>	<i>hij inderdaad het paper</i>	<i>moest inleveren</i>	<i>op woensdag</i>
	that	he indeed the paper	should submit	on Wednesday

Table 6.1: Illustration of topological regions and the “brace” construction in Dutch clauses

The assumption of a brace construction as a descriptive template allows differentiation between a prefield (material preceding the left bracket), a middle-field (material between the left and the right bracket), and a postfield (material following the right bracket). The locus of variation in object placement in historical Dutch is between the middle-field and postfield: direct objects appear in the middle-field (preverbally) or in the postfield (postverbally). The locus of variation in Present-day Dutch is in the middle-field (scrambling). We will discuss both types of variation in turn.

6.2.1 OV/VO variation in historical Dutch

OV/VO variation is one of the main syntactic characteristics of older (West-)Germanic language varieties, and sparked a vigorous debate on word order typology as well as on the analysis of individual languages (see e.g. van Kemenade 1987, Pintzuk 1999, Taylor & Pintzuk 2012, de Bastiani 2019, Struik & van Kemenade 2020, forthcoming on Old English; Petrova 2009, Sapp 2016 on Old High German; Sapp 2014 on Middle High German; Walkden 2014 on Old Saxon). This is also the case for historical Dutch, although traditional analyses often (implicitly) assume historical Dutch to be an OV language. VO order is usually accounted for by an extraposition rule, which is taken to be more liberal than in Present-day Dutch, which only allows full clauses (CPs) and non-predicative PPs in postverbal position (see Zwart 2011).

Burridge (1993: Chapter 3) approaches OV/VO variation in Middle Dutch from a topological perspective, and employs the term “exbraciation”, that is, displacement of material to a position outside of the brace. Similarly, Neeleman & Weerman (1992:

²However, Koster (2008) later argues for the return to the classical, pre-Minimalist analysis of Dutch.

189) assume VO structures to be “leakages in the older West-Germanic OV structures.” Most studies only give a descriptive overview of observed VO constructions and do not directly address the issue of underlying clause structure (e.g. Gerritsen 1978, van den Berg 1980, de Meersman 1980). Gerritsen (1987), Blom (2002), and De Schutter (2003) are notable exceptions, and all conclude on the basis of frequency that Middle Dutch is an OV language. Gerritsen (1987) adds as evidence that pronouns are always OV and argues that, since Proto-Indo-European was considered an OV language, positing a change from OV to VO and then back to OV is conceptually undesirable. An argument for Blom (2002) to assume that OV is the base order in Middle Dutch is that VO is only available under specific conditions: it can only be used when the object contains a relative clause or when the object belongs to the focus of the clause.

Weerman (1987, 1989) is one of the few who provides a syntactic analysis of OV/VO variation in historical Dutch. He argues that languages allow both orders at D-structure (in Government-Binding terms), since theta roles are assigned hierarchically and not directionally. However, constituent orders must be licensed at S-structure, which is administered by Case Theory, which assigns case directionally. Weerman argues that Present-day Dutch assigns case exclusively to the left, which results in basic OV order. His analysis of VO orders in Middle Dutch rests on the assumption that constituents can escape Case assignment if they have their own licenser, which Weerman claims is, at earlier stages, morphological case. This means that in Middle Dutch, which distinguished four morphological cases, the choice between OV and VO is essentially free (from a syntactic perspective). However, Dutch (largely) lost morphological case marking, which according to Weerman means that the a postverbal object can no longer be licensed. As a result, VO order is lost. A potential problem for such an analysis is the observation that German retained its inflections but, like Dutch, became more rigidly SOV. This suggests that more factors come into play in the process of word order change.

Much of the discussion in (recent) literature on OV/VO variation in historical West-Germanic revolves around the influence of information structure. The hypothesis that preverbal objects convey given information, and postverbal objects new information, has been explored for many (West-)Germanic language varieties (see e.g. Burridge 1993, Bech 2001, Blom 2002, Petrova 2009, 2012, Coussé 2009, Petrova & Speyer 2011, Taylor & Pintzuk 2012, Walkden 2014, de Bastiani 2019, Struik & van Kemenade 2020, forthcoming). Understanding the nature of the variation helps to inform the syntactic analysis of a language. Struik & van Kemenade (2020, forthcoming), for instance, show for historical English that objects in preverbal position predominantly express given information, while objects in postverbal position can be given or new. They take this as evidence for an analysis of historical English as a VO language, with leftward object movement that is driven by information structure.

The effect of information structure has also been explored in earlier studies of Middle Dutch. Burridge (1993: 107), for example, claims that “exbraciated material is likely to be non-topical material, i.e. usually unknown information, which cannot be understood from the context and which is not shared by speaker and hearer.” Burridge, however, is concerned with all types of sentence material that can be exbraciated, and bases her conclusions on general characteristics of gram-

matical categories, rather than on annotation of individual objects (e.g. objects are more likely to exbraciate than subjects, because they more frequently convey new information).

Blom (2002) notes that one of the factors responsible for VO order in Middle Dutch is that the object belongs to the focus of the clause as well.³ Blom studies the characteristics of postverbal objects in three different text genres: official texts, religious texts, and narratives. She observes that objects of naming verbs, such as *noemen* ‘call’ and *heten* ‘call’, are always postverbal, and maintains that this is due to the fact that this information is never part of the common ground. She also observes that there is a large amount of VO structures in official texts, which she claims is because direct objects in these clauses “encode the item that is at the heart of the legal agreement” (Blom 2002: 18). Similarly, Coussé (2009) uses the determiner as a proxy for information structure (following Givón 1988) and finds a relation between the definiteness of objects and their surface position: indefinite objects, which typically convey focused information, are more likely to appear postverbally than definite objects, which typically convey non-focused information.

6.2.2 Scrambling in Present-day Dutch

VO word order is lost from the Dutch language after the 16th century (see Coussé 2009), which restricted variation in object placement to the middle-field (as in (2) above). While experimental and corpus studies investigating this type of variation are scarce, various syntactic analyses have been proposed to account for scrambling in the theoretical literature (Verhagen 1986, Vanden Wyngaerd 1989, Zwart 1993, Neeleman 1994b, de Hoop 1996, 2000, 2003, Neeleman & Reinhart 1998, Koster 1999, 2008, Schaeffer 1997, 2000, Broekhuis 2008, Neeleman & van de Koot 2008a, Schoenmakers 2020). There is a consensus that information structure also plays a crucial role in scrambling. The literature discusses topicality (or “aboutness”, see Reinhart 1981), discourse-anaphoricity (i.e. explicit mention in previous discourse), and presuppositionality (the level of activation of a referent in the common ground; cf. *accessibility* in Ariel 1990). Schoenmakers et al. (2021) find in a language production study that the topicality status and the discourse-anaphoricity of definite objects induce distinct effects on their position in the middle-field. In general, however, scrambling follows the given-before-new pattern: given objects (topical and/or anaphoric) are more frequently produced to the left of the adverb (i.e. in scrambled position), while new objects (focused and/or non-anaphoric) are more frequently located to their right (i.e. in unscrambled position).

³ Focus (or “non-topicality”) and discourse-newness are related terms that are sometimes used interchangeably in the literature. However, the two terms do not refer to the same concepts. Foci are elements that express informative or contrary-to-expectation material (sometimes also called “rheme” or “comment”; see de Swart & de Hoop 2000). Although foci typically convey information that is new to the discourse, this is not necessarily the case, as evidenced by the discourse-given focus in (i).

- (i) **Speaker A:** Who does John’s wife love?
Speaker B: John’s wife loves [John]_{FOC}.

Such an information structural partitioning is supported by the fact that pronouns, which typically convey given information, appear in scrambled position almost obligatorily (but not if they receive contrastive stress, for example, see Bouma & de Hoop 2008), as illustrated in (3).

- (3) a. #*We moesten eerst **hem** voeren.*
 we had.to first him feed
 b. *We moesten **hem** eerst voeren.*
 we had.to him first feed
 ‘We had to feed him first.’

This contrast is reflected in the corpus data reported in van Bergen & de Swart (2009, 2010), who investigate the scrambling behavior of different kinds of objects in spoken Dutch: 99% of pronouns in their data-set appear in scrambled position. Only 2% of indefinite objects, which typically convey new information, are scrambled. They find most variation with proper names (53% scrambled). Van Bergen & de Swart find only 12% of definite objects in scrambled position. This is surprising, given that, on the assumption that the determiner can be used as a proxy for information structure (Coussé 2009), definite objects are expected to convey given information and hence to appear in scrambled position. Even more striking is that the authors also annotate for anaphoricity, and find that only 22% of anaphoric definite objects are located in scrambled position. This finding contradicts most theoretical literature, where a strict discourse template is postulated in which given objects obligatorily occur in scrambled position (see Schoenmakers 2020 and Broekhuis 2021 for discussion).

Van Bergen & de Swart (2009) note that speakers are more likely to use a pronoun instead of a full DP when the object is anaphoric. However, Schoenmakers & de Swart (2019) find in an experimental study, in which participants were forced to use definite DP objects in context-free scrambling clauses, that they are produced in scrambled position in 45% of the trials with a clause adverb. Schoenmakers et al. (2021) find in a follow up study that anaphoric definite objects are produced in scrambled position from 42% to 57% of the trials (depending on the condition), whereas non-anaphoric (focused) definite objects are produced in scrambled position in only 34.5% of the trials. But even though the proportion of scrambled anaphoric definites is much higher than that in the corpus data reported in van Bergen & de Swart (2009, 2010), the information structural partitioning in scrambling clauses in both studies is nowhere near categorical.

These data cannot readily be accounted for by most theoretical approaches to Dutch scrambling, which either link the information structural effect to a post-syntactic mapping rule that maps an anaphoric interpretation onto the scrambled position (e.g. Neeleman & van de Koot 2008a), or to Cinque’s (1993) *Nuclear Stress Rule*: objects in unscrambled position typically carry the main stress of the clause, and given that stress corresponds with new information focus assignment (e.g. Chomsky 1971, Jackendoff 1972, Cinque 1993), objects in this position are interpreted as information that is new to the discourse (e.g. Neeleman & Reinhart 1998, Broekhuis 2008). Objects in scrambled position, by contrast, undergo a process of

“anaphoric destressing” (Reinhart 2006) and convey information that is already available in the context set. Such analyses predict that given objects obligatorily occur in scrambled position, and new objects in unscrambled position (but see van der Does & de Hoop 1998 and de Hoop 2000, 2003 for notable exceptions).

Little is known about the diachrony of scrambling in Dutch. To our knowledge, this phenomenon has never been addressed in the literature on historical Dutch syntax. It is easy to show, however, that it is at least a syntactic option: we find objects in a position immediately left-adjacent to the verb (4a), but also in a position to the left of an adverbial (4b).

- (4) a. *naedat sij op ten xviii. julij haer legher te Heyloe opgebroken*
 after they on the 18 july their army at Heiloo dissolve
hadden
 had
 ‘after they had broken up their army at Heiloo on 18 July’
 [CLVN_Nanning van Foreest_1573–83]
- b. *dat diegene die dat bijer buten vueren sellen dat teyken daeraf in*
 that the.one who that beer outside carry will that proof thereof in
den poerten toenen sellen
 the gates show will
 ‘that the one who transports the beer out will show proof thereof at the
 gates’ [CLVN_Utrecht_1530–1539]

It is not clear, however, whether scrambling was already information structurally motivated in historical Dutch in the same way as in Present-day Dutch. This raises the question if, and how, scrambling is related to OV/VO variation.

6.2.3 Relating OV/VO variation and scrambling

The discussion above shows that Dutch allows (at least) three object positions throughout its history: VO, OV, and O-Adv-V. The literature suggests that OV/VO variation in historical Dutch and scrambling in Present-day Dutch serve a similar purpose; they differentiate the information structural domains of given and new information. This leads to the hypothesis that the two types of variation may be diachronically related: the loss of VO entails the loss of an important pragmatic marker and hence entails a shift in the locus of information structure encoding. The boundary between the information structural domains in historical Dutch is the verb, whereas in Present-day Dutch it is the adverbial in the middle-field. An analysis of Dutch object placement should allow for a natural transition from a system in which the verb serves as the boundary between the given-new domains to a system in which information structure is encoded in the middle-field. Before we can present a unified syntactic analysis, however, we first need to understand how OV/VO variation and scrambling are motivated synchronically, and how they develop diachronically.

The next sections report on a corpus study of historical Dutch in which we in-

investigate how the relation between syntax and information structure develops over time. We hypothesize that there is an effect of information structure on OV/VO in the earliest part of our data-set. More specifically, we expect to find given objects in preverbal position and new objects in postverbal position. As long as VO is a productive option in Dutch, we do not expect an effect of information structure on scrambling, because we expect OV objects to be given. As the frequency of VO reduces, the verb loses its status as the boundary between information structural domains. Information structure then “exploits” syntax to find a new way to distinguish between given and new information. Thus, we do not expect scrambling to have a clear discourse-related function in the earlier stages of Dutch and to become information structurally distinctive only after the 16th century, when VO is no longer a productive syntactic option.

6.3 A corpus study of historical Dutch

We studied a comprehensive selection of historical Dutch texts to test the hypotheses introduced in the previous section. Relevant clauses were manually collected from various sources over the time period between 1250 and 1900. The online version of the Corpus Gysseling was used for 13th century material and the Corpus van Reenen-Mulder (CRM, van Reenen & Mulder 1993) for 14th century material. The majority of texts in CRM are short charters, so we supplemented this material with several longer texts from the Corpus Laatmiddel- en Vroegnieuw-nederlands (CLVN, van der Sijs et al. 2018). The CLVN was also the source for 15th, 16th, and 17th century material. We used the Compilatiecorpus Historisch Nederlands (CHN, Coussé 2010) for narrative texts from the late 16th century onwards. We selected a representative sample of texts from each corpus based on the localization of each text. We excluded texts from the (north-)eastern part of the Netherlands to avoid potential influence from German, Low Saxon, and Frisian. The main body of texts originate from Holland, Utrecht, and Flanders. We supplemented the data-set with several religious texts to balance the overwhelmingly official nature of the earlier texts. This procedure resulted in a corpus of approximately 700,000 words. A complete overview of the material is given in the appendix.

For each text in our selection, we manually selected all subclauses with a direct object, a finite verb (excluding forms of *zijn* ‘be’, to exclude passives), and a non-finite verb (excluding *te* ‘to’ infinitives). Selecting clauses with two verbs ensures that there is no effect of (finite) verb movement on the order of the main verb and the object. Indirect objects were excluded, because their behavior is not comparable to that of direct objects. Although indirect objects do appear in postverbal position in historical Dutch, it is unclear whether they are subject to the same constraints as direct objects. Burridge (1993) notes that indirect objects are not as likely to appear postverbally as direct objects, but this might be because they are mostly pronouns in her sample. Research on Old English indicates that there is no conclusive regularity in the placement of indirect objects (Koopman 1990), and that information structure does not seem to play a role (Struik & van Kemenade 2020). We leave the behavior

of indirect objects for future research. Further, we excluded pronominal objects, as these are categorically OV. One could argue that pronouns are always preverbal because they are prototypically given; however, their syntactic status is different from that of full DPs. Pronouns are prosodically light elements and could be analyzed as clitics (see van Kemenade 1987, van Bergen 2003, Pintzuk 2005, and the sources cited there for discussion of the status of pronouns in Old English; see Zwart 1996 for a discussion of Dutch weak pronouns as clitics). We also excluded clausal objects, as these are categorically VO (cf. Gerritsen 1987, Burridge 1993).

After collecting relevant clauses, each object was manually annotated for *information status*. Our annotation is based on a simplified version of the Pentaset (Komen 2013) and follows the methodology in Struik & van Kemenade (2020, forthcoming). We annotate objects as “given” if they are mentioned in the preceding discourse (*Identity* in the Pentaset), as in (5a). The object *die vorseide kerke* ‘the aforementioned church’ is mentioned in the preceding discourse, which is also indicated by the adjective *vorseide* ‘aforementioned’. Objects are also annotated as “given” if their referent can be inferred from previous discourse (*elaborating inferables* in Birner 2006; *Inferred* in the Pentaset). This is illustrated in (5b), where *zyn ambocht* ‘his trade’ can be inferred from *gildebrueder* ‘guild brother’ mentioned earlier in the text, since members of a guild all practice the same trade. Finally, objects are annotated as “given” if they can be assumed to be familiar to the audience (*Assumed* in the Pentaset), i.e. if they represent encyclopedic or world knowledge, such as *de brandende hel* ‘the burning hell’ in (5c).

- (5) a. Identity
dat sie die vorseide kerke daer scadeloes ende vri
 that they that aforementioned church there without.damage and free
souden houden
 would keep
 ‘that they would indemnify the aforementioned church’
 [Gys_0681_1286]
- b. Inferred (elaborating)
ende zyn ambocht binnen der stat van Vtrecht niet geleert en had
 and his trade within the city of Utrecht not learned NEG had
 ‘and had not learned his trade within the city of Utrecht’
 [CLVN_Utrecht_1470–79]
- c. Assumed
als of ik de brandende hel met een stukje houtskool op graauw
 as if I the burning hell with a piece.of charcoal on gray
papier wilde schetsen
 paper wanted sketch
 ‘as if I wanted to sketch the burning hell with a piece of charcoal on gray
 paper’
 [CHN_paape_1789]

Objects that are newly introduced in the discourse are annotated as “new”. For example, the object *Anthuenis Inffroot* in (6a) is not mentioned before and is new

to the discourse. When the object is linked to an antecedent, but the relationship does not inherently follow, the object is also annotated as “new” (*bridging inferables* in Birner 2006). *Basilica* ‘basilica’ in (6b), for example, is linked to the preceding discourse by the adjective *naastgelegen* ‘adjacent’, which refers to a temple that has been mentioned before. However, the existence of a temple does not imply the existence of a basilica, and therefore, the object’s referent is new to the discourse.

(6) a. New

dat Ferry Bertram, bailliu van den Proosschen, of zijn dienaers als
 that Ferry Bertram governor of the Proossche or his servants as
ghisteren ghevanghen hadden Anthuenis Inffroot, poortere der
 yesterday captured had Anthuenis Inffroot citizen the.GEN
voorsejde stede.
 aforementioned city

‘that Ferry Bertram, governor of the Proossche, or his servants captured Anthuenis Inffroot yesterday, citizen of the aforementioned city.’

[CLVN_Brugge_1510–1520]

b. Inferred (bridging)

Nadat men de naastgelegen basilica gezien had die echter den
 after they the adjacent basilica seen had which however the
indruck van Poseidoons tempel niet kan evenaren.
 impression of Poseidon.GEN temple not could match

‘After they had seen the adjacent basilica, which, however, could not match the impression of Poseidon’s temple.’ [CHN_Vosmaer_1880]

In some of the cases, objects are non-referential, because they are abstract, quantified or negated, part of a fixed expression, or for some other reason do not refer to a real-world referent. These objects are annotated as “inert” and were discarded prior to statistical analysis.

Scrambling is annotated by documenting the adjacency of the object and the non-finite verb. Objects which are not adjacent to the non-finite verb, but have an intervening adverbial, are annotated as “scrambled”; objects which are preceded by an adverbial, but followed by another, are also annotated as “scrambled”. We take adverbials as a diagnostic for scrambling in the broad sense of the word: we not only include clauses with an adverb, but with any adjunct (including DP adverbs and PPs). Adverbs and other (structurally more complex) adjuncts occupy the same structural position; they adjoin to VP or some higher maximal projection. Including any adjunct as a diagnostic for scrambling should therefore not make a difference on syntactic grounds. Objects adjacent to the verb and preceded by an adverbial are annotated as “unscrambled”. If no adverbial is present in the middle-field, the sentence is recorded as “ambiguous”, since in those cases the surface order does not provide evidence for or against scrambling.

6.4 Results

This section discusses the results of our corpus study. Section 6.4.1 discusses the relation between information structure and OV/VO variation in historical Dutch; Section 6.4.2 discusses the relation between information structure and scrambling in historical Dutch. We discuss our findings and their implications in Section 6.4.3.

6.4.1 Information structure and OV/VO variation

We collected 2245 analyzable subclauses with a finite verb, non-finite verb, and an object. 1419 of these sentences contain a referential object. The distribution of given and new objects across OV and VO word orders per century is given in Table 6.2, along with the percentage of VO constructions.

	13 th C.		14 th C.		15 th C.		16 th C.		17 th C.		18 th C.		19 th C.	
	OV	VO	OV	VO	OV	VO	OV	VO	OV	VO	OV	VO	OV	VO
New	38	71	16	27	25	24	32	23	41	6	51	1	49	0
Total	109		43		49		55		47		52		49	
%VO	65.1%		62.8%		49.0%		41.8%		12.8%		1.9%		0%	
	OV		VO		OV		VO		OV		VO		OV	
	OV	VO	OV	VO	OV	VO	OV	VO	OV	VO	OV	VO	OV	VO
Given	250	54	111	13	147	11	166	12	114	1	83	0	53	0
Total	304		124		158		178		115		83		53	
%VO	17.8%		10.5%		7.0%		6.7%		0.9%		0%		0%	

Table 6.2: Distribution of given and new objects across OV and VO word orders per century (C.)

There is a consistent strong preference for given objects to occur in preverbal position throughout the centuries. While they occur in postverbal position with some frequency in the earliest period, VO with given objects is clearly the minority pattern. There is more variation in the placement of new objects. These occur in postverbal position at higher frequencies (even though their overall number is much lower) and for a longer period of time. Although gradually declining, VO with new objects is productive until the 16th century, but its occurrence reduces dramatically after that. VO is arguably lost from the language after the 16th century, as only 4.3% of all objects occur in postverbal position in the 17th century (although this position remains available as a minority pattern until the 18th century). These findings demonstrate that given objects are strongly associated with the preverbal position throughout the history of Dutch. New objects also surface in preverbal position, but could also surface freely in postverbal position before the 17th century.

To test the statistical validity of these observations we fitted a binary logistic regression within a generalized mixed model using the *glmer* function from the *lme4* package (Bates et al. 2015) in the software R (v4.0.3, R Core Team 2020). We take *object position* (OV, VO) as the dependent variable, with VO set as the reference category. The fixed factors included in the model are *information status* (given,

new), *length* (of the object, measured as the logarithm of the number of letters), and the interaction between *information status* and *century*. The addition of the interaction term controls for the diachronic reduction of the VO order and for the reduction of the influence of the object's information status. Before entering the variables into the model, we applied a non-linear transformation to the variable *century* by subtracting 13 from each data point, thereby anchoring the value 0 to the first century in our data-set. Furthermore, we centered the variable *length* around the mean. *Information status* was treatment-coded (contrasts of 0, 1). We added varying intercepts for *textID* (the specific text an item was extracted from) to the random structure of the model. This lets the model evaluate the effect of the fixed factors while taking into consideration the variation between individual texts.

We find significant main effects of *length* ($\beta = -1.016$; SE = 0.110; $z = -9.251$; $p < .001$) and *information status* ($\beta = -2.224$; SE = 0.287; $z = -7.764$; $p < .001$) on the surface word order. Shorter objects are more likely to be placed in preverbal position than longer objects, and given objects are placed in preverbal position more frequently than new objects. The coefficients of the two levels of *information status* in interaction with the effect of *century* represent a significant rise in the use of preverbal objects as time progresses for both new objects ($\beta = 0.822$; SE = 0.102; $z = 8.045$; $p < .001$) and given objects ($\beta = 0.664$; SE = 0.104; $z = 6.410$; $p < .001$). Table 6.3 presents the odds ratios and 95% confidence intervals for each of the fixed effects. These values represent the size of an effect and indicate whether the influence of a particular factor increases the odds of objects appearing in preverbal position (values below 1) or in postverbal position (values above 1).

Model Term	Odds Ratio	95% CI for O.R.	
		Lower	Upper
(Intercept)	0.595	0.417	0.773
<i>length</i>	2.761	2.246	3.462
<i>information status</i>	9.244	5.374	16.637
<i>information status</i> (new) * <i>century</i>	0.440	0.354	0.530
<i>information status</i> (given) * <i>century</i>	0.515	0.414	0.624

Table 6.3: Odds ratios and confidence intervals of the fixed effects which explain the distribution of objects relative to the verb in our corpus

The odds ratio for *length* indicates that with each one unit increase in object length, the chances that this object appears in postverbal position are 2.76 times larger. The odds ratio for the variable *information status* indicates that new objects are 9.24 times more likely to appear in postverbal position than given objects. Notice that the odds ratios for the interactions between *information status* and *century* are below 1, which confirms that the chances for given and new objects to appear in preverbal position increase over time. Figure 6.1 visualizes the effects of *information status* and *century* on *object position*.

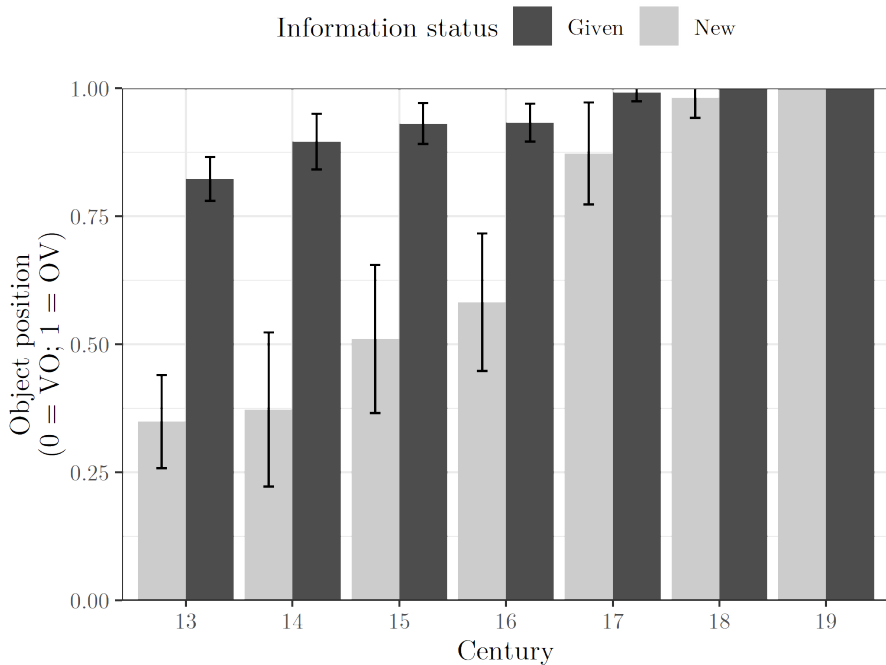


Figure 6.1: Objects in pre- and postverbal position per *information status* and *century* (error bars represent the 95% confidence intervals for the means)

6.4.2 Information structure and scrambling

610 out of 1176 referential preverbal objects in our data-set contain an adverbial which provides unambiguous evidence for scrambling. The data are presented in Table 6.4, along with the percentage of scrambled constructions. Given objects scramble at a consistent high rate throughout the history of Dutch. Scrambling with new objects is also frequent in the earlier centuries, but it should be noted that the overall number of new items in preverbal position is low, as new objects frequently appear in VO order (cf. the previous subsection). New objects show a distinct preference for the unscrambled position from the 16th century onwards (i.e. after the postverbal position was lost). That is, as the overall number of new objects in preverbal position increases over time, the proportion of new objects in scrambled position reduces and becomes more stable.

To test the statistical validity of these observations we fitted a binary logistic regression within a generalized mixed model using the *glmer* function from the *lme4* package (Bates et al. 2015) in the software R (v4.0.3, R Core Team 2020), similar to the model presented in the previous subsection. Here, we take *object position* (scrambled, unscrambled) as the dependent variable, with the unscrambled order as the reference category. The fixed factors included are *information status* (given,

	13 th C.		14 th C.		15 th C.		16 th C.		17 th C.		18 th C.		19 th C.	
	OA	AO	OA	AO	OA	AO	OA	AO	OA	AO	OA	AO	OA	AO
New	9	4	5	3	8	7	5	11	8	18	7	29	5	22
Total	13		8		15		16		26		36		27	
%OA	69.2%		62.5%		53.3%		31.3%		30.8%		19.4%		18.5%	
	OA		AO		OA		AO		OA		AO		OA	
	OA	AO	OA	AO	OA	AO	OA	AO	OA	AO	OA	AO	OA	AO
Given	66	16	39	9	60	7	79	24	53	16	47	18	24	11
Total	82		48		67		103		69		65		35	
%OA	80.5%		81.3%		89.6%		76.7%		76.8%		72.3%		68.6%	

Table 6.4: Distribution of given and new objects across scrambled (OA) and unscrambled (AO) word orders per century (C.)

new) and the interaction between *information status* and *century*. Adding the (log-transformed) variable *length* to the model did not result in a significant main effect on the outcome variable, or in a significant improvement of the overall model ($\chi^2(1) = 0.720, p = .396$). We consequently excluded this variable for reasons of parsimony. *Information status* was treatment-coded (contrasts of 0, 1), and the same non-linear transformation was applied to *century* as in Section 6.4.1. We added varying intercepts for *textID* to the random structure of the model.

We did not find a significant main effect of *information status* ($\beta = -0.896$; SE = 0.478; $z = -1.875$; $p = .061$), which indicates that there is no evidence for a difference between given and new objects in terms of their overall placement relative to the adverbial. The interaction effect between *information status* (given) and *century* did not reach significance ($\beta = -0.115$; SE = 0.067; $z = -1.708$; $p = .088$). Thus, the surface position of given objects in the Dutch middle-field did not change significantly over time. We did find a significant interaction effect between *information status* (new) and *century* ($\beta = -0.419$; SE = 0.109; $z = -3.841$; $p < .001$), indicating that the scrambling behavior of new objects changes over time. The odds ratios can be found in Table 6.5. The odds ratio of the interaction between *information status* (new) and *century* is below 1 (0.658), which indicates that new objects become more likely to surface in unscrambled position as the centuries pass. The effect of *information status* and *century* on *object position* is visualized in Figure 6.2.

Model Term	Odds Ratio	95% CI for O.R.	
		Lower	Upper
(Intercept)	2.218	0.976	5.270
information status	2.451	0.946	6.280
information status (new) * century	0.658	0.526	0.810
information status (given) * century	0.891	0.782	1.021

Table 6.5: Odds ratios and confidence intervals of the fixed effects which explain the distribution of objects relative to the adverbial in our corpus

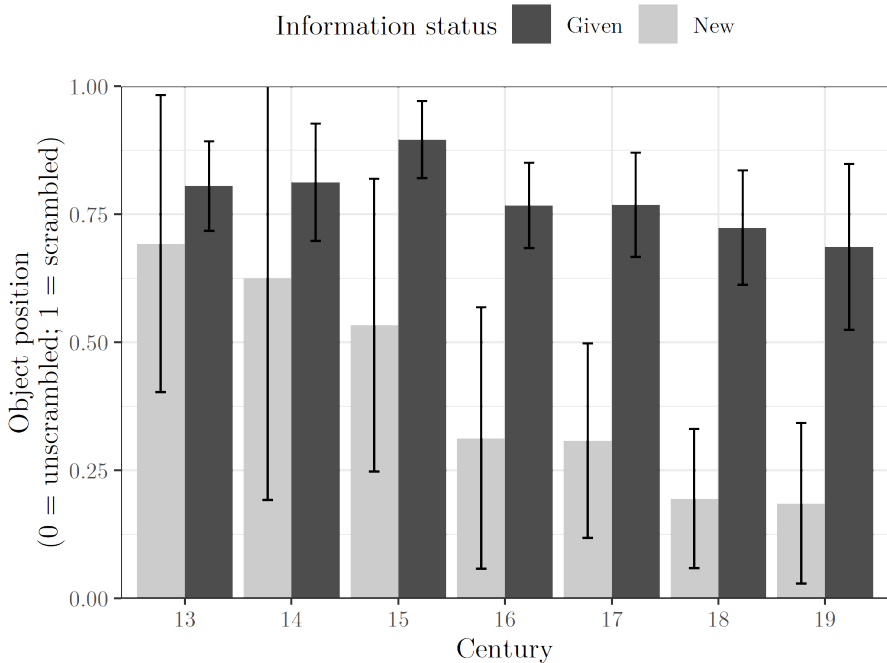


Figure 6.2: Objects in unscrambled and scrambled position per *information status* and *century* (error bars represent the 95% confidence intervals for the means)

6.4.3 Discussion

The results presented in Sections 6.4.1 and 6.4.2 demonstrate that object placement in Dutch has relied heavily on information structure throughout the history of the language. However, the locus of variation seems to change over time. The position of new objects play a key role in this observation.

When VO was a productive word order in the language, the alternation with OV was (at least partially) governed by information structure. Given objects show a strong preference for the preverbal position throughout the entire period. New objects, in contrast, show a preference for the postverbal position—until this position is lost after the 16th century, after a period of gradual reduction. At this point, the verb can no longer function as the boundary between information structural domains, since new objects must now appear preverbally as well. The option to place preverbal objects before or after the adverbial (scrambling) already existed in the early stages of Dutch. Our corpus data indicate that the scrambled position was the preferred object position in pre-15th century Dutch, regardless of information status (although the overall number of preverbal new objects was relatively small in this period). As the frequency of VO reduces, new objects increasingly surface in unscrambled position. This shift is visualized in Figure 6.3, which demonstrates the development

of objects in terms of OV/VO variation and scrambling, based on the frequencies and percentages from Table 6.2 and Table 6.4 for new and given objects respectively. Given objects show a consistent preference for the preverbal, scrambled position. However, as new objects start to occur in preverbal position *more* frequently (OV), they start to occur in scrambled position *less* frequently (scrambling). This suggests that there is a relation between the loss of VO and the emergence of scrambling as an information structurally meaningful operation. The boundary between the information structural domains thus seems to have shifted from the verb to the adverbial.

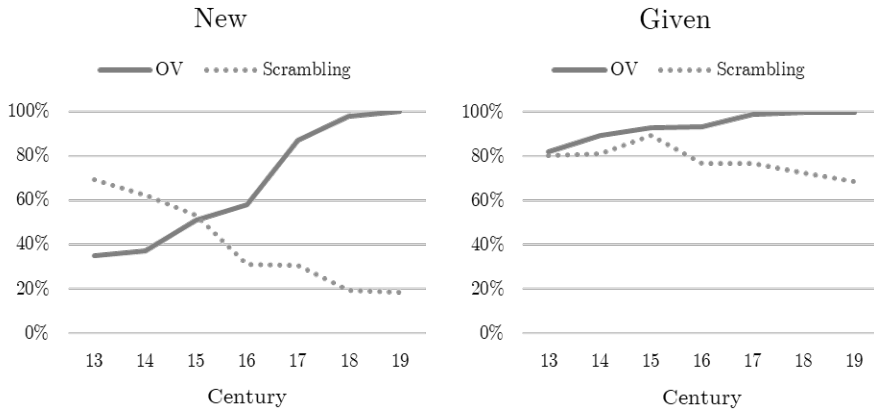


Figure 6.3: Development of new and given objects in terms of scrambling and OV/VO variation

In the next section, we propose a syntactic analysis of the variation in object placement in the history of Dutch, which allows for a natural transition from one locus of variation (the verb) to another (the adverb). We show that this can be achieved in an anti-symmetric model in which information structure is not directly encoded but follows from interface conditions.

6.5 An analysis of Dutch object placement

The previous section has shown that OV/VO variation in historical Dutch and scrambling in Present-day Dutch have a similar function and seem to be diachronically related; both variations mark the information status of direct objects. Given objects are predominantly preverbal throughout the history of Dutch and scramble at a high rate. The surface position of new objects, on the other hand, gradually shifts from a (largely) postverbal position to a preverbal position to the right of an adverbial (i.e. unscrambled position). A syntactic analysis of object placement should therefore not only comprise a synchronic analysis of OV/VO variation and scrambling; it

should also bring out the diachronic relatedness between the two phenomena. We propose that an anti-symmetric account with object movement from a postverbal base position, building on Broekhuis (2008) and with multiple Spell Out options, accounts for the facts presented in the previous section.

6.5.1 An anti-symmetric account of object placement

We present an account of scrambling in Present-day Dutch that involves movement of the object (following Vanden Wyngaerd 1989, Schaeffer 1997, 2000, Broekhuis 2008) and will generally follow the analysis presented in Broekhuis (2008). Broekhuis adopts Kayne's (1994) theory of anti-symmetry, which claims that linguistic structure universally follows the same specifier-head-complement order. Under this view, the underlying structure of Dutch is VO. OV surface order in complex main clauses and subclauses results from leftward object movement motivated by structural factors.

An anti-symmetric analysis of Dutch clause structure can straightforwardly derive both the synchronic and diachronic variation discussed in the previous section. While earlier approaches are able to account for synchronic OV/VO variation and middle-field scrambling independently, they do not provide a conceptually coherent account of the diachronic functional overlap between the loss of VO and scrambling in the middle-field. In the traditional analysis of historical Dutch as an OV language with rightward extraposition to derive VO (Burrige 1993, Weerman 1987, 1989), scrambling must be the result of leftward movement, and hence an operation independent of OV/VO variation. Similarly, approaches in which there is competition between base-generated OV and VO, as in Pintzuk (1999) and Haider (2013), scrambling would only be possible in base-generated OV clauses. These approaches cannot straightforwardly account for the distribution presented in Section 6.4. Finally, the base-generation approach to Present-day Dutch scrambling in Neeleman & van de Koot (2008a), in which the information status of the object is determined by a post-syntactic mapping rule, cannot account for the gradual shift from OV/VO to middle-field scrambling as a means to express information structure, without additional stipulations about the way in which information encoding can change over time.

Crucial to Broekhuis's (2008) anti-symmetric analysis is that scrambling is not a single movement, but a process that involves two movement steps (see Schaeffer 1997, 2000 for a similar analysis). Consider the clause structure in (7), adapted from Broekhuis (2008: 61).

(7) [_{νP} OBJ₃ *ν* [_{VP} OBJ₂ [_{VP} V OBJ₁]]]

The base position of objects is postverbal (OBJ₁), but they must move into a specifier position in the extended projection of the verb to check the phi-features on V (cf. Grimshaw 1997; AgrP in Pollock 1989); that is, objects must move from OBJ₁ to OBJ₂. Objects can move further into the extended projection of *ν* (i.e. from OBJ₂ to OBJ₃).

Broekhuis (2008) argues that this last movement step is related to case. He supports this assumption with the observation that complement PP objects, unlike DP objects, cannot scramble over PP adverbials (cf. Vikner 1994, 2006). This is illustrated

in (8). Since DPs, but not PPs, are subject to the Case Filter (Chomsky 1981), case is a likely trigger for scrambling.

- (8) a. *Jan heeft tijdens de vergadering naar zijn baas geluisterd.*
 Jan has during the meeting to his boss listened
 'Jan listened to his boss during the meeting.'
 b. **Jan heeft naar zijn baas tijdens de vergadering geluisterd.*
 Jan has to his boss during the meeting listened

However, the assumption that case is a formal syntactic feature is questioned in recent (Minimalist) literature and it has been suggested that the (morphological) expression of case is merely a "by-product" of agreement of phi-features (see Bobaljik & Wurmbrand 2008, Sigurðsson 2012, Polinsky & Preminger 2014, Preminger 2021, and sources cited there for arguments and discussion). This questions the assumption that case is the trigger for object movement to *v*, and we leave open the possibility that it is a more general agreement feature that attracts the object. The crucial point here is that the object is licensed by formal syntactic operations in two steps, which, as we will argue below, provide several potential Spell Out positions.

As the object moves to a higher position in the clause, it may cross predicate adverbs adjoined to VP and clause adverbs adjoined to *v*P (VP- and S-adverbs in Jackendoff 1972).⁴ We follow Broekhuis's (2008) assumption that merger of the adverb and movement of the object is essentially free (as far as the syntax is concerned),⁵ because the required modification does not depend on a particular position of the adverb within the extended projection of the modified phrase. The object moves before an adverb is adjoined to VP or *v*P (depending on its type), leading to ADV – OBJ order, or the adverb is adjoined before the object moves, leading to OBJ – ADV order. This optionality is illustrated in (9) for predicate adverbs and (10) for clause adverbs, which are simplified versions of the structures in Broekhuis (2011: 21).

- (9) a. [_{VP} O [_{VP} adverb [_{VP} V t_O]]] (Merge adverb > Move object)
 b. [_{VP} adverb [_{VP} O [_{VP} V t_O]]] (Move object > Merge adverb)
- (10) a. [_{IP} S ... [_{vP} O [_{vP} adverb [_{vP} t_S v [_{VP} t_O [_{VP} V t_O]]]]]] (Merge adverb > Move object)
 b. [_{IP} S ... [_{vP} adverb [_{vP} O [_{vP} t_S v [_{VP} t_O [_{VP} V t_O]]]]]] (Move object > Merge adverb)

⁴Experimental support for a distinction between the two movement steps in scrambling, using adverb type as a proxy, can be found in Schoenmakers & de Swart (2019). In the absence of linguistic context, there was a distinct preference to produce definite objects to the left of predicate adverbs (71%) which was absent in sentences with a clause adverb (45%).

⁵This idea is reminiscent of Neeleman & van de Koot (2008a), who argue that the order in which adverbs and objects are merged is syntactically free. Their analysis differs from Broekhuis's (2008) analysis in that the optionality in the order of merger in the latter does not concern lexical material, but functional material in the extended projection of the verb. That is, the difference is whether scrambling results from internal or external merge (Chomsky 2001a).

A crucial difference between the movement steps from OBJ₁ to OBJ₂ and from OBJ₂ to OBJ₃ in Broekhuis's (2008) analysis is that he considers the latter syntactically optional, regulated by information structure.⁶ The rationale behind this assumption is the claim that (prosodically unmarked) new information foci must appear in the rightmost position of the clause (cf. Cinque 1993, see also Neeleman & Reinhart 1998). Broekhuis proposes that, in Dutch, this interface constraint is ranked higher than the economy constraint EPP(case), i.e. the requirement to check case on *v* locally. New objects consequently do not have to move to check case features on *v*; these features are instead checked at a distance under an *Agree* relation (Chomsky 2000). Thus, object movement from OBJ₂ to OBJ₃ is blocked for new objects, and only given objects are predicted to appear in OBJ₃.

Our analysis is in many ways compatible with the general proposal in Broekhuis (2008). However, we do not rely on optimality theoretic constraints to derive the surface variation; instead, we take movement as an operation that copies and pastes elements in the syntactic structure (see Chomsky 1995, Nunes 2004). The copy theory of movement claims that copies of displaced elements are not removed from the derivation, but remain available, thereby allowing for flexibility in their Spell Out positions. For Dutch clauses, this means the object is generated in OBJ₁ and obligatorily moves via OBJ₂ to OBJ₃, leaving behind copies in each intermediate position. The position in which the object is spelled out is governed by an interplay of interface conditions (essentially the LF and PF constraints in Broekhuis's analysis). Assuming that these conditions are independent of obligatory syntactic operations allows us to integrate the (discourse-)semantic and prosodic factors that have been argued to play a role in scrambling. These factors together determine which of the object positions made available by the syntax are felicitous in a particular context, which may in fact be more than one. Information structure then exploits the available positions to express discourse relations, and is hence not a cue for differential movement, but for differential pronunciation (see also Haider 2020).

Our analysis is also in line with Struckmeier's (2017) "subtractive grammatical architecture". Struckmeier argues that the semantic interface determines which structures are semantically interpretable and subtracts any structure that does not adhere to the semantic requirements of a language. He shows for German that scrambling has clear semantic effects in some cases, but not in others. The same facts hold for Dutch: scrambling feeds binding (Vanden Wyngaerd 1989, Neeleman 1994b), as illustrated in (11), and it "triggers all possible strong readings" (de Hoop 1996: 51) in terms of referentiality, partitivity, and genericity. For instance, scrambling of indefinites yields interpretive effects related to the specificity of the object (see

⁶Broekhuis (2008) advances the so-called *Derivations & Evaluations* framework, which seeks to combine certain aspects from the minimalist program and from optimality theory (see also Broekhuis & Dekkers 2000, Broekhuis & Woolford 2013). In this framework, the 'generator' creates a candidate set of syntactic derivations, the size of which is restricted by operations of the computational system. Each candidate from this set is evaluated against a number of universal violable economy and interface constraints, which are ranked in a language-specific order (hence allowing for language-specific properties). An input form is then mapped onto the most appropriate, or "optimal", output form. It is important to note that the syntax does not have access to the post-syntactic interfaces in this analysis, that is, movement is not *triggered* by information structure (see also Haider 2020).

also Unsworth 2005: 63–66), as illustrated in (12). These effects are absent if the object is a definite DP (see van der Does & de Hoop 1998).

- (11) a. **Piet heeft met elkaars hamer **die mensen** vermoord.*
 Piet has with e.o.'s hammer those people murdered
- b. *Piet heeft **die mensen** met elkaars hamer vermoord.*
 Piet has those people with e.o.'s hammer murdered
 'Piet murdered those people with each other's hammer.'
- (12) a. *Cécile heeft waarschijnlijk **een roos** geplant.*
 Cécile has probably a rose planted
 'Cécile probably planted a(ny) rose.'
- b. *Cécile heeft **een roos** waarschijnlijk geplant.*
 Cécile has a rose probably planted
 'Cécile probably planted a (certain) rose.'

Struckmeier (2017) argues that the semantic effects may be expected to occur after movement, on the assumption that (optional) movement must have an effect on the outcome (Chomsky 2001a). The word order changes yield new binding options or interpretations, thereby directly fulfilling the effect-on-the-output condition.⁷ He proposes that German and Dutch are scope-rigid (or “scope-transparent”) languages in which scope relations are by default computed according to surface order, that is, objects are usually interpreted in the position in which they are spelled out. Thus, movement in these languages already creates the relevant configurations for the semantic interface at least in the scope-transparent cases. Any word order which results in a position-meaning mismatch is ruled out.

The phonetics interface similarly determines which structures are phonologically well-formed, potentially obscuring semantic transparency, and further restricts word order options. For instance, low Spell Out of prosodically unmarked pronouns is ruled out at the syntax–phonetics interface (cf. (3), repeated here as (13), see Bouma & de Hoop 2008).

- (13) a. #*We moesten eerst **hem** voeren.*
 we had.to first him feed
- b. *We moesten **hem** eerst voeren.*
 we had.to him first feed
 'We had to feed him first.'

The syntax thus makes available various Spell Out positions for the object, and the relational output configurations of elements thus created are subjected to conditions at the semantics and phonetics interfaces. Speakers may have preferences for particular Spell Out options (out of the remaining felicitous candidates, which may in fact be more than one), based on, we argue, pragmatic principles such as given-

⁷As noted, there are also “asemantic” cases of scrambling, i.e. cases without a clear semantic effect on the outcome (e.g. when definite objects scramble). Struckmeier (2017) notes that these cases cannot be instances of optional internal merge (cf. Chomsky 2001a) and calls upon an alternative mode of structure building for them (see Struckmeier 2014 for details).

before-new (Gundel 1988) or short-before-long (Wasow 1997). Our conception of the pragmatic interface is that the principles at play are violable; pragmatic constraints are “soft” (cf. Keller 2000). That is, they are not as strict as those imposed by syntax, semantics, or phonology. Thus, scrambling is influenced, but not determined, by information structural preferences (cf. Schoenmakers et al. 2021).

Adopting the copy theory of movement permits a uniform analysis of OV/VO variation in historical Dutch and scrambling in Present-day Dutch, and allows for a natural transition from a clause structure with the verb as the boundary between information structural domains, to a clause structure in which the adverb serves this function in the middle-field. When we relate the object positions outlined in this section to the results presented in Section 6.4, we arrive at the schematic representation of Spell Out positions and information structural domains in (14).

(14)

	[_{VP}	OBJ ₃	ν	[_{VP}	OBJ ₂	[_{VP}	V	OBJ ₁]]
Historical Dutch		Given						New	
Present-day Dutch		Given			New				

We showed that objects in postverbal position were typically new to the discourse (or heavy) in historical Dutch, but that there are no clear indications of an information structural constraint on scrambling. Rather, the scrambled position (OBJ₃) is preferred for all objects in the middle-field, regardless of their information status (although the number of preverbal new objects is low). The most important Spell Out positions in historical Dutch are therefore OBJ₃ and OBJ₁. While OBJ₂ is also available as a Spell Out position, it does not seem to serve an independent information structural function. The verb thus marks the boundary between the domains in which given and new information is expressed in historical Dutch. The postverbal object position (OBJ₁) became more and more restricted as a Spell Out position, until it was lost as a regular position for objects after the 16th century. As a result, the verb no longer separates the domains in which given and new information is expressed. This is when the middle-field starts to show a division between information structural domains, with OBJ₃ for given objects and OBJ₂ for new objects, and the boundary between these domains shifts to the adverbial.

6.5.2 Shifting the border between information domains

One question that we have not addressed thus far is why VO was lost, and how the middle-field became the locus of information structure encoding. The data presented in Section 6.4 indicate that the loss of VO and the establishment of an information structurally functional middle-field proceed in tandem. While the number of VO structures with new objects declines, scrambling becomes sensitive to information structure. This leads to the question whether VO order was reduced and the middle-field became the locus of variation as a consequence, or whether word order in the middle-field became information structurally motivated first and VO was lost as a result. If our analysis is on the right track, the loss of VO likely prompted the establishment of the middle-field as the locus of information structure encoding.

It is not clear from the literature what triggered the loss of VO, but it seems unlikely that this is the result of a single factor. It is more likely that the loss of VO was lost as the result of a series of internal and external changes. As a full-fledged multifactorial analysis is beyond the scope of this study, we here present a broad-brush sketch of a number of factors that may have played a role in the loss of VO and how this may have resulted in an information structurally motivated middle-field.

An account of object licensing in two movement steps creates three possible Spell Out positions. However, only two positions are required to separate given from new information, and so the way information structure is encoded in the syntactic structure in historical Dutch creates a gap in the paradigm (see (14) above). The discourse-semantic function of OBJ₂ is unclear, while movement to and through it is syntactically obligatory. The internal pressure for stricter word order may have been increased by the loss of morphological case, as the relation between constituents could no longer be inferred from morphology (cf. Weerman 1987, 1989). Neeleman (1994b), for instance, argues that scrambling between two arguments is impossible in Dutch, because the language does not have an overt case-marking system, which obscures the identification of theta-roles. Languages with morphological case, like German, have a larger degree of word order freedom and allow for scrambling between arguments as well. This difference is illustrated in (15).

- (15) a. **dat de mannen de vrouw de film toont*
 that the men the woman the movie shows
- b. *daß den Männern die Frau den Film zeigt*
 that the men.DAT the woman.NOM the movie.ACC shows
 ‘that the woman shows the men the picture’

A second factor which may have affected the reduction of the number of VO structures is the learnability of the variation. Westergaard (2010) demonstrates that children need relatively little input to acquire syntactic variation, which generally results in diachronic stability of the variation, that is, children do not eliminate variation for the sake of a “simpler” grammar. However, she argues that in some cases the input frequency of a construction is so low that a child may ignore a construction, making it vulnerable to change. One may wonder how frequent VO orders are in the input of an acquirer of pre-1700 historical Dutch. Our data-set suggests a very strong genre effect: while VO structures occur in all text genres and contexts, they are most frequent in official documents detailing transactions (see also Blom 2002), as illustrated in (16).

- (16) *bouden dien dat die voerseide Pieter sal effen derente*
 provided that the aforementioned Pieter will charge the.interest
vanden huusen.
 of.the house
 ‘on the condition that the aforementioned Pieter will charge interest on the
 house’
 [Gys_1552_1296]

The grammatical object in such constructions is frequently the object of a transaction, either physically or monetarily. Approximately half of the referential VO objects in our sample are transactions. This is a very specific use, which presumably did not occur frequently in child-directed speech, nor would it have been part of everyday conversation. Note, however, that while these transactions might inflate the number of VO in historical Dutch, we find new objects in non-transaction readings as well, as in (17).

- (17) *dat wi hebben ghemakt ene vorworde vor die wet*
that we have made an introduction for that law
'that we made an introduction to that law' [Gys_0124_1272]

The occurrence of VO structures cannot be attributed to a genre effect alone, but the relatively low input frequency of non-formulaic VO structures and the obligatory feature checking in preverbal position, combined with the internal pressure of the language to reduce the redundant optionality in Spell Out positions, may have caused acquirers to disprefer the postverbal object position. As a result, the grammar of the language changed: the postverbal Spell Out position is lost over time. The loss of this position entails that the verb can no longer mark the boundary between the given and new domains; however, the middle-field is already equipped with elements which might take up the task: adverbials.

An adverbial, however, is not the ideal boundary between the given and new domain, because it is an optional element. Adverbials will not always be present to demarcate the given and new domains. Moreover, there is a distinction between (at least) predicate and clause adverbials (Jackendoff 1972, see also Cinque 1999), which may lead to variation in (or confusion about) the position of the information structure boundary. The verb, by contrast, is a clear boundary: it is obligatory and occupies a fixed position in the clause (in non-V2 contexts). The boundary shift does not appear to be an efficient one from an information structural point of view. This suggests that the syntactic triggers responsible for movement are stronger than the need for clearly demarcated information structural domains. This is in line with the idea that information structure piggy-backs on the structure that is made available by the syntax (see also Haider 2020). Syntax forces objects to move from the postverbal domain, and pragmatics can only operate on the positions that remain available for Spell Out.

6.6 Conclusion

The aim of this chapter was to bring together two types of word order variation in two stages of Dutch for which no relation had been previously assumed: OV/VO variation in historical Dutch and scrambling in Present-day Dutch. We tested the hypothesis that both types of word order variation are functionally similar, i.e. they differentiate the information structural domains of given and new information. This was confirmed by our corpus data, which showed that the distribution is similar for OV/VO variation and scrambling: given objects tend to appear in earlier positions

than new objects do. The placement of given objects is rather consistent throughout the history of Dutch. They predominantly occur in preverbal and scrambled position between the 13th and 19th century. The position of new objects shifts from the postverbal to preverbal, unscrambled position, which suggests that the two types of variation are diachronically related.

We analyzed the diachrony of object placement as movement from a uniformly head-initial base via the specifier of VP to the specifier of *v*P. Historical Dutch allows Spell Out of the object in its postverbal base position, but this position was lost after the 16th century, which we argued is (in part) due to internal pressure to reduce the optionality in Spell Out positions. Scrambling in the middle-field was always a part of Dutch syntax, but in the earlier stages of the language it did not have an independent function in terms of information structure. The loss of VO entails the loss of the expression of discourse relations and, as a consequence, information structure “exploits” syntax to find a new way to distinguish between given and new information. Thus, the boundary between the given and new domains shifts from the verb to the adverbial in the middle-field.

Chapter 7

General discussion

The previous chapters reported on a series of behavioral experiments in which the scrambling behavior of definite direct objects in the Dutch middle-field was investigated, and a corpus study exploring the diachrony of the information structural encoding in Dutch clauses. The primary aim was to gain insight into the “linguistic landscape” of scrambling clauses through formal methods, as the theoretical literature is mostly based on researcher intuitions. These intuitions, and the precise factors taken to influence scrambling, have been a topic of discussion among theoretical researchers. Moreover, the claims in most theoretical literature are not corroborated by earlier empirical studies on the topic. Evidence from empirical studies, however, is only limited. The studies presented in this work contributed additional empirical evidence to the discussion, yet the new data do not fully support the strong claims in the theoretical literature either. Therefore, I argue that it is important to consider evidence from a variety of data sources to get a better grasp on the phenomenon.

It was shown in Chapters 2 and 3 that the type of adverb plays a key role in scrambling of definite objects. Scrambling over focus sensitive expressions (including negation) interacts with matters of contrast and focus placement, while scrambling over time-point adverbs is not affected by such truth-conditional factors. The discrepancies between the results from previous experimental studies can be explained through this factor. In the experiments of Chapters 4 and 5, the information structure of scrambling clauses was manipulated. The claim in most literature is that presuppositional (topical and/or anaphoric) objects must surface in scrambled position, whereas non-presuppositional (focused and/or non-anaphoric) objects are restricted to the verb-adjacent unscrambled position. Chapter 4 demonstrated that scrambling is indeed informed by discourse conditions in language production in the expected direction, characterized by a preference for given-before-new sequencing. However, the claim that scrambling is obligatory for presuppositional objects, and blocked for non-presuppositional objects, is not corroborated by the experimental data. The Dutch middle-field instead shows great freedom in the placement of definite objects. In fact, the experiment reported in Chapter 5 provides no

evidence for an information structurally motivated preference in sentence judgment at all. Finally, Chapter 6 investigated the diachronic development of the information structural partitioning in Dutch clauses between the 13th and 19th century, and demonstrated that the given-new partitioning was never categorical.

In this chapter, I will first go over the empirical results contributed by this thesis in Section 7.1; Section 7.2 addresses the question what we can learn from them. Section 7.3 discusses the experiments reported in Chapters 2 and 3 in more detail, with particular regard for the adverb types tested from a theoretical point of view. Finally, Section 7.4 discusses the discrepancies between different kinds of data and the way in which they can inform linguistic theory.

7.1 A summary of the empirical results

7.1.1 Chapters 2 and 3

Chapter 2 started with the observation that there are substantial differences in the results from previous experimental studies on Dutch scrambling. Schaeffer (1997, 2000) and Unsworth (2005) investigated the L1 acquisition of scrambling clauses and report that adult speakers of Dutch scramble definite objects almost categorically. This conclusion, which is based on the results from experiments that combine truth judgment and sentence production, sharply contrasts with the conclusions in van Bergen & de Swart (2009, 2010) and de Swart & van Bergen (2011). Van Bergen & de Swart conducted a large-scale corpus study and find a strong preference for definite objects to be produced in unscrambled position. De Swart & van Bergen report on two sentence completion experiments in which they tested scrambling clauses with a definite object. They find that only ~20% of definite objects were produced in scrambled position. De Swart & van Bergen (2014) later attribute the discrepancy between their results and those reported in Unsworth (2005) to the use of negation in Unsworth's experiment. Negation is known to be "associated with focus" (Jackendoff 1972) and strongly favors scrambling of definite objects. The experiments in de Swart & van Bergen (2011), by contrast, tested scrambling clauses with a time-point adverb.

The adverb type (time-point, negation) was added as an experimental manipulation in a sentence judgment experiment and a sentence completion task in Chapter 2. The results from these experiments are displayed in Table 7.1. The judgment data indicate that scrambling clauses with a time-point adverb are acceptable regardless of the position of the definite object (in line with the judgment data in de Swart & van Bergen 2011). The scrambled word order is favored in sentences with negation. The results from the sentence completion experiment point towards the same conclusion: definite objects are scrambled in the vast majority of experimental trials with negation (in line with Schaeffer 1997, 2000, Unsworth 2005). Definite object scrambling in clauses with a time-point adverb is more variable (in line with the production data in de Swart & van Bergen 2011). Thus, the type of adverb plays a key role in Dutch scrambling.

Adverb type	Object position	Judgment	Production
Time-point adverbs	Unscrambled	6.1	60.3%
	Scrambled	6.2	39.7%
Negation	Unscrambled	4.2	9.0%
	Scrambled	6.4	91.0%

Table 7.1: Overview of results from experimental set 2 (Chapter 2), with judgment scores on a 7-point scale

The experiment in Schaeffer (1997, 2000) also included a manipulation of the type of adverb: it tested experimental items with a time-point adverb, a manner adverb, or the negation word *niet* ‘not’. As noted, adult participants scrambled definite objects over negation consistently. Schaeffer argues that scrambling over time-point adverbs is more costly than scrambling over manner adverbs, because they occupy a higher syntactic position (cf. Broekhuis 2008). However, she did not find evidence for this hypothesis in her experiment, as the adult participants scrambled most definite objects over time-point adverbs and manner adverbs as well. But the stimulus sentences in Schaeffer’s experiment contained contrastive pairs of adverbs to keep the focus off the object. Such explicit emphasis may have been a confounding factor in her experimental design. The hypothesis that scrambling is favored in clauses with a syntactically low predicate adverb, but not in clauses with a syntactically high clause adverb, was tested in another experimental set in Chapter 2, consisting of a sentence judgment experiment and a sentence completion experiment.

The results from these experiments are displayed in Table 7.2. These data indicate that there is no strong preference for either word order in scrambling clauses with clause adverbs (note that these were not time-point adverbs) or predicate adverbs, although the appreciation scores for definite objects in scrambled and unscrambled position diverge slightly in the expected direction when the adverb is syntactically low. This effect is much stronger in the production data, which reveal a distinct preference to scramble definite objects over predicate adverbs. Scrambling over clause adverbs is more variable; these proportions are similar to the proportions for clauses with a time-point adverb (Table 7.1), which occupy a relatively high position in the syntactic tree (cf. Barbiers 2018).

Adverb type	Object position	Judgment	Production
Clause adverbs	Unscrambled	6.2	54.8%
	Scrambled	6.2	45.2%
Predicate adverbs	Unscrambled	5.9	28.7%
	Scrambled	6.5	71.3%

Table 7.2: Overview of results from experimental set 1 (Chapter 2), with judgment scores on a 7-point scale

The experiments presented in Chapter 3 are an extension of those testing scrambling clauses with time-point adverbs and the negation word *niet* ‘not’ in Chapter 2.

The stimulus sentences in Chapter 2 contained “simple” scrambling clauses, in that they were not followed by a contrastive *but*-clause. Our interpretation of the deviant judgment scores for unscrambled clauses with negation (see Table 7.1) was that “[t]he constituent negation interpretation is pragmatically incomplete, so to speak, if there is no second entity to contrast with the object” (Schoenmakers & de Swart 2019: 137). The speeded judgment experiment in Chapter 3 controlled for this “incompleteness” by adding secondary *but*-clauses with a verb or DP continuation. The experiment moreover included twelve focus sensitive expressions other than the negation word *niet* ‘not’.

The results from the speeded judgment experiment are displayed in Table 7.3. These data show that scrambling of contrastive and non-contrastive definite objects is perfectly acceptable over time-point adverbs and focus sensitive expressions.¹

Adverb type	Object position	Continuation	Acceptability rate	Reaction time
Time-point adverbs	Unscrambled	DP	87.6%	568ms
		VP	94.1%	577ms
	Scrambled	DP	88.3%	611ms
		VP	97.1%	591ms
Focus sensitive adverbs	Unscrambled	DP	95.5%	596ms
		VP	88.3%	703ms
	Scrambled	DP	87.0%	667ms
		VP	93.5%	606ms

Table 7.3: Overview of results from the speeded judgment experiment (Chapter 3)

Thus, the finding in Chapter 2, that definite objects in scrambled and unscrambled position are equally acceptable in clauses with a time-point adverb, is replicated. The data in Table 7.3 moreover support the claim that the decreased judgment scores for unscrambled definites in clauses with negation are due to the contrastive interpretation evoked by the relative order of the object and the focus sensitive negation word *niet* ‘not’. Once a contrast is made explicit, sentences with a focus sensitive expression are accepted in the vast majority of cases. But still, the data in Table 7.3 show that there are differences between scrambling of definite objects over the two different types of adverb. If a sentence contained a focus sensitive expression, its scrambled variant was accepted more frequently and processed more quickly than its unscrambled variant when the continuation was a verb, see (1a); the opposite pattern was found when the continuation was a DP, see (1b). These effects did not emerge in sentences with a time-point adverb.

- (1) a. *Sophie heeft de kok vaak beledigd, maar niet geslagen.*
 Sophie has the cook often insulted but not punched
 ‘Sophie often insulted the cook, but did not punch (him).’

¹Approaches to *contrast* and *contrastive focus* are diverse (see e.g. Samek-Lodovici 2019). Here, a contrastive set-up was used to identify the definite object in a scrambling as the (contrastive) focus.

- b. *Sophie heeft vaak de kok beledigd, maar niet de ober.*
 Sophie has often the cook insulted but not the waiter
 ‘Sophie often insulted the cook, but not the waiter.’

The scrambling behavior of definite objects thus depends in part on the type of adverb; that is, focus sensitive expressions give rise to different scrambling strategies than time-point adverbs. However, these strategies are in no way enforced, given that the vast majority of scrambling sentences was accepted in each of the conditions tested. The data therefore support the view that scrambling is optional.

The difference between scrambling over time-point adverbs and scrambling over focus sensitive expressions implies that Dutch scrambling is sensitive to information structural considerations. Indeed, most of the theoretical literature concurs with this claim and postulates a strict “discourse template”: presuppositional (topical and/or anaphoric) definite objects must appear in scrambled position and non-presuppositional (focused and/or non-anaphoric) definite objects must appear in unscrambled position (Verhagen 1986, Schaeffer 1997, 2000, Neeleman & Reinhart 1998, Erteschik-Shir 2007, Broekhuis 2008, Neeleman & van de Koot 2008a, Broekhuis & Corver 2016: Chapter 13). The data in Table 7.3 indicate that the items with a focus sensitive adverb are better appreciated, and judgments were given quicker, when definite objects are placed according to this discourse template. But, crucially, sentences that deviate from the discourse template are still considered acceptable sentences of Dutch. Moreover, no such effects were found in the items with focus insensitive (time-point) adverbs. These findings indicate that scrambling of definite objects is much more optional than is commonly assumed in the theoretical literature. The experiments reported in Chapters 4 and 5 further investigated the existence of a strict discourse template in Dutch scrambling clauses.

7.1.2 Chapters 4 and 5

Chapter 4 considered five scrambling analyses from the literature, which differ with respect to which definite objects exactly are predicted to scramble, as well as with respect to the optionality of scrambling. We conducted a sentence completion experiment which investigated the scrambling behavior of anaphoric topics, anaphoric foci, and non-anaphoric foci in a first item set, and (non-anaphoric) permanently available topics in a second item set. The adverbs in the stimulus sentences were time-point adverbs. The scrambling proportions in each condition are displayed in Table 7.4. These data indicate that there is a general “given-before-new” preference (cf. Gundel 1988), that is, topical definites are scrambled more frequently than focused definites, and anaphoric definites more frequently than non-anaphoric definites. Permanently available topics, however, are deviant (cf. Givón 1983) in that they are topical, but scramble the least. The data indicate that the incentives to scramble definite objects cannot be reduced to topicality or anaphoricity alone, although scrambling generally behaves according to the discourse template postulated in most literature. But the data also indicate that scrambling is by no means obligatory for any type of definite object; there is a lot of freedom in the Dutch middle-field

(contra Neeleman & Reinhart 1998, Schaeffer 1997, 2000, Erteschik-Shir 2007). The results best corroborate de Hoop's (2000, 2003) analysis, although the scrambling proportions are much lower than she predicts (in line with van Bergen & de Swart 2009, de Swart & van Bergen 2011).

Object type	Result
Anaphoric topic	56.6% scrambled
Anaphoric focus	41.6% scrambled
Non-anaphoric focus	34.5% scrambled
Permanently available topic, with context	26.2% scrambled
Permanently available topic, without context	21.3% scrambled

Table 7.4: Overview of results from sentence completion experiment (Chapter 4)

Chapter 5 tested the discourse template hypothesis again in a sentence judgment experiment. Definite objects in the stimulus sentences were anaphoric topics or anaphoric foci, as this manipulation yielded significant results in the sentence completion experiment presented in Chapter 4. The adverbs used in the stimulus sentences were clause adverbs (not time-point adverbs). The main research question in this experiment was whether different scale dimensions would lead to different responses; therefore, judgment scores were elicited in terms of the linguistic system (*acceptability*), linguistic reality (*surface probability*), and linguistic feeling (*aesthetics*).

The results from this judgment experiment are displayed in Table 7.5. The data indicate once again that scrambling is an optional phenomenon, given that each of the conditions received scores at the high ends of the judgment scales. More specifically, participants rated scrambling sentences with a topical or focused definite object in either position as beautiful, highly acceptable, and highly likely to be produced by native speakers of Dutch.² This means that the results do not reflect the discourse template commonly assumed in most literature, nor do they corroborate the finding in Chapter 4 that topical definites are more likely to scramble than focused definites (which was found for language production). Instead, scrambled definite objects are better appreciated than unscrambled definite objects (in all three dimensions) regardless of their topicality. Thus, the data also do not fully align with the judgment data for context-free scrambling clauses reported in Chapters 2 and 3, as no preference for the scrambled word order was found there. Note, however, that the preference for the scrambled word order in Table 7.5 is only relative: the unscrambled word order is still considered beautiful, highly acceptable, and highly likely to be produced by native speakers (in line with the findings in Chapters 2 and 3).

²The aesthetics scores are decreased compared to the other two dimensions, but this effect is likely due to a lack of poetic flourish in the stimulus sentences.

Object type	Object position	Aesthetics	Acceptability	Probability
Topic	Unscrambled	62.8 (23.7)	77.9 (24.8)	79.8 (22.3)
	Scrambled	72.1 (21.4)	85.0 (19.9)	86.5 (17.1)
Focus	Unscrambled	65.4 (22.4)	79.9 (21.5)	78.5 (24.8)
	Scrambled	71.2 (19.8)	86.0 (18.2)	85.4 (18.9)

Table 7.5: Overview of results from judgment experiment (Chapter 5), with judgment scores on a 100-point scale and standard deviations (between brackets)

It was suggested in Chapter 5 that participants may not have properly read the discourse context and interpreted the definite article as a proxy for information structure instead, given that there must be some form of discourse accommodation for the use of definite articles (Givón 1988, Coussé 2009). Moreover, all target objects were part of the common ground already, because they were always anaphoric. Participants may thus have attributed a similar degree of discourse salience to the definite objects in the two conditions. However, if this is the case, the data still do not support the strict discourse template, as presuppositional objects in unscrambled position are then rated at the high end of the scale. Certainly, this result does not correspond with the qualifications “highly disfavored” (Neeleman & Reinhart 1998: 325) and “decidedly awkward” (Neeleman & van de Koot 2008a: 60).

7.1.3 Chapter 6

Chapter 6 shows that scrambling was always a syntactic option in Dutch. However, its function in the earliest stages of the language is unclear. The postverbal position was still productive for direct objects at this stage; this position was lost after the 16th century. Discourse-given objects have always occurred in the leftmost position (i.e. preverbal and scrambled). Discourse-new objects also showed a preference for the scrambled position in the 13th century, but the unscrambled position gradually established itself as the default position for discourse-new objects. It is important to note here, though, that the information structural partitioning was never categorical; it was always associated with a large degree of freedom. The change in the locus of the information structural encoding of Dutch clauses took place in tandem with the gradual decline of VO in Dutch. We inferred from this that OV/VO variation in historical Dutch and middle-field scrambling in Present-day Dutch are diachronically related. More specifically, when VO was lost from the language after the 16th century, the middle-field started to establish itself as the locus of information structure encoding, with adverbials as the boundary between the domains in which given and new information are expressed.

7.2 What we can learn from these results

On the basis of the experimental results presented in this thesis, we can conclude the following. In constrained language production, scrambling of definite objects is

preferred in clauses with a syntactically low predicate adverb (i.e. manner adverbs; *VP-adverbs* in Jackendoff 1972). Note, however, that this preference is by no means categorical: as much as 29% of the definite objects were produced in unscrambled position. There is no clear preference for either word order in the production of scrambling clauses with a syntactically high adverb (i.e. clause adverbs and time-point adverbs; *S-adverbs* in Jackendoff 1972); here, the scrambling proportion is much more balanced. This difference can be related to the syntactic distance that an object has to travel to reach its target position; this distance is increased when scrambling happens over clause adverbs (cf. Schaeffer 1997, 2000, Broekhuis 2008). In the judgment experiments, participants happily accepted both scrambled and unscrambled clauses with syntactically high and syntactically low adverbs. These findings indicate that scrambling is an optional operation in principle.

The type of adverb in scrambling clauses nevertheless influences word order preferences. Additional support for this claim comes from scrambling clauses with negation or other focus sensitive expressions. Here, the scrambled position is clearly preferred for definite objects when they are non-contrastive. This effect emerges in sentence judgment as well as in the reaction time data from Chapter 3. Contrastive definite objects favor the unscrambled position in clauses with a focus sensitive expression; however, both the scrambled and the unscrambled word order are acceptable constructions of Dutch when the clause contains a focus sensitive expression, as long as a contrast is given. Since these effects did not occur in clauses with a time-point adverb, the data confirm that the lexical nature of the adverb interacts with scrambling preferences. The results can moreover explain the discrepancies found in earlier empirical studies, which investigated scrambling clauses with time-point adverbs or negation.

Another conclusion that we can draw from the experimental data is that scrambling of definite objects is related to information structure. More specifically, in constrained language production anaphoric definite objects scramble more frequently than non-anaphoric definite objects, and topical definite objects scramble more frequently than focused definite objects. This effect reflects the often attested “given-before-new” principle, in that discourse-given information tends to precede discourse-new information (cf. Gundel 1988). This ordering preference was present in historical Dutch as well, where the variation was between a preverbal position in the middle-field and a postverbal position in the post-field. A crucial finding is that information structurally motivated word order variation is not categorical, as is commonly claimed in the linguistic literature. With regards to middle-field scrambling, Neeleman & Reinhart (1998), Schaeffer (1997, 2000), Erteschik-Shir (2007), Broekhuis (2008), and Neeleman & van de Koot (2008a) claim that definite objects scramble obligatorily when they convey presuppositional information, and that scrambling is blocked when they convey non-presuppositional information. The experimental data do not corroborate this claim—scrambling is not *determined* by information structure; it is at most *influenced* by it (cf. van der Does & de Hoop 1998, de Hoop 2000, 2003). In sentence judgment, the difference between topical and focused definite objects in scrambling clauses was not significant.

The general conclusion about scrambling of definite objects in the (Present-day)

Dutch middle-field, then, is that it should be regarded as an optional phenomenon. Both word orders are fully acceptable in clauses with a clause or time-point adverb, regardless of the information status of the object. Only in clauses with a focus sensitive expression and to a lesser extent a predicate adverb do judgment scores start to diverge—but even then, scrambling or not scrambling definite objects are both still acceptable options. The adverbial effects are more evident in language production, but this discrepancy may well be due to the task difference (I will return to this claim in Section 7.4). The scrambling proportion of definite objects in clauses with a clause or time-point adverb is well-balanced in language production, although information structure does impact the scrambling behavior in a given-before-new fashion. Crucially, however, these observations do detract not from the claim that scrambling is in essence an optional phenomenon.

7.3 Discussion about certain adverbial hurdles

One of the main findings of this thesis is that the type of adverb plays a key role in Dutch scrambling of definite objects. In clauses with a time-point adverb, the scrambling proportions were relatively balanced. However, it was mentioned in Chapter 3 that time-point adverbs are sometimes claimed to be flexible in terms of their syntactic base position (see Broekhuis & Corver 2016: Section 8.2.3). Broekhuis & Corver (2016) argue that time-point adverbs serve as clause adverbs when they appear to the left of modal adverbs, and as predicate adverbs when they appear to the right of modal adverbs. Broekhuis (2021) argues that time-point adverbs are therefore not the right type of adverbs to investigate scrambling with, because in his analysis the only unambiguous case of scrambling is when the object crosses clause adverbs (Broekhuis 2008).³ This claim casts doubt on the possible interpretations of the results from the experiments in Chapters 2, 3, and 4, which all tested scrambling clauses with time-point adverbs.

However, semantic differences between the high and low variants of time-point adverbs are hard to find. Broekhuis & Corver (2016) claim to have found a minimal pair in which the differences emerge. Consider the sentences in (2), where the time-point adverbial *op zaterdag* ‘on Saturday’ is right- or left-adjacent to the frequency adverb *altijd* ‘always’. According to Broekhuis & Corver, the time-point adverbial *op zaterdag* ‘on Saturday’ is a predicate adverb in (2a) and a clause adverb in (2b). The semantic difference between the two sentences is that, if there is a Saturday on which Jan did not dance, (2b) is false, but (2a) may still be true.

- (2) a. *Jan gaat altijd op zaterdag dansen.* (predicate adverb)
 Jan goes always on Saturday dance
 ‘Jan always goes dancing on Saturdays.’

³Or a subset of clause adverbs: “[u]nfortunately, the selection of clause adverbs [in Schoenmakers & de Swart (2019)] does not completely avoid structural ambiguity, as *gelukkig* ‘fortunately’ and *helaas* ‘unfortunately’ are high clause adverbs” (Broekhuis 2021: 16).

- b. *Jan gaat op zaterdag altijd dansen.* (clause adverb)
 Jan goes on Saturday always dance
 'Jan always goes dancing on Saturdays.'

This difference, however, may not be due to the syntactic and semantic properties of the time-point adverbial, but due to the fact that the frequency adverb *altijd* 'always' is an adverb of quantification (de Swart 1991), or a focus sensitive expression (Beaver & Clark 2008), which by their very nature trigger the truth-conditional effects described by Broekhuis & Corver (2016). That this effect is not due to the syntactic position of time-point adverbs, but to the quantificational nature or focus sensitivity of *altijd* 'always', is illustrated in (3), taken from Beaver & Clark (2002: 15), where the focus-marked material is indicated by a perceptible pitch rise on the stressed syllable.⁴ Beaver & Clark argue that (3a) is false when you have sat on anything other than your arse. This does not hold for (3b).

- (3) a. *U heeft altijd op [uw kont]_{FOC} gezeten.*
 you have always on your arse sat
 b. *U heeft altijd op uw kont [gezetten]_{FOC}.*
 you have always on your arse sat
 'You have always sat on your arse'

The sentence in (2) therefore does not provide evidence for a syntactically low position of time-point adverbs. Barbiers (2018: 62) classifies time-point adverbs as clause adverbs, syntactically high up in the referential tense domain. Ernst (2002) argues that time-point adverbs do not have low attachment sites, because they must locate the entire event in time, without making reference to the internal structure of the event.

Still, time-point adverbs pass each of the predicate adverb diagnostics identified in Chapter 2 (cf. Broekhuis & Corver 2016: 1125–1126): they allow for the *en doet dat* ADVERB ('and does that' + ADVERB) paraphrase (4a), and they entail the same sentences without the adverb (4b).

- (4) a. *Jan heeft de cursus afgerond en deed dat gisteren.*
 Jan has the course completed and did that yesterday
 'Jan completed the course, and (he) did so yesterday.'
 b. *Jan kwam gisteren.* → *Jan kwam.*
 Jan came yesterday. Jan came.
 'Jan came yesterday.' → 'Jan came.'

However, they also pass all the diagnostics for clause adverbs: they allow for the *het is* ADVERB *zo dat* 'it is ADVERB the case that' paraphrase (5a), they precede negation (5b), and they can be extraposed (5c).

⁴Differences in prosody are correlated with information structure (Beaver & Clark 2008, Büring 2016), in that focus attracts stress and discourse-given phrases resist it. Stress patterns have been linked to Dutch scrambling as well (Verhagen 1986, Neeleman & Reinhart 1998). The present work did not investigate the role of prosody, but does acknowledge its importance. This factor is therefore left for future research.

- (5) a. *Het was **gisteren** zo dat Jan de cursus heeft afgerond.*
 it was yesterday so that Jan de course has completed
 ‘Yesterday, it was the case that Jan completed the course.’
- b. *Elsa heeft **gisteren** niet gewerkt.*
 Elsa has yesterday not worked
 ‘Elsa did not work yesterday.’
- c. *Elsa heeft gewerkt **gisteren**.*
 Elsa has worked yesterday
 ‘Elsa worked yesterday.’

Broekhuis & Corver (2016) take the flexible behavior of time-point adverbs as evidence that they can perform different syntactic and semantic functions. However, these diagnostics should be considered as indicative of, and not as evidence for, syntactic and semantic properties. An alternative explanation for the fact that time-point adverbs pass the predicate adverb diagnostics, for example, is that they do not pertain to such matters as speech acts (cf. *eerlijk gezegd* ‘honestly’), or evaluative (cf. *helaas* ‘unfortunately’), evidential (cf. *kennelijk* ‘allegedly’), or epistemic (cf. *waarschijnlijk* ‘probably’) mood, which are located in the highest adverbial domain (i.e. the speaker-oriented domain in Barbiers 2018).

Another concern raised in Broekhuis (2021) relates to the scrambling clauses tested in Chapters 2 and 3 which contained negation and focus sensitive adverbs. Broekhuis argues that the contrastive negation *niet* ‘not’ is a focus particle (cf. Dik 1997: §13.4), just like *ook* ‘also’ and *alleen* ‘only’. Focus particles syntactically latch onto the material they modify, that is, *niet* ‘not’ in (6) is part of a complex direct object *niet het boek* ‘not the book’. This claim is supported by the sentence in (7), where this entire sequence is fronted, given that the inflected verb in Dutch main clauses can only be preceded by a single part-of-speech.

- (6) *Jan heeft niet het boek gelezen.*
 Jan has not the book read
 ‘It was not the book that Jan read.’
- (7) *Niet het boek heeft Jan gekocht, maar de plaat.*
 not the book has Jan bought but the record
 ‘Jan did not buy the book, but the record.’

Importantly, however, the definition of *focus sensitivity* used in Chapter 3 differs from Broekhuis’s (2021) definition for *focus particles*. The stimulus items were chosen on the basis of the *focus sensitivity* of the adverbs (Beaver & Clark 2002, 2008), that is, whether their interpretation correlated with the location of the focus (cf. the sentences in (3)). Still, five stimulus items allowed for the adverb-DP complex to be fronted as in (7) and could therefore be analyzed as focus particles (in the sense of Dik 1997: §13.4) as well. Statistical analysis of a data-set excluding these items did not lead to a qualitative difference with the results reported in Chapter 3. Thus, the finding stands that scrambling clauses with a focus sensitive expression are acceptable with contrastive and non-contrastive definite objects in either position, although reaction times were impacted by the interaction between the object’s

position and the adverb's focus sensitivity. The sentences in (1), repeated here as (8), can thus be considered the unmarked variants, and structural deviations lead to a slowdown in reaction times and a penalty in judgment scores.

- (8) a. *Sophie heeft de kok vaak beledigd, maar niet geslagen.*
Sophie has the cook often insulted but not punched
'Sophie often insulted the cook, but did not punch (him).'
- b. *Sophie heeft vaak de kok beledigd, maar niet de ober.*
Sophie has often the cook insulted but not the waiter
'Sophie often insulted the cook, but not the waiter.'

Crucially, however, deviations from this template are still perfectly acceptable constructions of Dutch, and therefore I maintain that scrambling is essentially optional.

7.4 Capturing and handling wild scrambling

The experiments presented in this work revealed discrepancies between expert judgments about scrambling, folk judgments about scrambling, and scrambling in constrained language production. Recall that most theoretical linguists postulate a strict discourse template. Linguistically naïve participants, however, generally accepted scrambled and unscrambled clauses with a definite object as constructions in Dutch (Chapters 2, 3, and 5), regardless of the information status of the object (Chapter 5). But there is a clear preference to scramble definite objects over predicate adverbs and negation in production (Chapter 2), and the information status of definite objects correlates with their position in the middle-field in clauses with a time-point adverb (Chapter 4).

The discrepancy between judgment data and production data has been reported with regard to Dutch scrambling before (de Swart & van Bergen 2011), and divergent patterns between the acceptability of sentences and their frequency in corpora have been reported more generally many times before (Featherston 2005, Arppe & Järvikivi 2007, Divjak 2008, Kempen & Harbusch 2008, Adli 2010, 2015, Bader & Häussler 2010, Bermel & Knittl 2012, Bader & Dümig 2013). Featherston (2005) argues that the diverging patterns are in part due to differences in the type of construct measured. Corpus data (as well as the production data reported in this thesis) are measured in terms of frequency (i.e. occurrence vs. non-occurrence), whereas judgments are gradual (cf. Keller 2000, Sorace & Keller 2005, Fanselow et al. 2006)—and, crucially, not in competition with structural alternatives. Since the patterns develop in the same direction (i.e. there are no highly unacceptable but frequently produced structures), Featherston suggests that judgment data and frequency data at least measure the same underlying factor.

The often attested gaps between frequency and acceptability led researchers to argue in favor of a “converging evidence” approach between corpus and experimental methods (e.g. Fillmore 1992, de Mönnink 1999, Gries 2002, Hoffman 2006, Arppe & Järvikivi 2007, Rosenbach 2013, see also Gilquin & Gries 2009 for an overview). Such a multi-method approach encourages researchers to study linguistic variation

from different angles, so as to provide more detailed analysis of the phenomenon under investigation than individual methods would allow. Corpus data, for example, are faced with the “negative evidence problem”, i.e. they do not provide any insight into the structures that do not frequently occur but might be grammatical (see also Broekhuis 2020).

As noted in Chapter 5, various linguists also advocate a methodologically pluralistic approach that includes the traditional expert intuition-based approach in the generative framework (e.g. Schütze 1996, Phillips & Wagers 2007, Featherston 2009, Lewis & Phillips 2015, Juzek & Häussler 2020, Phillips et al. 2021). Phillips et al. (2021) argue, for example, that experimental data can raise new questions and lead to new insights that may not have come to light without an empirical approach. The experiments presented in this thesis show that this is indeed the case. The discussion on Dutch scrambling has for the most part been informed by expert intuitions, but these intuitions are not corroborated by the experimental data. Instead, they demonstrate that most theoretical analyses of Dutch scrambling are too rigorous in their claims about its optionality, and additionally they reveal substantial differences between the acceptability of scrambling clauses (with regards to information structural considerations) and their distribution in language production. These data thus highlight the need to incorporate experimental evidence in a converging evidence approach to the construction of an all-round theory of Dutch middle-field scrambling.

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Appendices

Appendix to Chapter 2

Stimulus material for Experiment 1A

Each experimental item occurred with the clause adverbs *blijkbaar* ‘apparently’, *helaas* ‘unfortunately’, *inderdaad* ‘indeed’, *waarschijnlijk* ‘probably’, or the predicate adverbs *fantastisch* ‘fantastically’, *moeiteloos* ‘effortlessly’, *vakkundig* ‘skillfully’, and *vlug* ‘quickly’. Experimental items were presented in the unscrambled (ADV – OBJ) or scrambled (OBJ – ADV) word order.

- | | |
|---|--|
| 1. <i>Anton heeft het verslag uitgewerkt.</i>
‘Anton worked out the report.’ | 18. <i>Harrie heeft de flipperkast verkocht.</i>
‘Harrie sold the pinball machine.’ |
| 2. <i>Caroline heeft de brand geblust.</i>
‘Caroline put out the fire.’ | 19. <i>Johan heeft het kunstwerk bijgewerkt.</i>
‘Johan touched up the artwork.’ |
| 3. <i>Fred heeft het bestek opgepoetst.</i>
‘Fred polished the cutlery.’ | 20. <i>Karin heeft de stofzuiger gerepareerd.</i>
‘Karin repaired the vacuum cleaner.’ |
| 4. <i>Hanneke heeft de klacht ingediend.</i>
‘Hanneke filed the complaint.’ | 21. <i>Laurens heeft de schatkist opgespoord.</i>
‘Laurens traced the treasure chest.’ |
| 5. <i>Ingrid heeft de snaar vervangen.</i>
‘Ingrid replaced the string.’ | 22. <i>Marieke heeft het experiment uitgevoerd.</i>
‘Marieke carried out the experiment.’ |
| 6. <i>Irene heeft de reis georganiseerd.</i>
‘Irene organized the trip.’ | 23. <i>Markus heeft het bewijs verduisterd.</i>
‘Markus obscured the evidence.’ |
| 7. <i>Joris heeft de schutting geplaatst.</i>
‘Joris placed the wooden fence.’ | 24. <i>Patrick heeft het abonnement opgezegd.</i>
‘Patrick canceled the subscription.’ |
| 8. <i>Katja heeft het tentamen gehaald.</i>
‘Katja passed the exam.’ | 25. <i>Renée heeft het gebouw nagetekend.</i>
‘Renée copied (drew) the building.’ |
| 9. <i>Klaas heeft de moed opgegeven.</i>
‘Klaas gave up (the) hope.’ | 26. <i>Paul heeft het bouwwerk afgebroken.</i> [†]
‘Paul demolished the building.’ |
| 10. <i>Lars heeft de kast verschoven.</i>
‘Lars moved the closet.’ | 27. <i>Ria heeft het volkslied gezongen.</i> [†]
‘Ria sang the national anthem.’ |
| 11. <i>Leonie heeft het boek gelezen.</i>
‘Leonie read the book.’ | 28. <i>Sam heeft het bier gebrouwen.</i> [†]
‘Sam brewed the beer.’ |
| 12. <i>Loek heeft de tekst bestudeerd.</i>
‘Loek studied the text.’ | |
| 13. <i>Roos heeft het kozijn geverfd.</i>
‘Roos painted the window frame.’ | |
| 14. <i>Sandra heeft de zaal versierd.</i>
‘Sandra decorated the room.’ | |
| 15. <i>Tamara heeft het citaat vertaald.</i>
‘Tamara translated the quote.’ | |
| 16. <i>Tom heeft het contact verbroken.</i>
‘Tom cut off (the) contact.’ | |
| 17. <i>Bianca heeft de bekeuring verscheurd.</i>
‘Bianca tore up the ticket.’ | |

[†]These items were not included in the sentence completion experiment.

Stimulus material for Experiment 1B

Each experimental item occurred with the clause adverbs *gelukkig* ‘fortunately’, *helaas* ‘unfortunately’, *inderdaad* ‘indeed’, *waarschijnlijk* ‘probably’, or the predicate adverbs *prachtig* ‘beautifully’, *vliegensvlug* ‘lightning fast’, *vakkundig* ‘skillfully’, and *bewust* ‘consciously’. Experimental items were presented in the unscrambled (ADV – OBJ) or scrambled (OBJ – ADV) word order.

- | | |
|---|--|
| 1. <i>Anton het verslag uitwerken</i>
Anton the report work.out | 13. <i>Lars de vloer schrobben</i>
Lars the floor scrub |
| 2. <i>Bianca de bekeuring verscheuren</i>
Bianca the ticket tear.up | 14. <i>Laurens de achterstand inhalen</i>
Laurens the backlog catch.up |
| 3. <i>Fred de ruit ingooien</i>
Fred the window smash | 15. <i>Leonie het boek lezen</i>
Leonie the book read |
| 4. <i>Hanneke de piano verkopen</i>
Hanneke the piano sell | 16. <i>Loek het tijdschrift opzeggen</i>
Loek the magazine cancel |
| 5. <i>Harrie de vaas omstoten</i>
Harrie the vase knock.over | 17. <i>Marieke het doelpunt scoren</i>
Marieke the goal score |
| 6. <i>Ingrid de snaar vervangen</i>
Ingrid the string replace | 18. <i>Markus het horloge slopen</i>
Markus the watch destroy |
| 7. <i>Irene de cursus afronden</i>
Irene the course complete | 19. <i>Renée de leraar tekenen</i>
Renée the teacher draw |
| 8. <i>Johan het team verslaan</i>
Johan the team beat | 20. <i>Roos het kozijn verven</i>
Roos the window.frame paint |
| 9. <i>Joris de taart versieren</i>
Joris the cake decorate | 21. <i>Sandra het schilderij ophangen</i>
Sandra the painting hang.up |
| 10. <i>Karin de stofzuiger repareren</i>
Karin the vacuum.cleaner repair | 22. <i>Tamara de tekst vertalen</i>
Tamara the text translate |
| 11. <i>Katja het tentamen verprutsen</i>
Katja the exam mess.up | 23. <i>Tom het optreden missen</i>
Tom the performance miss |
| 12. <i>Klaas de sleutel vinden</i>
Klaas the key find | 24. <i>Patrick het kunstwerk modernise-
ren</i>
Patrick the artwork modernize |

Stimulus material for 2A and 2B

Each experimental item occurred with the time-point adverbs *gisteren* ‘yesterday’, *vanochtend* ‘this morning’, *vanmiddag* ‘this afternoon’, *zojuist* ‘just now’, *zonet* ‘just now’, *onlangs* ‘recently’, *meteen* ‘immediately’, or the negation word *niet* ‘not’. Experimental items were presented in the unscrambled (ADV – OBJ) or scrambled (OBJ – ADV) word order.

- | | |
|---|---|
| 1. <i>Anton heeft het verslag uitgewerkt.</i>
‘Anton worked out the report.’ | 17. <i>Tamara heeft de kaart geschreven.</i>
‘Tamara wrote the card.’ |
| 2. <i>Fred heeft de ruit ingegooid.</i>
‘Fred smashed the window.’ | 18. <i>Tom heeft de bagel gegeten.</i>
‘Tom ate the bagel.’ |
| 3. <i>Hanneke heeft de piano gestemd.</i>
‘Hanneke tuned the piano.’ | 19. <i>Bianca heeft de bekeuring verscheurd.</i>
‘Bianca tore up the ticket.’ |
| 4. <i>Harrie heeft de vaas omgestoten.</i>
‘Harrie knocked over the vase.’ | 20. <i>Karin heeft de stofzuiger gerepareerd.</i>
‘Karin repaired the vacuum cleaner.’ |
| 5. <i>Ingrid heeft de snaar vervangen.</i>
‘Ingrid replaced the string.’ | 21. <i>Laurens heeft de schatkist opgegraven.</i>
‘Laurens dug up the treasure chest.’ |
| 6. <i>Irene heeft de cursus afgerond.</i>
‘Irene completed the course.’ | 22. <i>Loek heeft het tijdschrift doorgebladerd.</i>
‘Loek leafed through the magazine.’ |
| 7. <i>Johan heeft de brief gepost.</i>
‘Johan posted the letter.’ | 23. <i>Sandra heeft het schilderij opgehangen.</i>
‘Sandra put up the picture.’ |
| 8. <i>Joris heeft de taart aangesneden.</i>
‘Joris cut the cake.’ | 24. <i>Markus heeft de schutting gebeitst.*</i>
‘Markus stained the wooden fence.’ |
| 9. <i>Katja heeft de kaars aangestoken.</i>
‘Katja lit the candle.’ | 25. <i>Sam heeft de jenever gedronken.†</i>
‘Sam drank the gin.’ |
| 10. <i>Klaas heeft de sleutel verstoppt.</i>
‘Klaas hid the key.’ | 26. <i>Ria heeft de badkamer gepoetst.†</i>
‘Ria cleaned the bathroom.’ |
| 11. <i>Lars heeft de vloer geschrobd.</i>
‘Lars scrubbed the floor.’ | 27. <i>Paul heeft het bouwwerk gesloopt.†</i>
‘Paul destroyed the building.’ |
| 12. <i>Leonie heeft het boek gelezen.</i>
‘Leonie read the book.’ | 28. <i>Caroline heeft de brand geblust.†</i>
‘Caroline put out the fire.’ |
| 13. <i>Marieke heeft de emmer gevuld.</i>
‘Mareike filled the bucket.’ | |
| 14. <i>Patrick heeft de coupon uitgeknipt.</i>
‘Patrick cut out the coupon.’ | |
| 15. <i>Renée heeft de computer aangezet.</i>
‘Renée turned on the computer.’ | |
| 16. <i>Roos heeft het kozijn geverfd.</i>
‘Roos painted the window frame.’ | |

*The verb in this item was changed to *geplaatst* ‘placed’ in the sentence completion experiment.

†These items were not included in the sentence completion experiment.

Appendix to Chapter 3

Stimulus material from the speeded judgment experiment. The target sentences are presented here in the scrambled word order. Target sentences were presented with a focus sensitive expression or a time-point adverb, and with a VP or DP continuation.

1. *Hannah heeft de duif {vaak / toen} gehoord maar niet {gezien / de uil}.*
'Hannah {often/then} heard the pigeon but not {seen/the owl}.'
2. *Simon heeft de minister {twee keer / vanmorgen} gebeld maar niet {gesproken / de premier}.*
'Simon called the minister {twice/this morning} but not {spoken/the prime minister}.'
3. *Merel heeft het drumstel {altijd / destijds} gewild maar niet {gekocht / de pauk}.*
'Merel {always/at the time} wanted the drum set but not {bought/the timpani}.'
4. *Robert heeft de buurvrouw {regelmatig / vorige week} begroet maar niet {geholpen / de buurman}.*
'Robert {regularly/last week} greeted the neighbor(F) but not {helped/ the neighbor(M)}.'
5. *Lucas heeft de ober {herhaaldelijk / onlangs} beledigd maar niet {geslagen / de ober}.*
'Lucas {repeatedly/recently} insulted the waiter but not {punched/the waiter}.'
6. *Emma heeft de blouse {soms / vanochtend} gestreken maar niet {gedragen / het broekje}.*
'Emma {sometimes/this morning} ironed the blouse but not {worn/ the pants}.'
7. *Lotte heeft de stoel {langdurig / vanmiddag} geschuurd maar niet {geverfd / de stoel}.*
'Lotte sanded down the chair {for a long time / this afternoon} but not {painted / the chair}.'
8. *Sophie heeft het biertje {wel / vannacht} betaald maar niet {gedronken / het wijntje}.[†]*
'Sophie paid {AFF/last night} for the beer but not {drunk/the wine}.'
9. *David heeft de schilder {alleen / vandaag} gezocht maar niet {gevonden / de monteur}.[†]*
'David {only/today} looked for the painter but not {found/the mechanic}.'
10. *Anne heeft de badkamer {zelfs / zojuist} gestofzuigd maar niet {gedweild / de gang}.[†]*
'Anne {even/just now} vacuumed the bathroom but not {mopped/the hallway}.'
11. *Thomas heeft de komkommer {ook / net} gewassen maar niet {gesneden / de tomaat}.[†]*
'Thomas {also/just now} washed the cucumber but not {cut/the tomato}.'
12. *Peter heeft de hond {vooral / gisteren} gevoerd maar niet {geaaid / de kat}.[†]*
'Peter {mainly/yesterday} fed the dog but not {petted/the cat}.'

[†]These items were excluded from the additional statistical analysis in Chapter 7.

Appendix to Chapter 4

Topics and foci (T/F item set)

Stimulus material from the T/F item set of the sentence completion experiment. The target sentences are presented here in the scrambled word order.

1. **Anaphoric topic condition:**

Dit gaat over een kleurrijk stripboek dat Milan heeft uitgezocht. Het is een dik stripboek met een harde kaft. Wat gaat er gebeuren met het stripboek?

‘This is about a colorful comic book that Milan picked out. It is a thick comic book with a hard cover. What will happen to the comic book?’

Anaphoric focus condition:

Dit gaat over Milan die een kleurrijk stripboek heeft uitgezocht. Hij houdt het meest van avontuurlijke verhalen. Wat gaat Milan doen?

‘This is about Milan who picked out a colorful comic book. He likes adventurous stories the most. What will Milan do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?

‘What’s going to happen?’

Target sentence:

Milan gaat het stripboek vandaag lezen.

‘Milan is going to read the comic book today.’

2. **Anaphoric topic condition:**

Dit gaat over een geleende fiets die Sophie heeft gesloopt. Het is een zwarte fiets met een flinke slag in het wiel. Wat gaat er gebeuren met de fiets?

‘This is about a borrowed bicycle that Sophie wrecked. It’s a black bicycle with a buckled wheel. What will happen to the bicycle?’

Anaphoric focus condition:

Dit gaat over Sophie die een geleende fiets heeft gesloopt. Ze maakt wel vaker per ongeluk andermans spullen stuk. Wat gaat Sophie doen?

‘This is about Sophie who wrecked a borrowed bicycle. She often breaks other people’s things by accident. What will Sophie do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?

‘What’s going to happen?’

Target sentence:

Sophie gaat de fiets gauw repareren.

‘Sophie is going to fix the bicycle soon.’

3. Anaphoric topic condition:

Dit gaat over een leuk bordspel dat Lucas heeft gewonnen. Het is een nieuw bordspel dat een beetje lijkt op Cluedo. Wat gaat er gebeuren met het bordspel?
 ‘This is about a fun board game that Lucas won. It’s a new board game that looks a bit like Cluedo. What will happen to the board game?’

Anaphoric focus condition:

Dit gaat over Lucas die een leuk bordspel heeft gewonnen. Hij heeft een uitgebreide review gelezen op internet. Wat gaat Lucas doen?
 ‘This is about Lucas who won a fun board game. He has read an extensive review on the internet. What will Lucas do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?
 ‘What’s going to happen?’

Target sentence:

Lucas gaat het bordspel morgen spelen.
 ‘Lucas is going to play the board game tomorrow.’

4. Anaphoric topic condition:

Dit gaat over een dikke boterham die Isa heeft gesmeerd. Het is een volkoren boterham met kip, kaas en pesto. Wat gaat er gebeuren met de boterham?
 ‘This is about a big sandwich that Isa made. It is a whole-wheat sandwich with chicken, cheese and pesto. What will happen to the sandwich?’

Anaphoric focus condition:

Dit gaat over Isa die een dikke boterham heeft gesmeerd. Ze heeft inmiddels behoorlijk veel honger gekregen. Wat gaat Isa doen?
 ‘This is about Isa who made a big sandwich. She is quite hungry now. What will Isa do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?
 ‘What’s going to happen?’

Target sentence:

Isa gaat de boterham zometeen opeten.
 ‘Isa is going to eat the sandwich soon.’

5. Anaphoric topic condition:

Dit gaat over een zomerse jurk die Lotte heeft gescheurd. Het is een korte jurk met een bloemetjesmotief. Wat gaat er gebeuren met de jurk?
 ‘This is about a summer dress that Lotte tore. It is a short dress with a floral pattern. What will happen to the dress?’

Anaphoric focus condition:

Dit gaat over Lotte die een zomerse jurk heeft gescheurd. Ze is per ongeluk achter een haakje blijven hangen. Wat gaat Lotte doen?

'This is about Lotte who tore a summer dress. She accidentally got stuck behind a hook. What will Lotte do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Lotte gaat de jurk zo herstellen.

'Lotte is going to repair the dress soon.'

6. **Anaphoric topic condition:**

Dit gaat over een zoete appel die Ruben heeft gepakt. Het is een glanzende appel die heel lekker ruikt. Wat gaat er gebeuren met de appel?

'This is about a sweet apple that Ruben grabbed. It is a shiny apple that smells very nice. What will happen to the apple?'

Anaphoric focus condition:

Dit gaat over Ruben die een zoete appel heeft gepakt. Hij probeert minstens twee stuks fruit per dag te eten. Wat gaat Ruben doen?

'This is about Ruben who grabbed a sweet apple. He tries to eat at least two pieces of fruit a day. What will Ruben do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Ruben gaat de appel gelijk schillen.

'Ruben gaat de appel gelijk schillen.'

7. **Anaphoric topic condition:**

Dit gaat over een giftige slang die Jesse heeft gevangen. Het is een gevaarlijke slang van bijna een halve meter. Wat gaat er gebeuren met de slang?

'This is about a venomous snake that Jesse caught. It is a dangerous snake of almost half a meter. What will happen to the snake?'

Anaphoric focus condition:

Dit gaat over Jesse die een giftige slang heeft gevangen. Hij is altijd geïnteresseerd geweest in reptielen. Wat gaat Jesse doen?

'This is about Jesse who caught a poisonous snake. He has always been interested in reptiles. What will Jesse do?'

Non-anaphoric focus condition:*Wat gaat er gebeuren?*

‘What’s going to happen?’

Target sentence:*Jesse gaat de slang straks vrijlaten.*

‘Jesse is going to release the snake soon.’

8. Anaphoric topic condition:*Dit gaat over een prachtige brief die Emma heeft geschreven. Het is een emotionele brief met veel persoonlijke ervaringen. Wat gaat er gebeuren met de brief?*

‘This is about a beautiful letter that Emma wrote. It is an emotional letter with many personal experiences. What will happen to the letter?’

Anaphoric focus condition:*Dit gaat over Emma die een prachtige brief heeft geschreven. Ze heeft al jarenlang een penvriendin in Engeland. Wat gaat Emma doen?*

‘This is about Emma who wrote a beautiful letter. She has had a pen pal in England for many years. What will Emma do?’

Non-anaphoric focus condition:*Wat gaat er gebeuren?*

‘What’s going to happen?’

Target sentence:*Emma gaat de brief vrijdag posten.*

‘Emma is going to post the letter on Friday.’

9. Anaphoric topic condition:*Dit gaat over een moeilijke opgave die Eva heeft gekregen. Het is een pittige opgave met zeven onderdelen. Wat gaat er gebeuren met de opgave?*

‘This is about a difficult assignment that Eva was given. It is a tough task with seven parts. What will happen to the assignment?’

Anaphoric focus condition:*Dit gaat over Eva die een moeilijke opgave heeft gekregen. Ze vindt wiskunde een van de minst leuke vakken. Wat gaat Eva doen?*

‘This is about Eva who was given a difficult assignment. She thinks mathematics is one of the least fun subjects. What will Eva do?’

Non-anaphoric focus condition:*Wat gaat er gebeuren?*

‘What’s going to happen?’

Target sentence:

Eva gaat de opgave binnenkort maken.

'Eva gaat de opgave binnenkort maken.'

10. Anaphoric topic condition:

Dit gaat over een mooie pioenroos die Thomas heeft gezien. Het is een grote pioenroos die al helemaal open is. Wat gaat er gebeuren met de pioenroos?

'This is about a beautiful peony that Thomas saw. It is a big peony that is already fully open. What will happen to the peony?'

Anaphoric focus condition:

Dit gaat over Thomas die een mooie pioenroos heeft gezien. Hij is dol op bloemen en heeft thuis veel planten staan. Wat gaat Thomas doen?

'This is about Thomas who saw a beautiful peony. He loves flowers and has many plants at home. What will Thomas do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Thomas gaat de pioenroos dadelijk plukken.

'Thomas will pick the peony soon.'

11. Anaphoric topic condition:

Dit gaat over een interessant museum dat Nora heeft ontdekt. Het is een interactief museum dat veel mooie spullen heeft. Wat gaat er gebeuren met het museum?

'This is about an interesting museum that Nora discovered. It is an interactive museum that has a lot of beautiful stuff. What will happen to the museum?'

Anaphoric focus condition:

Dit gaat over Nora die een interessant museum heeft ontdekt. Ze is erg gefascineerd door het werk van beeldhouwers. Wat gaat Nora doen?

'This is about Nora who discovered an interesting museum. She is very fascinated by the work of sculptors. What will Nora do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Nora gaat het museum dinsdag bezoeken.

'Nora is going to visit the museum on Tuesday.'

12. Anaphoric topic condition:

Dit gaat over een tweedehands auto die Hugo heeft bekeken. Het is een blauwe auto uit het jaar 2001. Wat gaat er gebeuren met de auto?

‘This is about a used car that Hugo looked at. It is a blue car from the year 2001. What will happen to the car?’

Anaphoric focus condition:

Dit gaat over Hugo die een tweedehands auto heeft bekeken. Hij heeft maandenlang gespeurd op het internet. Wat gaat Hugo doen?

‘This is about Hugo who looked at a used car. He has been searching on the internet for months. What will Hugo do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?

‘What’s going to happen?’

Target sentence:

Hugo gaat de auto zondag kopen.

‘Hugo is going to buy the car on Sunday.’

13. Anaphoric topic condition:

Dit gaat over een ijskoude milkshake die Sanne heeft besteld. Het is een suikervrije milkshake met aardbeiensmaak. Wat gaat er gebeuren met de milkshake?

‘This is about an ice cold milkshake that Sanne ordered. It is a sugar-free strawberry flavored milkshake. What’s going to happen to the milkshake?’

Anaphoric focus condition:

Dit gaat over Sanne die een ijskoude milkshake heeft besteld. Ze kiest eigenlijk bijna altijd voor aardbeiensmaak. Wat gaat Sanne doen?

‘This is about Sanne who ordered an ice cold milkshake. She almost always opts for strawberry flavor. What will Sanne do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?

‘What’s going to happen?’

Target sentence:

Sanne gaat de milkshake meteen opdrinken.

‘Sanne is going to drink the milkshake right away.’

14. Anaphoric topic condition:

Dit gaat over een nieuw tuinhuisje dat Floris heeft gebouwd. Het is een houten tuinhuisje met een raampje. Wat gaat er gebeuren met het tuinhuisje?

‘This is about a new garden shed that Floris built. It is a wooden garden shed with a window. What will happen to the garden shed?’

Anaphoric focus condition:

Dit gaat over Floris die een nieuw tuinhuisje heeft gebouwd. Hij had behoefte aan wat meer opslagruimte. Wat gaat Floris doen?

‘This is about Floris who built a new garden shed. He needed a little more storage space. What will Floris do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?

‘What’s going to happen?’

Target sentence:

Floris gaat het tuinhuisje morgenvroeg schilderen.

‘Floris is going to paint the garden shed in the morning.’

15. **Anaphoric topic condition:**

Dit gaat over een nieuw overhemd dat Pepijn heeft gewassen. Het is een grijs overhemd met een subtiel wit streepje. Wat gaat er gebeuren met het overhemd?

‘This is about a new shirt that Pepijn washed. It is a gray shirt with a subtle white stripe. What will happen to the shirt?’

Anaphoric focus condition:

Dit gaat over Pepijn die een nieuw overhemd heeft gewassen. Hij wil professioneel overkomen op zijn sollicitatiegesprek. Wat gaat Pepijn doen?

‘This is about Pepijn who washed a new shirt. He wants to appear professional at his job interview. What will Pepijn do?’

Non-anaphoric focus condition:

Wat gaat er gebeuren?

‘What’s going to happen?’

Target sentence:

Pepijn gaat het overhemd zodirect strijken.

‘Pepijn is going to iron the shirt in a minute.’

16. **Anaphoric topic condition:**

Dit gaat over een waar kunstwerk dat Fenna heeft gemaakt. Het is een modern kunstwerk dat is gemaakt van koper. Wat gaat er gebeuren met het kunstwerk?

‘This is about a true work of art that Fenna made. It is a modern work of art that is made of copper. What will happen to the artwork?’

Anaphoric focus condition:

Dit gaat over Fenna die een waar kunstwerk heeft gemaakt. Ze vindt het fijn om af en toe creatief bezig te zijn. Wat gaat Fenna doen?

‘This is about Fenna who created a true work of art. She likes to be creative every now and then. What will Fenna do?’

Non-anaphoric focus condition:*Wat gaat er gebeuren?*

‘What’s going to happen?’

Target sentence:*Fenna gaat het kunstwerk maandag tentoonstellen.*

‘Fenna will display the artwork on Monday.’

17. Anaphoric topic condition:*Dit gaat over een smakelijke kersentaart die Ryan heeft gebakken. Het is een goed gevulde kersentaart met monchou en slagroom. Wat gaat er gebeuren met de kersentaart?*

‘This is about a tasty cherry pie that Ryan baked. It is a well-filled cherry pie with monchou and whipped cream. What will happen to the cherry pie?’

Anaphoric focus condition:*Dit gaat over Ryan die een smakelijke kersentaart heeft gebakken. Hij staat in het weekend graag in de keuken. Wat gaat Ryan doen?*

‘This is about Ryan who baked a tasty cherry pie. He likes to be in the kitchen on weekends. What will Ryan do?’

Non-anaphoric focus condition:*Wat gaat er gebeuren?*

‘What’s going to happen?’

Target sentence:*Ryan gaat de kersentaart vanmiddag aansnijden.*

‘Ryan is going to cut the cherry pie this afternoon.’

18. Anaphoric topic condition:*Dit gaat over een oude bijzettafel die Nina heeft geschuurd. Het is een ronde bijzettafel die lang in de schuur heeft gestaan. Wat gaat er gebeuren met de bijzettafel?*

‘This is about an old side table that Nina sanded down. It is a round side table that has been in the shed for a long time. What will happen to the side table?’

Anaphoric focus condition:*Dit gaat over Nina die een oude bijzettafel heeft geschuurd. Ze vindt het leuk om versleten meubels op te knappen. Wat gaat Nina doen?*

‘This is about Nina who sanded down an old side table. She enjoys refurbishing worn-out furniture. What will Nina do?’

Non-anaphoric focus condition:*Wat gaat er gebeuren?*

‘What’s going to happen?’

Target sentence:

Nina gaat de bijzettafel morgenochtend lakken.

'Nina is going to paint the side table in the morning.'

19. Anaphoric topic condition:

Dit gaat over een energieke hond die Sara heeft uitgelaten. Het is een bruine hond van bijna drie jaar oud. Wat gaat er gebeuren met de hond?

'This is about an energetic dog that Sara walked. It is a brown dog almost three years old. What will happen to the dog?'

Anaphoric focus condition:

Dit gaat over Sara die een energieke hond heeft uitgelaten. Ze zorgt wel vaker voor de huisdieren van vrienden. Wat gaat Sara doen?

'This is about Sara who walked an energetic dog. She often takes care of her friends' pets. What will Sara do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Sara gaat de hond nu voeren.

'Sara is going to feed the dog now.'

20. Anaphoric topic condition:

Dit gaat over een antieke piano die Lieke heeft geërfd. Het is een zwarte piano die al jaren niet meer is gebruikt. Wat gaat er gebeuren met de piano?

'This is about an antique piano that Lieke inherited. It is a black piano that has not been used for years. What will happen to the piano?'

Anaphoric focus condition:

Dit gaat over Lieke die een antieke piano heeft geërfd. Ze heeft altijd al een eigen instrument gewild. Wat gaat Lieke doen?

'This is about Lieke who inherited an antique piano. She always wanted an instrument of her own. What will Lieke do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Lieke gaat de piano zaterdag stemmen.

'Lieke will tune the piano on Saturday.'

21. Anaphoric topic condition:

Dit gaat over een verborgen schatkist die Simon heeft gevonden. Het is een grote schatkist met een gouden inscriptie. Wat gaat er gebeuren met de schatkist?

'This is about a hidden treasure chest that Simon found. It is a large treasure chest with a golden inscription. What will happen to the treasure chest?'

Anaphoric focus condition:

Dit gaat over Simon die een verborgen schatkist heeft gevonden. Hij was een oude landkaart tegengekomen op zolder. Wat gaat Simon doen?

'This is about Simon who found a hidden treasure chest. He had come across an old map in the attic. What will Simon do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Simon gaat de schatkist strakjes openen.

'Simon is going to open the treasure chest soon.'

22. Anaphoric topic condition:

Dit gaat over een belangrijke sleutel die Jasmijn is verloren. Het is een ronde sleutel met een hanger eraan. Wat gaat er gebeuren met de sleutel?

'This is about an important key that Jasmijn lost. It is a round key with a key ring attached to it. What will happen to the key?'

Anaphoric focus condition:

Dit gaat over Jasmijn die een belangrijke sleutel is verloren. Ze had haar zakken gecontroleerd voordat ze van huis vertrok. Wat gaat Jasmijn doen?

'This is about Jasmijn who lost an important key. She had checked her pockets before leaving home. What will Jasmijn do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Jasmijn gaat de sleutel direct zoeken.

'Jasmine will immediately look for the key.'

23. Anaphoric topic condition:

Dit gaat over een speciaal biertje dat Jurre heeft uitgekozen. Het is een donker biertje met tonen van karamel en koffie. Wat gaat er gebeuren met het biertje?

'This is about a special beer that Jurre chose. It is a dark beer with notes of caramel and coffee. What will happen to the beer?'

Anaphoric focus condition:

Dit gaat over Jurre die een speciaal biertje heeft uitgekozen. Hij vindt het leuk om nieuwe smaken uit te proberen. Wat gaat Jurre doen?

'This is about Jurre who chose a special beer. He likes to try new flavors. What will Jurre do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Jurre gaat het biertje onmiddellijk proeven.

'Jurre will taste the beer immediately.'

24. **Anaphoric topic condition:**

Dit gaat over een kapotte computer die Erik heeft gevonden. Het is een oude computer met een vastzittende cd-lade. Wat gaat er gebeuren met de computer?

'This is about a broken computer that Erik found. It's an old computer with a CD tray that is stuck. What will happen to the computer?'

Anaphoric focus condition:

Dit gaat over Erik die een kapotte computer heeft gevonden. Hij knutselt in zijn vrije tijd graag met hardware. Wat gaat Erik doen?

'This is about Erik who found a broken computer. He likes to tinker with hardware in his spare time. What will Erik do?'

Non-anaphoric focus condition:

Wat gaat er gebeuren?

'What's going to happen?'

Target sentence:

Erik gaat de computer vanavond openschroeven.

'Erik is going to open the computer tonight.'

Permanently available topics (PA item set)

Stimulus material from the PA item set for the sentence completion experiment. The target sentences are presented here in the scrambled word order.

1. *Dit gaat over Jasper die een afspraak heeft met een speciaal iemand. Hij kijkt er al heel erg lang naar uit. Wat gaat er gebeuren?*
'This is about Jasper who has an appointment with someone special. He's been looking forward to it for a very long time. What's going to happen?'

Target sentence:

Jasper gaat de koning weldra ontmoeten.
'Jasper will meet the king soon.'

2. *Dit gaat over David die aan een trektocht is begonnen door de Ardennen. Hij heeft de afgelopen tijd veel getraind voor deze hike. Wat gaat er gebeuren?*
'This is about David who has embarked on a trek through the Ardennes. He has recently trained a lot for this hike. What's going to happen?'

Target sentence:

David gaat de Everest ooit beklimmen.
'One day, David will climb the Everest.'

3. *Dit gaat over Joris die een nare zonnesteek heeft opgelopen. Hij is duizelig en ziet heel bleek. Wat gaat er gebeuren?*
'This is about Joris who has suffered a nasty sunstroke. He is dizzy and looks very pale. What's going to happen?'

Target sentence:

Joris gaat de zon snel vermijden.
'Joris will avoid the sun quickly.'

4. *Dit gaat over Frenkie die een belangrijke interland voor de boeg heeft. Hij staat al klaar op het veld. Wat gaat er gebeuren?*
'This is about Frenkie who has an important international match ahead of him. He's already on the pitch. What's going to happen?'

Target sentence:

Frenkie gaat het volkslied spoedig zingen.
'Frenkie will sing the national anthem soon.'

5. *Dit gaat over Helen die een christelijke opvoeding heeft gehad. Ze wil graag meer over de Islam leren. Wat gaat er gebeuren?*
'This is about Helen who had a Christian upbringing. She would like to learn more about Islam. What's going to happen?'

Target sentence:

Helen gaat de Koran woensdag bestuderen.

'Helen will study the Quran on Wednesday.'

6. *Dit gaat over Iris die een gloednieuwe telescoop heeft gekocht. Ze is gefascineerd door het heelal. Wat gaat er gebeuren?*

'This is about Iris who bought a brand new telescope. She is fascinated by the universe. What's going to happen?'

Target sentence:

Iris gaat de Melkweg vannacht verkennen.

'Iris will explore the Milky Way tonight.'

7. *Dit gaat over Hannah die een tour door New York heeft geboekt. Ze wil alle toeristische trekpleisters zien. Wat gaat er gebeuren?*

'This is about Hannah who has booked a tour of New York. She wants to see all the tourist attractions. What's going to happen?'

Target sentence:

Hannah gaat het Vrijheidsbeeld donderdag bewonderen.

'Hannah will admire the Statue of Liberty on Thursday.'

8. *Dit gaat over Anouk die een belangrijke klus heeft gekregen. Ze mag voor de regionale tv naar Den Haag. Wat gaat er gebeuren?*

'This is about Anouk who has been given an important job. She can go to The Hague for regional television. What's going to happen?'

Target sentence:

Anouk gaat de premier overmorgen interviewen.

'Anouk will interview the prime minister in two days.'

Appendix to Chapter 5

Grammatical taboo item set

Stimulus material from the grammatical taboo item set for the sentence judgment experiment. The target sentences are presented here in the grammatical taboo condition (+grammatical, +taboo).

1. *Machteld is samen met haar ouders verhuisd. Terwijl ze buiten aan het spelen was leerde ze haar nieuwe buurmeisje kennen. Die heeft samen met haar een grote tekening gemaakt van stoepkrijt.*
'Machteld moved with her parents. When she was playing outside, she met the girl next door. She made a large drawing of sidewalk chalk with her.'

Target sentence:

Machteld vindt haar leuker als haar vorige buurmeisje.

'Machteld likes her more than the previous girl next door.'

2. *Liesbeth had ontzettend veel zin in de lasagne die ze had gemaakt. Haar zusje had haar bord nog maar half leeg. Liesbeth had intussen al een tweede stuk gepakt.*
'Liesbeth was really looking forward to the lasagna she had made. Her sister only ate half her plate. In the meantime, Liesbeth had already taken a second piece.'

Target sentence:

Liesbeth eet meer als haar jongere zusje.

'Liesbeth eats more than her younger sister.'

3. *Edwin deed samen met de andere leraren een quiz tijdens het personeelsuitje. Er waren vragen over alle verschillende vakken. Uiteindelijk had Edwin de meeste vragen goed.*
'Edwin participated in a quiz with the other teachers during the staff outing. There were questions about different topics. In the end, Edwin got most of the questions right.'

Target sentence:

Edwin is slimmer als de andere leraren.

'Edwin is smarter than the other teachers.'

4. *Leon heeft een eigen koffiezetapparaat op zijn kantoor. Zijn collega gaat altijd erg snel door de koffie heen, maar hij doet er zelf wat langer mee.*
'Leon has his own coffee machine in his office. His colleague always finishes the coffee (beans) very quickly, but he takes a little longer.'

Target sentence:

Leon drinkt minder koffie als zijn collega.

'Leon drinks less coffee than his colleague.'

5. *Marit had vandaag een spellingtoets op school. Het dictee was erg moeilijk. Toch was ze als eerste van de hele groep klaar.*
'Marit had a spelling test at school today. The exercise was very difficult. Yet, she was the first of the group to finish.'

Target sentence:

Marit schrijft sneller als de rest van haar klas.

'Marit writes faster than the rest of her class.'

6. *Timo was met zijn familie in de dierentuin. Zijn broer was nogal bang voor de leeuwen die naar elkaar brulden. Timo vond ze niet zo eng.*
'Timo was at the zoo with his family. His brother was quite afraid of the lions roaring at each other. Timo didn't think they were that scary.'

Target sentence:

Timo is dapperder als zijn grote broer.

'Timo is braver than his big brother.'

7. *Vincent heeft aan een hardlooppwedstrijd meegedaan. In zijn categorie deden 50 mannen mee. Vincent is als 48^e geëindigd.*
'Vincent participated in a running race. 50 men took part in his category. Vincent finished 48th.'

Target sentence:

Vincent is langzamer als de meeste mannen.

'Vincent is slower than most men.'

8. *Yara studeert biologie op de universiteit. De studie valt haar erg zwaar. Daarom is ze elke dag aan het studeren in de bibliotheek.*
'Yara is studying biology in college. The study is very difficult for her. That is why she is studying in the library every day.'

Target sentence:

Yara werkt harder als haar medestudenten.

'Yara works harder than her fellow students.'

9. *Danny gaat het kerstdiner verzorgen dit jaar. Vorig jaar had zijn moeder het vlees laten aanbranden. Danny werkt in de keuken van een restaurant.*
'Danny is going to provide Christmas dinner this year. Last year, his mother burned the meat. Danny works in the kitchen of a restaurant.'

Target sentence:

Danny kookt beter als zijn moeder.

'Danny cooks better than his mother.'

10. *Tessa is bijna elke dag in de sportschool te vinden. Ook hockeyt ze al haar hele leven. Tessa rent het hardste van het hele team.*

'Tessa can be found in the gym almost every day. She also played field hockey all her life. Tessa is the fastest of the whole team.'

Target sentence:

Tessa is sneller als haar teamgenoten.

'Tessa is faster than her teammates.'

11. *Mike heeft een succesvol bedrijf opgezet. Hij maakt en verkoopt de mooiste bloemboeketten. Zijn inkomsten heeft hij ook slim geïnvesteerd.*

'Mike set up a successful business. He makes and sells the most beautiful flower bouquets. He also cleverly invested his income.'

Target sentence:

Mike is rijker als zijn concurrenten.

'Mike is richer than his competitors.'

12. *Wendy deed voor de eerste keer mee aan een schoonheidswedstrijd. Speciaal voor deze gelegenheid had een kapper haar haren opgestoken. Tot haar verbazing won ze de wedstrijd.*

'Wendy entered a beauty pageant for the first time. A hairdresser had put her hair up especially for this occasion. To her surprise, she won the competition.'

Target sentence:

Wendy was knapper als de andere deelnemers.

'Wendy was prettier than the other contestants.'

13. *Brian had zich aangemeld als coach voor het nieuwe basketbalteam. De meeste teamleden waren al erg goed toen hij begon, maar sommigen moest hij nog iets meer sturing geven.*

'Brian signed on to coach the new basketball team. Most of the team members were already very good when he started, but he needed to give some of them a little more direction.'

Target sentence:

Brian denkt dat hun nog wel zullen verbeteren.

'Brian thinks they will still improve.'

14. *Loes is zich al een jaar lang aan het voorbereiden op de triatlon. Haar tante doet ook met de competitie mee. Het wordt zwaar, maar ze hebben goed getraind.*

'Loes has been preparing for the triathlon for a year now. Her aunt also participates in the competition. It's going to be tough, but they've trained well.'

Target sentence:

Loes denkt dat hun het aankunnen.

'Loes thinks they can handle it.'

15. *René rookte al tien jaar en had met zijn collega's afgesproken om samen te stoppen. Tijdens de pauze kon hij ze nergens vinden. Teleurgesteld keek hij uit het raam.*

'René had smoked for ten years and had agreed with his colleagues to quit together. During the break, he couldn't find them anywhere. Disappointed, he looked out the window.'

Target sentence:

René zag dat hun buiten stonden te roken.

'René saw them smoking outside.'

16. *Arthur is een cadeau aan het bedenken voor het jubileum van zijn ouders. Opeens heeft hij een geweldige ingeving: hij gaat ze een weekendje weg aanbieden.*

'Arthur is thinking of a present for his parents' anniversary. Suddenly, he has a great idea: he is going to offer them a weekend away.'

Target sentence:

Arthur weet dat hun naar Parijs willen.

'Arthur knows they want to go to Paris.'

17. *Anna houdt ontzettend veel van voetbal. Volgend jaar is er alweer een Europees kampioenschap. Anna gaat dan het Nederlands elftal aanmoedigen.*

'Anna loves football very much. Another European Championship will take place next year. Anna will encourage the Dutch national team then.'

Target sentence:

Anna hoopt dat hun de finale bereiken.

'Anna hopes that they reach the final.'

18. *Barbara was naar een televisiequiz aan het kijken. De twee kandidaten wisten ontzettend veel. Vraag na vraag hadden ze goed beantwoord.*

'Barbara was watching a TV quiz. The two candidates knew a lot. They answered question after question correctly.'

Target sentence:

Barbara vindt dat hun hartstikke slim zijn.

'Barbara thinks they are very smart.'

19. *Caroline moest als regisseur de toneelspelers kiezen voor een nieuwe musical. Er waren veel mensen die auditie wilden doen. Uiteindelijk heeft Caroline spelers gekozen voor elk van de rollen.*

'As a director, Caroline had to choose the actors for a new musical. There were many people who wanted to audition. In the end, Caroline chose players for each of the roles.'

Target sentence:

Caroline vindt dat hun de beste keuze waren.

'Caroline thinks they were the best choice.'

20. *Lorna heeft haar vader al lang niet gezien. Ze woont namelijk sinds een jaar of twee in het buitenland. Morgen komt ze naar Nederland om hem te verrassen.*

'Lorna hasn't seen her father in a long time. She has been living abroad for a year or two. Tomorrow she will come to the Netherlands to surprise him.'

Target sentence:

Lorna doet hem expres niet vertellen dat ze komt.

'Lorna doesn't tell him she's coming on purpose.'

21. *Theresa liep onderweg naar huis langs een bushokje. Ze hoorde luide muziek en het geluid van gebroken glas. In het hokje zag Theresa een groep hangjongeren staan.*

'Theresa passed a bus shelter on the way home. She heard loud music and the sound of broken glass. Theresa saw a group of loiterers in the bus shelter.'

Target sentence:

Theresa zag dat hun het bushokje vernielden.

'Theresa saw them destroy the bus shelter.'

22. *Kas was met zijn vrouw onderweg naar het vliegveld. Ze zouden op vakantie gaan naar Spanje, maar kwamen in een lange file terecht.*

'Kas was on his way to the airport with his wife. They were going to go on holiday to Spain, but ended up in a long traffic jam.'

Target sentence:

Kas weet dat hun te laat zullen komen.

'Kas knows they will be late.'

23. *Julia heeft haar ouders uitgezwaaid. Ze gaan vandaag uit eten om te vieren dat ze dertig jaar getrouwd zijn. Julia ziet dat ze nog steeds gek op elkaar zijn.*

'Julia waved goodbye to her parents. They are going out for dinner today to celebrate their 30th anniversary. Julia sees that they are still crazy about each other.'

Target sentence:

Julia denkt dat hun niet zonder elkaar kunnen.

'Julia thinks they can't live without each other.'

24. *Marco zou deze zomer met zijn vrienden op vakantie gaan, maar hij heeft zijn been gebroken. Nu mag hij van de dokter niet meer met zijn vrienden mee.*

'Marco was supposed to go on holiday with his friends this summer, but he broke his leg. Now the doctor won't let him go with his friends anymore.'

Target sentence:

Marco denkt dat hun wel een kaartje sturen.

'Marco thinks they'll send a card.'

25. *Richard lag al de hele week ziek op bed. Hij had een flinke griep te pakken en kwam zijn bed niet uit. Gelukkig hoefde hij zich niet te vervelen.*

'Richard had been sick in bed all week. He had a bad flu and couldn't get out of bed. Fortunately, he didn't have to be bored.'

Target sentence:

Richard deed regelmatig bellen met zijn vrienden.

'Richard regularly calls his friends.'

26. *Robert zou vandaag met zijn vrienden naar het strand gaan, maar hij werd opeens opgeroepen om te komen werken. Gelukkig kon een collega voor hem invallen.*

'Robert was supposed to go to the beach with his friends today, but he was unexpectedly called to work. Fortunately, a colleague was able to fill in for him.'

Target sentence:

Robert doet binnenkort zelf ook invallen voor een collega.

'Robert will soon be filling in for a colleague himself.'

27. *Veerle heeft altijd van muziek gehouden. Als klein meisje speelde ze al viool en kende ze alle teksten van Britney Spears. Ook tijdens haar studie was ze nog veel met muziek bezig.*

'Veerle has always loved music. She played the violin as a little girl already and knew all the lyrics to Britney Spears songs. During her studies, she was still very much involved with music.'

Target sentence:

Veerle deed met het studentenchor meezingen.

'Veerle sang along with the student choir.'

28. *Thijs heeft zijn stem uitgebracht voor de Tweede Kamerverkiezingen. Er stond een lange rij voor het stembureau. Toen hij naar binnen mocht heeft hij voor de liberale partij gestemd.*

'Thijs cast his vote for the elections to the House of Representatives. There was a long line at the polling station. When he was allowed in, he voted for the Liberal party.'

Target sentence:

Thijs hoopt dat hun veel zetels behalen.

'Thijs hopes that they will win many seats.'

29. *Adam kijkt een vlog op zijn tablet. Opeens sluit het programma zich af en valt zijn tablet uit: er moeten updates worden uitgevoerd.*

'Adam is watching a vlog on his tablet. Suddenly, the program terminates and his tablet shuts down: updates must be performed.'

Target sentence:

Adam doet vanavond checken of alles weer werkt.

'Adam will check if everything is working again tonight.'

30. *Rosa heeft een belangrijke brief ontvangen van haar makelaar. Ze weet niet goed hoe ze erop moet antwoorden. Na veel wikken en wegen vraagt ze haar moeder om hulp.*

'Rosa received an important letter from her real estate agent. She doesn't quite know how to answer it. After much deliberation, she asks her mother for help.'

Target sentence:

Rosa doet vanavond op de brief reageren.

'Rosa will respond to the letter tonight.'

31. *Daniël is bezig met de grote schoonmaak van zijn huis. Vandaag staat de benedenverdieping op de planning. Hij is vast begonnen met stofzuigen.*

'Daniel is busy cleaning his house. Today, the ground floor is scheduled (to be cleaned). He started vacuuming already.'

Target sentence:

Daniël doet vanmiddag ook nog dweilen.

'Daniël will also mop (the floor) this afternoon.'

32. *Esmée houdt erg van fotografie. Ze zoekt vaak de mooiste plekjes op om foto's te maken. Ook na haar reis naar Argentinië kwam ze terug met veel foto's.*

'Esmée is very fond of photography. She's often looking for the most beautiful places to take pictures. After her trip to Argentina, she came back with many photos.'

Target sentence:

Esmée deed tijdens haar vakantie schitterende watervallen fotograferen.

'Esmée photographed beautiful waterfalls during her vacation.'

33. *Quinten werkt als taxichauffeur. Hij kreeg de taak om een oude vrouw naar de bank te brengen. Ze vroeg hem te wachten tot ze klaar was.*

'Quinten works as a taxi driver. He was given the task of taking an old woman to the bank. She asked him to wait until she was ready.'

Target sentence:

Quinten deed de taxi parkeren in de schaduw.

'Quinten parked the taxi in the shade.'

34. *Kim vindt het fantastisch als het sneeuwt. Haar favoriete seizoen is dan ook de winter. Elk jaar hoopt ze dat het meertje achter haar huis bevriest.*

'Kim loves when it snows. Her favorite season is winter. Every year, she hopes that the lake behind her house will freeze.'

Target sentence:

Kim doet dan altijd schaatsen op natuurijis.

'Kim always skates on natural ice.'

35. *Johan heeft een drukke werkweek achter de rug. Hij moest elke dag met zware zakken sjouwen. Daarom wil hij dit weekend het liefst helemaal niets uitvoeren.*

'Johan has had a busy working week. He had to carry heavy bags every day. That's why he prefers to do nothing at all this weekend.'

Target sentence:

Johan doet dan normaal gesproken altijd sporten.

'Johan usually does sports then.'

36. *Iris was vorige week jarig en kreeg daarom vrienden op bezoek. Die hebben haar gezamenlijk een 3D-printer gegeven. Omdat het regenachtig weer was, is ze gelijk aan de slag gegaan.*

'It was Iris's birthday last week and that's why friends came to visit. They jointly gave her a 3D printer. Because it was rainy weather, she immediately got to work.'

Target sentence:

Iris doet nu de hele dag printen.

'Iris now prints all day.'

Scrambling item set

Stimulus material from the scrambling item set for the sentence judgment experiment. The target sentences are presented here in the unscrambled word order. The subject in the target sentences was replaced by a pronoun if it followed the focus condition.

1. Topic condition:

Sophie heeft een geleende fiets gesloopt. Het is een zwarte fiets met een flinke slag in het wiel. Morgen moet de fiets worden teruggebracht.

‘Sophie wrecked a borrowed bicycle. It’s a black bicycle with a big kick in the wheel. The bicycle has to be returned tomorrow.’

Focus condition:

Sophie heeft een geleende fiets gesloopt. Ze is behoorlijk onvoorzichtig met andermans spullen. Morgen heeft ze een vrije dag.

‘Sophie wrecked a borrowed bicycle. She’s pretty careless with other people’s stuff. She has a day off tomorrow.’

Target sentence:

Sophie gaat natuurlijk de fiets repareren.

‘Sophie is of course going to repair the bike.’

2. Topic condition:

Lotte heeft een oude pop gevonden. Het is een stoffige pop waarvan het rechteroog ontbreekt. Eigenlijk is het stuk speelgoed te erg beschadigd om te bewaren.

‘Lotte found an old doll. It is a dusty doll with the right eye missing. Actually, the toy is too badly damaged to keep.’

Focus condition:

Lotte heeft een oude pop gevonden. Ze had onlangs besloten om haar kamer eens flink op te ruimen. Eigenlijk wil ze zo weinig mogelijk spullen bewaren.

‘Lotte found an old doll. She had recently decided to clean up her room. In fact, she wants to keep as little stuff as possible.’

Target sentence:

Lotte gaat waarschijnlijk de pop weggooien.

‘Lotte is probably going to throw the doll away.’

3. Topic condition:

Eva heeft een moeilijke opdracht gekregen. Het is een uitgebreide opdracht met zeven onderdelen. De docent vindt het echter geen belangrijke lesstof.

‘Eva was given a difficult assignment. It is a comprehensive assignment with seven parts. However, the teacher does not consider it important teaching material.’

Focus condition:

Eva heeft een moeilijke opdracht gekregen. Ze vindt wiskunde een van de minst leuke vakken. Haar docent weet haar ook helemaal niet te stimuleren.

'Eva was given a difficult assignment. Mathematics is one of the least enjoyable subjects. Her teacher doesn't encourage her at all.'

Target sentence:

Eva gaat misschien de opdracht overslaan.

'Eva might skip the assignment.'

4. **Topic condition:**

Milan heeft een spannend boek uitgezocht. Het is een dik boek met veel personages en een tragisch einde. De afgelopen tijd heeft het verhaal veel positieve aandacht gekregen.

'Milan selected an exciting book. It is a thick book with many characters and a tragic ending. Recently, the story has received a lot of positive attention.'

Focus condition:

Milan heeft een spannend boek uitgezocht. Hij houdt ervan om diep in een verhaal te duiken. De afgelopen tijd heeft hij steeds meer interesse gekregen voor literatuur.

'Milan selected an exciting book. He likes to dive deep into a story. Recently, he became increasingly interested in literature.'

Target sentence:

Milan gaat absoluut het boek lezen.

'Milan is definitely going to read the book.'

5. **Topic condition:**

Ruben heeft een dure telefoon besteld. Het is een moderne telefoon met een helder scherm. Gisteren meldde het merk echter een fabrieksfout.

'Ruben ordered an expensive phone. It is a modern phone with a bright screen. Yesterday, however, the brand reported a manufacturing defect.'

Focus condition:

Ruben heeft een dure telefoon besteld. Hij volgt het nieuws over gadgets op de voet. Gisteren las hij echter dat er alweer een nieuwe versie is uitgekomen.

'Ruben ordered an expensive phone. He follows the news about gadgets closely. Yesterday, however, he read that a new version has already been released.'

Target sentence:

Ruben gaat absoluut de telefoon terugsturen.

'Ruben is definitely going to return the phone.'

6. Topic condition:

Emma heeft een meeslepend essay geschreven. Het is een emotioneel essay met persoonlijke ervaringen. Verschillende tijdschriften hebben al interesse getoond.
'Emma wrote a compelling essay. It is an emotional essay with personal experiences. Several magazines have already expressed interest.'

Focus condition:

Emma heeft een meeslepend essay geschreven. Ze werkt als opinieschrijver op freelancebasis. Verschillende tijdschriften hebben haar al benaderd.
'Emma wrote a compelling essay. She works as an opinion writer on a freelance basis. Several magazines have already approached her.'

Target sentence:

Emma gaat mogelijk het essay publiceren.
'Emma might publish the essay.'

7. Topic condition:

Jesse heeft een schattige poes gezien in het asiel. Het is een jonge poes met een zwart-witte vacht. Al snel was er een beslissing genomen.
'Jesse saw a cute cat at the shelter. It is a young cat with black and white fur. A decision was quickly made.'

Focus condition:

Jesse heeft een schattige poes gezien in het asiel. Hij is al een tijdje op zoek naar wat gezelschap in zijn huis. Al snel heeft hij een beslissing genomen.
'Jesse saw a cute cat at the shelter. He has been looking for some company in his house for a while now. He quickly made a decision.'

Target sentence:

Jesse gaat natuurlijk de poes adopteren.
'Jesse is of course going to adopt the cat.'

8. Topic condition:

Thomas heeft een mooie ketting gezien. Het is een zilveren ketting met een diamantje. Deze week is het sieraad flink afgeprijsd.
'Thomas saw a beautiful necklace. It is a silver necklace with a diamond. This week, the piece of jewelry is heavily discounted.'

Focus condition:

Thomas heeft een mooie ketting gezien. Hij heeft wat geld opzij gezet voor een verjaardagscadeau. Deze week wil hij zijn vriendin verrassen.
'Thomas saw a beautiful necklace. He set aside some money for a birthday present. This week, he wants to surprise his girlfriend.'

Target sentence:

Thomas gaat wellicht de ketting kopen.

'Thomas might buy the necklace.'

9. **Topic condition:**

Nina heeft een aftands krukje opgeduikeld. Het is een houten krukje dat wel een likje verf kan gebruiken. Bovendien zitten een aantal schroeven los.

'Nina dug up a tatty stool. It is a wooden stool that could use a lick of paint. Moreover, some screws are loose.'

Focus condition:

Nina heeft een aftands krukje opgeduikeld. Ze vindt het leuk om afgedankte meubels te herstellen. Bovendien was ze nog op zoek naar een nieuw klusproject.

'Nina dug up a tatty stool. She enjoys restoring discarded furniture. Moreover, she was still looking for a new DIY project.'

Target sentence:

Nina gaat waarschijnlijk het krukje opknappen.

'Nina is probably going to fix up the stool.'

10. **Topic condition:**

Simon heeft een digitale waardebon ontvangen. Het is een luxe waardebon van een parfumwinkel. Helaas is de code niet lang meer geldig.

'Simon received a digital voucher. It is a luxury voucher from a perfume shop. Unfortunately, the code is no longer valid.'

Focus condition:

Simon heeft een digitale waardebon ontvangen. Hij kan ermee terecht bij een parfumwinkel. Helaas is hij zelf allergisch voor parfum.

'Simon received a digital voucher. He can go to a perfume shop with it. Unfortunately, he is allergic to perfume.'

Target sentence:

Simon gaat wellicht de waardebon weggeven.

'Simon might give away the coupon.'

11. **Topic condition:**

Hugo heeft een tweedehands auto bekeken. Het is een blauwe auto uit het jaar 2001. Tijdens de proefrit maakte het voertuig een goede indruk.

'Hugo viewed a used car. It is a blue car from the year 2001. During the test drive, the vehicle made a good impression.'

Focus condition:

Hugo heeft een tweedehands auto bekeken. Hij heeft maandenlang gespeurd naar zijn favoriete model. Tijdens de proefrit stelde hij de verkoper veel vragen.

'Hugo viewed a used car. He searched for his favorite model for months. During the test drive, he asked the seller many questions.'

Target sentence:

Hugo gaat kennelijk de auto overnemen.

'Hugo is apparently going to purchase the car.'

12. Topic condition:

Ryan heeft een schitterend kunstwerk gemaakt. Het is een groot kunstwerk dat is gemaakt van koper. Sinds een tijdje staat de creatie op zolder.

'Ryan created a beautiful work of art. It is a big work of art that is made of copper. The creation has been in the attic for a while.'

Focus condition:

Ryan heeft een schitterend kunstwerk gemaakt. Hij vindt het fijn om creatief bezig te zijn. Sinds een tijdje streeft hij naar een carrière als artiest.

'Ryan created a beautiful work of art. He likes to be creative. For some time now, he has been aiming for an artistic career.'

Target sentence:

Ryan gaat ongetwijfeld het kunstwerk tentoonstellen.

'Ryan is undoubtedly going to exhibit the artwork.'

13. Topic condition:

Floris heeft een nieuwe schuur gebouwd. Het is een houten schuur met een klein raampje. Toch ziet het bouwwerk er nog vrij saai uit.

'Floris built a new shed. It is a wooden shed with a small window. However, the building still looks quite dull.'

Focus condition:

Floris heeft een nieuwe schuur gebouwd. Hij had behoefte aan wat meer opslagruimte. Toch is hij nog niet helemaal tevreden.

'Floris built a new shed. He needed a little more storage space. Still, he is not completely satisfied.'

Target sentence:

Floris gaat wellicht de schuur schilderen.

'Floris might paint the shed.'

14. Topic condition:

Marjon heeft een verse zalm gekocht. Het is een flinke zalm met het vel er nog aan. De laatste tijd zijn visgerechten erg populair.

'Marjon bought a fresh salmon. It is a large salmon with the skin still on. Recently, seafood dishes have become very popular.'

Focus condition:

Marjon heeft een verse zalm gekocht. Ze staat in het weekend altijd met veel plezier in de keuken. De laatste tijd probeert ze nieuwe keukentechnieken uit.
'Marjon bought a fresh salmon. She always enjoys being in the kitchen on weekends. Lately, she's been trying out new kitchen techniques.'

Target sentence:

Marjon gaat misschien de zalm stoven.
'Marjon might stew the salmon.'

15. **Topic condition:**

Lucas heeft een tof bordspel gewonnen. Het is een nieuw bordspel dat een beetje lijkt op Cluedo. Dit weekend is het eindelijk zover.
'Lucas won a great board game. It's a new board game that looks a bit like Cluedo. This weekend, the time has finally come.'

Focus condition:

Lucas heeft een tof bordspel gewonnen. Hij heeft een uitgebreide review gelezen op het internet. Dit weekend komen zijn vrienden op bezoek.
'Lucas won a great board game. He read an extensive review on the internet. His friends are coming to visit this weekend.'

Target sentence:

Lucas gaat ongetwijfeld het bordspel uitproberen.
'Lucas is undoubtedly going to try out the board game.'

16. **Topic condition:**

Erik had een Franse quiche bereid. Het was een goedgevulde quiche met spekjes en prei. Uiteindelijk bleek de maaltijd behoorlijk machtig te zijn.
'Erik had prepared a French quiche. It was a well-filled quiche with bacon and leeks. In the end, the meal turned out to be quite heavy.'

Focus condition:

Erik had een Franse quiche bereid. Hij had behoorlijk veel honger gekregen na een lange dag op kantoor. Uiteindelijk zat hij toch al vrij snel vol.
'Erik had prepared a French quiche. He had gotten pretty hungry after a long day at the office. In the end, he was full pretty quickly.'

Target sentence:

Erik gaat misschien de quiche invriezen.
'Erik might freeze the quiche.'

17. **Topic condition:**

Fenna heeft een eigen website ontworpen. Het is een zakelijke website met een webshop. Vorige week heeft de internetwinkel veel klanten getrokken.

'Fenna designed her own website. It is a business website with a webshop. Last week, the online shop attracted many customers.'

Focus condition:

Fenna heeft een eigen website ontworpen. Ze is vier maanden druk geweest met coderen. Vorige week is ze begonnen aan een gevorderde programmeercursus.
'Fenna designed her own website. She's been busy coding for four months. Last week, she started an advanced programming course.'

Target sentence:

Fenna gaat waarschijnlijk de website uitbreiden.
'Fenna is probably going to expand the website.'

18. **Topic condition:**

Nora heeft een interessant museum ontdekt. Het is een wetenschappelijk museum met een uitgebreide collectie. Binnenkort wordt een nieuwe expositie geopend.

'Nora discovered an interesting museum. It is a science museum with an extensive collection. A new exhibition will be opened soon.'

Focus condition:

Nora heeft een interessant museum ontdekt. Ze wil zich al een tijd meer verdiepen in de archeologie. Binnenkort heeft ze een weekendje vrij.
'Nora discovered an interesting museum. She has been wanting to indulge more in archaeology for a while. She has a weekend off soon.'

Target sentence:

Nora gaat absoluut het museum bezoeken.
'Nora is absolutely going to visit the museum.'

19. **Topic condition:**

Sanne heeft een riante studio gekocht. Het is een moderne studio met uitzicht op zee. Na de zomer staat het echter drie maanden leeg vanwege een buitenlandverblijf.

'Sanne bought a spacious studio. It is a modern studio with sea view. After the summer, however, it will be empty for three months because of a stay abroad.'

Focus condition:

Sanne heeft een riante studio gekocht. Ze wilde heel graag haar eigen woning hebben. Na de zomer verblijft ze echter drie maanden in het buitenland voor haar werk.

'Sanne bought a spacious studio. She really wanted to have her own place. After the summer, however, she will stay abroad for three months for work.'

Target sentence:

Sanne gaat vermoedelijk de studio verhuren.

'Sanne is probably going to rent out the studio.'

20. **Topic condition:**

Pepijn heeft een verdacht bestand gedownload. Het is een vertrouwelijk bestand met persoonsgegevens. Het is niet de bedoeling dat deze informatie vrij toegankelijk is.

'Pepijn downloaded a suspicious file. It is a confidential file with personal data. This information is not intended to be freely accessible.'

Focus condition:

Pepijn heeft een verdacht bestand gedownload. Hij klikte op een of andere link naar een onbetrouwbare pagina. Het is niet de bedoeling dat hij malware binnenhaalt.

'Pepijn downloaded a suspicious file. He clicked on some link to an untrustworthy page. He did not intend to bring in malware.'

Target sentence:

Pepijn gaat natuurlijk het bestand verwijderen.

'Pepijn is of course going to delete the file.'

21. **Topic condition:**

Lieke heeft een antieke piano geërfd. Het is een zwarte piano waar al jaren niet op is gespeeld. Jammer genoeg zijn sommige toetsen een beetje versleten.

'Lieke inherited an antique piano. It is a black piano that has not been played for years. Unfortunately, some keys are a bit worn.'

Focus condition:

Lieke heeft een antieke piano geërfd. Ze heeft zich nooit verdiept in klassieke muziek en is ook niet muzikaal aangelegd. Jammer genoeg kan ze dus niet spelen.

'Lieke inherited an antique piano. She never looked into classical music and is not musically inclined. Unfortunately, she cannot play.'

Target sentence:

Lieke gaat mogelijk de piano verkopen.

'Lieke might sell the piano.'

22. **Topic condition:**

Jasmijn heeft een prachtig gedicht geschreven. Het is een romantisch gedicht met een maatschappelijke boodschap. Binnenkort vindt een speciaal symposium plaats.

'Jasmijn wrote a beautiful poem. It is a romantic poem with a social message. A special symposium will be held shortly.'

Focus condition:

Jasmijn heeft een prachtig gedicht geschreven. Ze is altijd al een enorm schrijftalent geweest en kan fantastisch rijmen. Binnenkort treedt ze op bij een speciaal symposium.

'Jasmijn wrote a beautiful poem. She has always been a huge writing talent and has a fantastic rhyme. She will soon be performing at a special symposium.'

Target sentence:

Jasmijn gaat kennelijk het gedicht voordragen.

'Jasmijn is apparently going to recite the poem.'

23. Topic condition:

Jurre heeft een speciaal biertje gezien op de menukaart. Het is een donker biertje met tonen van karamel en koffie. Al snel verschijnt de bestelling op tafel.

'Jurre saw a special beer on the menu. It is a dark beer with notes of caramel and coffee. Soon enough, the order appears on the table.'

Focus condition:

Jurre heeft een speciaal biertje gezien op de menukaart. Hij vindt het leuk om nieuwe smaken uit te proberen. Al snel ziet hij zijn bestelling op tafel verschijnen.

'Jurre saw a special beer on the menu. He likes to try new flavors. Soon enough, he sees his order appear on the table.'

Target sentence:

Jurre gaat ongetwijfeld het biertje waarderen.

'Jurre is undoubtedly going to appreciate the beer.'

24. Topic condition:

Isabel heeft een ouderwetse computer aangeschaft. Het is een langzame computer met een cd-lade. De laatste jaren is de computer niet meer aangeraakt.

'Isabel bought an old-fashioned computer. It is a slow computer with a CD tray. The computer has not been touched in recent years.'

Focus condition:

Isabel heeft een ouderwetse computer aangeschaft. Ze knutselt in haar vrije tijd graag met hardware. De laatste jaren heeft ze zich ontwikkeld tot een echte specialist.

'Isabel bought an old-fashioned computer. She likes to tinker with hardware in her spare time. In recent years, she has developed into a real specialist.'

Target sentence:

Isabel gaat vermoedelijk de computer upgraden.

'Isabel is probably going to upgrade the computer.'

Appendix to Chapter 6

Our source material for Chapter 6 contains texts from the following corpora:

1. **Corpus Gysseling (2021)**

The online version of the *Corpus Gysseling* contains 13th century official documents, originally collected by Ghent linguist Martin Gysseling between 1977 and 1987, and is enriched with part-of-speech tagging and lemmatization. We included a selection of texts from the regions Flanders, Utrecht, and Holland. Total number of texts in subset: 336; total words in subset: 278,038.

2. **Corpus van Reenen-Mulder (CRM)** (van Reenen & Mulder 1993)

The CRM is a collection of 14th century official documents. The CRM contains over 3800 documents which are all dated and localized. We included a random selection of texts from the regions of Flanders, Utrecht, and Holland. Total number of texts in subset: 91; total words in subset: 54,460

3. **Corpus Laatmiddel- en Vroegnieuwederlands (CLVN)** (van der Sijs et al. 2018)

The CLVN contains over 2700 official documents from the 15th, 16th, and 17th century. Many texts in this corpus comprise several charters and hence appear longer in length than the texts from Corpus Gysseling or CRM. We included a random selection of texts from the regions of Flanders, Utrecht, and Holland. There is one exception: the corpus contains the diary of Christiaan Munsters, but this text is not localized. We included it to balance the predominantly official nature of the data-set.

Total number of texts in subset: 66; total words in subset: 176,543

4. **Narrative section of the Compilatiecorpus Historisch Nederlands (CHN)** (Coussé 2010)

The narrative sub-corpus of the CHN contains a balanced selection of narrative prose texts written from the end of the 16th century onward. The texts included in this sub-corpus are all written in Holland.

Total number of texts in subset: 63; total words in subset: 106,274

We used material from three religious primary sources to supplement the official documents included in the corpora mentioned above:

1. Sermons 1, 20, 39, 41, and 42 of *De Limburgsche Sermoenen* (Kern 1895). The *Limburgsche Sermoenen* are the oldest recorded sermons in the Dutch language and were written in the 13th century. They originate in the southeast of the Netherlands, but they were added to the text selection to balance the official treatises from *Corpus Gysseling*. (Total words in subset: 15,408)

2. Translations of the first 18 psalms (de Bruin 1978). The psalms were translated at the end of the 14th century. The author is unknown, so the text is not localized. (Total words in subset: 5,009)
3. *Den Tempel Onser Sielen* (Ampe 1968) and *Der Evangelische Peerle* (Ampe 1993), both written by the same beguine in the second half of the 16th century. (Total words in subset: 10,558)

The total number of words in our data-set was 702,519. An overview of the distribution of material across time and region is given in Table 7.6.

Region	13 th century		14 th century			15 th century
	Gysseling	Sermons	CRM	CLVN	Psalmen	CLVN
Holland	58,428		18,577	2,087		21,216
East Flanders	77,875		8,917	1,016		3,426
West Flanders	136,505		9,494	2,318		31,467
Utrecht	5,230		17,472	4,389		29,806
Other		15,408			5,009	
Total	278,038	15,408	54,460	9,810	5,009	85,915

Table 7.6: Distribution of source material across time and region

Region	16 th century			17 th century		18 th century	19 th century
	CHN	CLVN	Peerle and Tempel	CHN	CLVN	CHN	CHN
Holland	12,247	35,699		48,894	6,284	45,133	56,229
East Flanders		552					
West Flanders		6,941			1,161		
Utrecht		7,387					
Other		23,894	10,558				
Total	12,247	73,373	10,558	48,894	7,445	45,133	56,229

Table 7.6: Distribution of source material across time and region (cont.)

Nederlandse samenvatting

Variatie in de volgorde van woorden

Een van de aspecten waarin talen van elkaar kunnen verschillen is de volgorde van woorden en woordgroepen. Denk hierbij bijvoorbeeld aan de volgorde van het zelfstandig naamwoord en het bijvoeglijk naamwoord, of aan de volgorde van het werkwoord en het lijdend voorwerp. Zo hebben we het in het Nederlands over *een rode roos*, maar spreken de Fransen van *une rose rouge*. En in het Nederlands zeggen we dat iemand *een roos plukt*, maar in het Engels moet je zeggen dat iemand *picks a rose*. Maar ook binnen een taal kunnen woorden en woordgroepen op verschillende posities verschijnen. In de meeste gevallen heeft de afwijkende woordvolgorde een duidelijke functie, bijvoorbeeld als een woordgroep in de eerste zinspositie verschijnt in een vraagzin (*Welke roos heeft Jan geplukt?*) of om de nadruk te leggen op een woordgroep (*Die roos heeft Jan geplukt!*). In sommige gevallen is het echter niet helemaal duidelijk wat ten grondslag ligt aan de variatie.

Zo kunnen we in het Nederlands een lijdend voorwerp van plaats laten wisselen met een bijwoord of een bijwoordelijke bepaling. Deze variatie staat in de taalwetenschappelijke literatuur bekend als *scrambling*. Scrambling heeft een duidelijk effect op de betekenis van de zin wanneer het lijdend voorwerp indefiniet (onbepaald) is, zoals in (1), waar het lijdend voorwerp *een film* van plaats wisselt met het bijwoord *gisteren*. Als scrambling hier plaatsvindt, verandert echter de betekenis van de zin. We kunnen *een film* in (1a) namelijk opvatten als een specifieke of een niet-specifieke film: deze zin kan bijvoorbeeld worden vervolgd met *...namelijk "Reservoir Dogs"* of met *...maar ik weet niet welke film*. In zin (1b) kan *een film* alleen maar als specifiek worden opgevat.

- (1) a. Ik zei dat Jan gisteren **een film** heeft gezien.
b. Ik zei dat Jan **een film** gisteren heeft gezien.

Als het lijdend voorwerp de vorm van een persoonlijk voornaamwoord heeft, dan is het bijna verplicht om het aan de rechterkant van het bijwoord te plaatsen. Dit is geïllustreerd in (2): zonder verdere context klinkt de volgorde in (2a) vreemd in vergelijking met de volgorde in (2b).

- (2) a. Ik zei dat Jan gisteren **hem** heeft gezien.
b. Ik zei dat Jan **hem** gisteren heeft gezien.

Maar als het lijdend voorwerp definiet (bepaald) is, zoals in (3), dan is het helemaal niet zo duidelijk of er een voorkeur bestaat voor de ene of voor de andere volgorde, en welke factoren een rol spelen bij deze keuze. Er treedt in ieder geval niet een betekenisverschil op dat vergelijkbaar is met het betekenisverschil bij scrambling van een indefiniet lijdend voorwerp, zoals in (1).

- (3) a. Ik zei dat Jan gisteren **de film** heeft gezien.
b. Ik zei dat Jan **de film** gisteren heeft gezien.

In dit proefschrift wordt gebruik gemaakt van experimentele methodes om het scramblinggedrag van het definitieve lijdend voorwerp in het Nederlands in kaart te brengen. Specifiek worden twee factoren onderzocht die in de volgende twee subsecties zullen worden uiteengezet: het type bijwoord en de zogenaamde “informatiestructuur” van de zin, oftewel, de volgorde waarin de informatie die relevant is binnen de context van een gesprek, wordt aangeboden. Daarbij ligt de nadruk op het feit dat er een schaarste is aan experimentele studies naar scrambling van het definitieve lijdend voorwerp in het Nederlands. Hoewel het fenomeen veelvuldig is beschreven in de taalwetenschappelijke literatuur, zijn de meeste theorieën louter gebaseerd op de intuïties van de onderzoekers. Die intuïties zijn doorgaans ook sterk geformuleerd: volgens de meeste theoretische taalwetenschappers is scrambling verplicht of onmogelijk onder bepaalde condities.

Een van de doelstellingen van dit proefschrift is om aan de hand van een reeks experimentele studies aan te tonen dat scrambling van het definitieve lijdend voorwerp veel vrijer kan worden toegepast dan vaak wordt beweerd in de taalwetenschappelijke literatuur. Aangezien de experimentele resultaten niet altijd stroken met de intuïties van theoretische taalwetenschappers, beargumenteert het proefschrift tevens dat het belangrijk is om verschillende types data (“convergerende evidentie”) te gebruiken om tot theoretische conclusies te komen over scrambling.

Bijwoordelijke barrières

In de taalwetenschappelijke literatuur zijn maar weinig experimentele of empirische studies over het scramblinggedrag van het definitieve lijdend voorwerp in het Nederlands te vinden; in de meeste gevallen worden alleen de intuïties van de onderzoeker(s) zelf gerapporteerd. De resultaten van de experimentele studies zijn daarnaast ook nog eens tegenstrijdig aan elkaar. Zo concluderen Unsworth (2005) en Schaeffer (1997, 2000), op basis van een experiment waarin proefpersonen scramblingzinnen moesten afmaken, dat moedertaalsprekers van het Nederlands een definitief lijdend voorwerp bijna altijd links van een bijwoord plaatsen, zoals in (3b). De Swart & Van Bergen (2011) rapporteren daarentegen, op basis van een soortgelijk experiment, dat ze het definitieve lijdend voorwerp in de meeste gevallen juist rechts van het bijwoord plaatsen, zoals in (3a). Van Bergen & De Swart (2009, 2010) tonen bovendien in twee eerdere studies aan dat het definitieve lijdend voorwerp meestal aan de rechterkant van het bijwoord staat in een subset van het Corpus Gesproken Nederlands, een corpus van hedendaags Nederlands dat ongeveer tien miljoen woorden omvat. Uit de resultaten van de bestaande studies die empirische data rapporteren is dus niet direct af te leiden welke voorkeur Nederlanders hebben met betrekking tot de positie van het definitieve lijdend voorwerp in scramblingzinnen.

Een belangrijk verschil tussen de eerdere experimentele studies is het type bijwoord dat gebruikt wordt in de stimuluszinnen. In de studie van Unsworth (2005) worden de zinnen aangeboden met de negatie *niet*, terwijl De Swart & Van Bergen (2011) zinnen aanbieden met een tijdsbepaling, zoals *gisteren*. De interpretatie van ontkennende zinnen is echter afhankelijk van de plaats van het lijdend voorwerp ten opzichte van het bijwoord *niet*. Zin (4a) lezen we als ‘het is niet het kozijn dat

Roos geverfd heeft’, maar ze heeft dus wel iets anders geverfd, terwijl in zin (4b) de hele zin wordt ontkend, dus ‘het is niet waar dat Roos het kozijn geverfd heeft’. Dit verschil in interpretatie bestaat niet in zinnen met een tijdsbepaling, zoals (5).

- (4) a. Roos heeft niet **het kozijn** geverfd.
- b. Roos heeft **het kozijn** niet geverfd.
- (5) a. Roos heeft gisteren **het kozijn** geverfd.
- b. Roos heeft **het kozijn** gisteren geverfd.

In **Hoofdstuk 2** worden twee experimenten gerapporteerd waarin zinnen met negatie worden vergeleken met dezelfde zinnen met een tijdsbepaling. De resultaten van deze experimenten tonen aan dat proefpersonen de zinnen beter waarderen als het lijdend voorwerp links van de negatie wordt geplaatst (6.4 tegenover 4.2 op een 7-puntsschaal), maar niet als het lijdend voorwerp links van een tijdsbepaling wordt geplaatst (6.2 tegenover 6.1 op een 7-puntsschaal). Daarnaast plaatsen proefpersonen in een productie-experiment het definiete lijdend voorwerp in de meeste gevallen ook aan de linkerkant van negatie (91%). Dit was niet het geval in de zinnen met een tijdsbepaling (40%). Hieruit kunnen we opmaken dat het type bijwoord een belangrijke rol speelt bij het kiezen voor de ene of de andere volgorde, maar ook in de waardering van scramblingzinnen.

Hoofdstuk 3 rapporteert een vervolgonderzoek van de experimenten met negatie en tijdsbepalingen, waarin zinnen met een tijdsbepaling worden vergeleken met zinnen met een bijwoord dat dezelfde eigenschappen heeft als negatie (zogenaamde “focusgevoelige bijwoorden”, zoals bijvoorbeeld *vaak*). Voor dit experiment zijn zinnen zoals (4) en (5) aangevuld met een zinsdeel waarin een expliciet contrast wordt aangebracht met het lijdend voorwerp, zoals in (6) en (8), of met het werkwoord, zoals in (7) en (9).

- (6) a. Sophie heeft vaak **de kok** beledigd, maar niet **de ober**.
- b. Sophie heeft **de kok** vaak beledigd, maar niet **de ober**.
- (7) a. Sophie heeft vaak **de kok** beledigd, maar niet **geslagen**.
- b. Sophie heeft **de kok** vaak beledigd, maar niet **geslagen**.
- (8) a. Sophie heeft toen **de kok** beledigd, maar niet **de ober**.
- b. Sophie heeft **de kok** toen beledigd, maar niet **de ober**.
- (9) a. Sophie heeft toen **de kok** beledigd, maar niet **geslagen**.
- b. Sophie heeft **de kok** toen beledigd, maar niet **geslagen**.

Proefpersonen in dit experiment lazen de zinnen woord voor woord op een computerscherm en kregen na de presentatie van het laatste woord een rood vraagteken te zien. Op de vraag of de zin een goede constructie van het Nederlands is konden de proefpersonen dan met “JA” of “NEE” antwoorden door op een knop te drukken. Terwijl de proefpersonen deze keuze maakten, werd tevens hun reactietijd gemeten.

De resultaten wijzen opnieuw op een verschil tussen de twee types bijwoorden. Proefpersonen deden langer over het verwerken van zinnen met twee verschillende woordvolgordes in het eerste en tweede deel van de zin (zoals in (6b) en (7a)) dan

over de zinnen met twee keer dezelfde woordvolgorde (zoals in (6a) en (7b)). Dit verschil bestond echter alleen in de zinnen met een focusgevoelig bijwoord, waarin scrambling dus een betekenisverschil teweegbrengt. De resultaten van dit experiment tonen tevens aan dat alle varianten van de scramblingzinnen wel geaccepteerd worden als constructies van het Nederlands. Dit betekent dat zinnen vrij gescrembled kunnen worden. Maar als scrambling tot een betekenisverschuiving leidt, dan vergt het extra cognitieve inspanning om de zin te begrijpen.

Een ander verschil tussen bijwoordtypes is het verschil tussen zinsbijwoorden die de hele propositie modifieren en predicatbijwoorden die alleen het gezegde modifieren. Een zinsbijwoord kun je herkennen door het in een zin te zetten die begint met “*het is* BIJWOORD *zo dat...*”. De zin *Het is helaas zo dat Roos het kozijn verft* is bijvoorbeeld een goede zin, wat aangeeft dat *helaas* een zinsbijwoord is dat de hele bijzin *dat Roos het kozijn verft* modificeert. De zin *Het is snel zo dat Roos het kozijn verft* is echter geen goede zin, wat aangeeft dat *snel* geen zinsbijwoord is, maar een predicatbijwoord. Predicatbijwoorden zijn te herkennen aan de hand van de parafraze “*en deed dat* BIJWOORD”. Je kunt bijvoorbeeld wel zeggen: *Roos heeft het kozijn geverfd, en zij deed dat snel*, maar niet *Roos heeft het kozijn geverfd, en zij deed dat helaas*. Het predicatbijwoord *snel* modificeert dus niet de hele zin, maar alleen het gezegde *het kozijn verven*.

Aangezien zinsbijwoorden een groter “bereik” hebben dan predicatbijwoorden, nemen we aan dat ze een hogere positie hebben in de structurele hiërarchie van de zin. Onder de aanname dat het lijdend voorwerp van rechts naar links verplaatst in scramblingzinnen, moet het lijdend voorwerp daarom naar een hogere structurele positie verplaatsen wanneer het aan de linkerkant van een zinsbijwoord staat, dan wanneer het links van een predicatbijwoord staat. Het is daarom aannemelijk dat er een voorkeur bestaat voor zinnen met het lijdend voorwerp aan de rechterkant van het bijwoord als dit een zinsbijwoord is, in vergelijking met dezelfde zinnen met een predicatbijwoord, omdat de syntactische afstand die het lijdend voorwerp aflegt dan groter is.

In **Hoofdstuk 2** worden, naast de twee eerder genoemde experimenten, twee experimenten gepresenteerd waarin deze hypothese wordt onderzocht. Proefpersonen in een beoordelingsexperiment gaven beide woordvolgordes hoge scores, zowel in zinnen met een zinsbijwoord als in zinnen met een predicatbijwoord. Toch blijkt uit de data dat er, zoals verwacht, een lichte voorkeur bestaat voor zinnen met een definitief lijdend voorwerp aan de linkerkant van een predicatbijwoord (lijdend voorwerp links: 6.5, lijdend voorwerp rechts: 5.9, op een 7-puntsschaal). Dit verschil zien we niet terug bij de zinnen met een zinsbijwoord (beide volgordes: 6.2 op een 7-puntsschaal). Het effect van het type bijwoord wordt duidelijker in de resultaten van een productie-experiment: proefpersonen plaatsten het definitief lijdend voorwerp aan de linkerkant van 71% van de predicatbijwoorden, tegenover 45% van de zinsbijwoorden. Daarmee tonen deze experimenten opnieuw aan dat het type bijwoord een belangrijke factor is in het gebruik en de waardering van scramblingzinnen. Een definitief lijdend voorwerp wordt namelijk bij voorkeur aan de linkerkant van het bijwoord geplaatst als dit een predicatbijwoord is, maar niet als dit een zinsbijwoord is. In het laatste geval is de distributie meer gebalanceerd.

Een belangrijke observatie hierbij is dat beide woordvolgordes relatief hoge scores krijgen in de bijbehorende beoordelingstaken, zowel in zinnen met een zinsbijwoord als in zinnen met een predicaatbijwoord. Scrambling is in principe dus een optionele operatie.

Vrijheid in het Nederlandse middelveld

Iets wat vaak wordt beweerd over scrambling is dat het een mechanisme is om de “informatiestructuur” van de zin te reguleren, dat wil zeggen, de volgorde waarin informatie wordt aangeboden die relevant is binnen de gesprekscontext. Dat er een relatie bestaat tussen de informatiestructuur en de volgorde van woorden wordt al beschreven door de traditionele grammatici (Weil 1844, Behaghel 1909). Zij beschrijven dat informatie die al bekend is bij de gesprekspartner, bijvoorbeeld omdat iets al eerder is genoemd in het gesprek, vaak eerder in de zin voorkomt dan nieuwe informatie. Er ligt ook een psycholinguïstische reden ten grondslag aan dit principe: het vergemakkelijkt de *flow* van de informatie. Als de bekende informatie vroeg in de zin wordt geplaatst, kan deze namelijk makkelijk aan de voorgaande discours worden gekoppeld en is het makkelijker om de aanstaande nieuwe informatie te verwerken.

Met betrekking tot scrambling betekent dit dat het lijdend voorwerp bekende informatie zou moeten geven als het aan de linkerkant van het bijwoord staat en nieuwe informatie als het aan de rechterkant van het bijwoord staat. In (10), bijvoorbeeld, zou (10a) een beter antwoord op de vraag zijn dan (10b), omdat *het boek* nieuwe informatie is. Aangezien nieuwe informatie doorgaans later in de zin staat, verwacht je *het boek* aan de rechterkant van het bijwoord *morgen*. Voor (11) geldt het tegenovergestelde: *het boek* wordt al genoemd in de vraag en is dus bekende informatie. Zin (11b), waarin de bekende informatie aan de linkerkant van het bijwoord staat, zou daarom beter zijn als antwoord op de vraag dan (11a).

- (10) Hoe zit het met de voorbereidingen van je examen?
- a. Ik ga morgen **het boek** lezen.
 - b. Ik ga **het boek** morgen lezen.
- (11) Hoe zit het met je review van dat boek?
- a. Ik ga morgen **het boek** lezen.
 - b. Ik ga **het boek** morgen lezen.

De claim dat woorden in scramblingzinnen op deze discoursgerelateerde manier zijn verdeeld zien we vaak terug in de taalwetenschappelijke literatuur. Sterker nog, een veelvoorkomende claim is dat deze verdeling *altijd zo* is, oftewel, dat er een strikt “discourstemplaat” bestaat: bekende informatie *moet* links van het bijwoord staan en nieuwe informatie *moet* rechts van het bijwoord staan. Dit discourstemplaat wordt getest in een productie-experiment in **Hoofdstuk 4** en in een beoordelingsexperiment in **Hoofdstuk 5**. Anders dan in de eerdere experimenten worden de stimuluszinnen nu voorafgegaan door een kort verhaaltje waarin de informatiestructurele status van het definiëte lijdend voorwerp wordt gemanipuleerd. In **Hoofdstuk 4**

wordt daarbij een onderscheid gemaakt tussen drie types bekende informatie. Het lijdend voorwerp kan namelijk om verschillende redenen bekende informatie geven: het kan al eerder genoemd zijn in de discours (*anaforiciteit*), het gesprek kan over het lijdend voorwerp gaan (*topicaliteit*), of het maakt deel uit van onze wereldkennis (we weten in Nederland bijvoorbeeld ook zonder verdere context dat *de koning* verwijst naar Koning Willem-Alexander).

De voorbeelden in (12) en (13) laten zien hoe het lijdend voorwerp *het museum* in (13) kan verschillen in topicaliteit. *Het museum* in (13) is het topic als het wordt voorafgegaan door het verhaaltje in (12a), omdat dit verhaaltje echt om het museum draait. *Het museum* is daarentegen niet het topic als het wordt voorafgegaan door het verhaaltje in (12b), aangezien dit verhaaltje niet per se over het museum gaat, maar vooral over Nora. Omdat *het museum* in beide verhaaltjes in (12) wel expliciet wordt genoemd, is het lijdend voorwerp in (13) na beide verhaaltjes anaforisch.

- (12) a. Nora heeft een interessant museum ontdekt. Het is een wetenschappelijk museum met een uitgebreide collectie. Binnenkort wordt een nieuwe expositie geopend.
b. Nora heeft een interessant museum ontdekt. Ze wil zich al een tijd meer verdiepen in de archeologie. Binnenkort heeft ze een weekendje vrij.
- (13) Nora gaat (het museum) absoluut (het museum) bezoeken.

De resultaten van het productie-experiment in **Hoofdstuk 4** tonen aan dat het bekend-voor-nieuw principe ook van toepassing is op scrambling in het Nederlands: het definiete lijdend voorwerp werd vaker links van het bijwoord geplaatst als het het topic en/of anaforisch was. Als het definiete lijdend voorwerp zowel het topic als anaforisch was, werd het in 57% van de experimentele trials aan de linkerkant van het bijwoord geplaatst. Dit percentage is significant hoger dan het percentage van het volledig nieuwe (niet-topic, niet-anaforische) definiete lijdend voorwerp (35%). De informatiestructuur heeft dus wel een effect op scrambling, maar de verdeling is lang niet zo categorisch als vaak is beweerd in de literatuur. Het lijdend voorwerp werd tenslotte in 43% van de experimentele trials aan de rechterkant van het bijwoord geplaatst terwijl het bekende informatie gaf, en dus in 35% van de experimentele trials aan de linkerkant van het bijwoord terwijl het nieuwe informatie gaf. Op basis van de literatuur zijn die resultaten zeer onverwacht.

Een ander onverwacht resultaat is dat het definiete lijdend voorwerp verrassend vaak aan de rechterkant van het bijwoord verscheen als het deel uitmaakt van onze wereldkennis (76%). Dit geeft aan dat verschillende types bekende informatie verschillende effecten kunnen hebben op scrambling. Deze resultaten tonen bovendien opnieuw aan dat scrambling in principe een optionele operatie is: scrambling wordt wel beïnvloed, maar niet bepaald, door informatiestructuur.

Het stricte discourstemplaat wordt opnieuw getest in **Hoofdstuk 5**, dit keer in een beoordelingsexperiment. Anders dan in **Hoofdstuk 4** werd in de stimuluszinnen alleen de topicaliteit van het definiete lijdend voorwerp gemanipuleerd, zoals in (12), aangezien deze factor al een significant effect teweegbracht in het productie-experiment. Dit effect is echter niet gerepliceerd in het beoordelingsexperiment:

de resultaten bieden geen evidentie voor een effect van informatiestructuur op scrambling. Als een defniet lijdend voorwerp het topic was, werd de zin niet anders beoordeeld dan wanneer het niet het topic was. Echter, een onverwacht resultaat van dit experiment is dat de zinnen waarin het lijdend voorwerp aan de linkerkant van het bijwoord stond betere scores kregen dan dezelfde zinnen waarin het lijdend voorwerp aan de rechterkant van het bijwoord stond. Dit effect trad niet op in de resultaten van de beoordelingsexperimenten in **Hoofdstuk 2** en **3**. Het is hierbij wel belangrijk zich te realiseren dat het om een relatieve voorkeur gaat: de scores van elke variant van de stimuluszinnen (dus zinnen waarin het lijdend voorwerp het topic was of niet, en waarin het lijdend voorwerp links of rechts van het bijwoord stond) liggen in het hoogste kwadrant van de beoordelingsschalen. Oftewel, zinnen met het lijdend voorwerp rechts van het bijwoord kregen nog steeds heel hoge scores. De resultaten van dit experiment benadrukken daarmee de eerdere bevinding dat scrambling optioneel is: moedertaalsprekers van het Nederlands accepteren beide volgordes, ongeacht de informatiestructurele status van het lijdend voorwerp.

Een andere hoofdvraag die in **Hoofdstuk 5** wordt gesteld is of de dimensie van de beoordelingsschaal een effect heeft op de toegekende scores. Proefpersonen in het experiment werden daarom in drie groepen opgedeeld die elk een andere vraag over de zinnen kregen voorgeschied. De eerste groep kreeg de vraag in hoeverre de zinnen overeenkomen met de taalregels van het Nederlands (normatieve oordelen), de tweede groep kreeg de vraag hoe mooi ze de formulering van de zinnen vonden (esthetische oordelen), en de laatste groep kreeg de vraag hoe waarschijnlijk ze het vonden dat de zinnen zouden zijn uitgesproken door een moedertaalspreker van het Nederlands (waarschijnlijkheidsoordelen).

De normatieve oordelen waren vergelijkbaar met de waarschijnlijkheidsoordelen. En hoewel de esthetische oordelen iets lager uitvielen dan de normatieve en de waarschijnlijkheidsoordelen, waren ook deze scores nog relatief hoog. De proefpersonen gaven met hun beoordelingen dus aan dat alle varianten van de scramblingzinnen mooie en goede zinnen zijn die met een hoge waarschijnlijkheid zouden kunnen worden uitgesproken door moedertaalsprekers van het Nederlands. Daarmee bieden de resultaten van **Hoofdstuk 5** geen evidentie voor het strikte discourstemplaat. De resultaten van dit experiment en het experiment in **Hoofdstuk 4** tonen dus opnieuw aan dat scrambling meer vrijheid kent dan vaak wordt aangenomen in de literatuur. Het is niet zo dat een defniet lijdend voorwerp links van het bijwoord *moet* staan als het het topic is en rechts als het niet het topic is. Beide woordvolgordes komen voor en worden geaccepteerd, of het defniete lijdend voorwerp nu het topic is of niet.

De opkomst van scrambling in het Nederlands

Hoofdstuk 6 gaat in op de vraag of scrambling ook al bestond in vroegere stadia van het Nederlands en, zo ja, welke functie het toen had. Het experiment in **Hoofdstuk 4** toont aan dat scrambling in het hedendaags Nederlands een informatiestructurele functie heeft: hoewel scrambling niet wordt bepaald door de informatiestructuur, wordt het er wel door beïnvloed (in taalproductie). In **Hoofdstuk 6** wordt aan de hand van een samengesteld corpus in kaart gebracht hoe de informatiestructurele

verdeling in het Nederlands zich heeft ontwikkeld tussen de 13^e en de 19^e eeuw. Uit de data blijkt dat scrambling altijd al een optie is geweest in het Nederlands, maar de functie van de variatie is in de vroegste stadia van de taal niet geheel duidelijk.

Hierbij is het belangrijk om zich te realiseren dat een lijdend voorwerp in het Middelnederlands en (Vroeg)nieuwnederlands ook na het lexicale werkwoord geplaatst kon worden, zoals in voorbeeld (14) uit een tekst uit de 13^e eeuw. De mogelijkheid om het lijdend voorwerp in postverbale positie te plaatsen werd echter steeds beperkter naarmate de tijd vorderde. In de 18^e eeuw vinden we slechts één lijdend voorwerp (van 135) in deze positie.

- (14) *dat ic hebbe genomen dat hues terhurst.*
'dat ik dat Huis ter Horst heb genomen.'

De positie van het lijdend voorwerp vis-à-vis het werkwoord had in de vroegere stadia van het Nederlands een informatiestructureel effect. Als een lijdend voorwerp aan de linkerkant van het werkwoord voorkwam, drukte het meestal bekende informatie uit (80% of hoger, afhankelijk van de eeuw). Als een lijdend voorwerp aan de rechterkant van een werkwoord stond, drukte het in de 13^e eeuw meestal nog nieuwe informatie uit (65%), maar dit percentage wordt geleidelijk aan lager. In de 17^e eeuw is dit percentage teruggebracht tot 13%. Vanaf deze periode wordt een lijdend voorwerp in de meeste gevallen aan de linkerkant van het werkwoord geplaatst.

Zoals gezegd was scrambling in de vroege stadia van het Nederlands ook al een optie: als het lijdend voorwerp links van het werkwoord stond, bestond er nog steeds variatie in de positie van dit lijdend voorwerp ten opzichte van het bijwoord. Scrambling had in deze periode echter geen duidelijke informatiestructurele functie. Als een lijdend voorwerp dat nieuwe informatie gaf links van het werkwoord voorkwam, stond het vaak ook links van het bijwoord, hoewel dit percentage geleidelijk afneemt (69% in de 13^e eeuw, 31% in de 16^e eeuw, 19% in de 19^e eeuw). Het lijkt er dus op dat de positie links van het werkwoord, maar rechts van het bijwoord, zich manifesteert als de standaardpositie voor nieuwe informatie naarmate de postverbale positie een minder productieve optie wordt in het Nederlands. Hierbij is het belangrijk om op te merken dat de informatiestructurele partitie in het Nederlands nooit een categorische verdeling is geweest. Er is altijd een grote mate van vrijheid geweest in de woordvolgorde met betrekking tot de informatiestructuur, zoals we ook hebben gezien voor het hedendaags Nederlands in de andere studies in dit proefschrift. Echter, de grens van de informatiestructurele partitionering verschuift van het werkwoord naar het bijwoord in het middelveld van de zin: nieuwe informatie staat niet langer bij voorkeur in postverbale positie, maar in "postadverbiale" positie, de positie rechts van het bijwoord.

Convergerende evidentie: Theorie én empirie

De studies in dit proefschrift tonen aan dat er een grote discrepantie bestaat tussen de oordelen over scramblingzinnen van veel theoretische taalwetenschappers en die van niet taalkundig onderlegde moedertaalsprekers van het Nederlands. Daar-

naast doken ook verschillen op tussen de oordelen over scramblingzinnen en het scramblinggedrag van proefpersonen in de productie-experimenten. De experimentele data suggereren dat scrambling vrijer is dan vaak wordt aangenomen in taaltheoretisch werk: zinnen waarin het definiete lijdend voorwerp aan de linker- of rechterkant van een bijwoord staat worden over het algemeen zonder meer geaccepteerd (**Hoofdstuk 2, 3, en 5**), ongeacht de informatiestructurele status van het lijdend voorwerp (**Hoofdstuk 5**). Toch bestaat er in taalproductie een duidelijke voorkeur om het definiete lijdend voorwerp aan de linkerkant van een predicaatsbijwoord of negatie te plaatsen (**Hoofdstuk 2**) en correleert de informatiestructurele status van het lijdend voorwerp in taalproductie met diens positie ten opzichte van het bijwoord (**Hoofdstuk 4**).

Er is al vaker gerapporteerd dat de intuïties van proefpersonen over een bepaalde constructie niet altijd overeenkomen met hun eigen gebruik van de taal. Soms vinden proefpersonen een zin bijvoorbeeld slecht klinken, terwijl ze hem zelf (onbewust) aan de lopende band gebruiken. We hebben dus te maken met twee verschillende types taaldata die van elkaar kunnen afwijken maar wel dezelfde onderliggende competentie lijken te meten. Beide types data zeggen namelijk iets over “het menselijk taalvermogen”. Een van de redenen voor het verschil tussen de verschillende types data is dat de constructies in beoordelingstaken niet in competitie zijn met alternatieve manieren om een boodschap uit te drukken. Dit is uiteraard wel het geval in (spontane) spraak. Een zin kan daardoor een goede Nederlandse zin zijn, terwijl hij bijna nooit daadwerkelijk wordt gebruikt.

In de afgelopen twee decennia pleitten veel onderzoekers ervoor om “convergerende evidentie” te gebruiken bij het ontwikkelen van taalmodellen, dat wil zeggen, om gebruik te maken van verschillende types data bij het bestuderen van variatie en om deze data vanuit verschillende perspectieven te bekijken. Zo kunnen onderzoekers tot een gedetailleerdere analyse van een fenomeen komen. Taalwetenschappers in de stroming van de zogeheten *experimentele syntaxis* betrekken bij deze aanpak ook de inzichten van theoretische taalwetenschappers. Nieuwe inzichten in de theoretische taalwetenschap worden vaak verkregen aan de hand van de intuïties van de taalwetenschapper zelf (en zijn of haar directe omgeving). Echter, de resultaten van de experimenten in dit proefschrift zijn een voorbeeld van een taalfenomeen waarbij de intuïties van de taalwetenschapper afwijken van experimentele data.

In **Hoofdstuk 5** wordt een aantal argumenten besproken om inzichten uit de theoretische taalwetenschap te combineren met inzichten uit de experimentele taalwetenschap. Phillips et al. (2021) betogen dat experimentele data nieuwe vragen kunnen oproepen en tot nieuwe inzichten kunnen leiden die zonder een empirische aanpak nooit aan het licht zouden zijn gekomen. Hoe komt het, bijvoorbeeld, dat de scramblingdata minder categorisch zijn dan de intuïties van theoretische taalwetenschappers? Wat is de oorzaak van de verschillen tussen de beoordelingen en de productiedata? Waarom leiden verschillende types bijwoord tot verschillen in scramblingvoorkeuren en welke bijwoordtypes zouden nog moeten worden onderzocht? En uiteindelijk: hoe kunnen we de geobserveerde feiten samenvatten in een scramblingtheorie die optionaliteit toestaat, waarin ook de informatiestructuur een gepaste plaats krijgt?

Dit proefschrift toont aan dat het noodzakelijk is om een theoretisch taalkundig model empirisch te toetsen en op zoek te gaan naar convergerende evidentie, omdat een theoretisch model dat voornamelijk is gebaseerd op de intuïties en inzichten van taalwetenschappers geenszins hoeft te stroken met de talige werkelijkheid.

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Data management

Data storage during research

All research data were stored in a Radboud University working group file folder, which was made available only to the researchers working on the project and could only be accessed through (a VPN connection to) the campus network. No direct identifiers were saved, except for the audio recordings (voice). All data were originally identifiable by personal data (e.g. name, age, sex, and/or SONA ID), as participants had the right to withdraw their data from the study up until two weeks after the data were collected. Personal data were removed from the data files two weeks after data collection. The working group file folder is automatically backed up on a daily basis. All data will be retained for 10 years in the working group file folder, according to Radboud University's research data management policy.

Reuse of research data

All fully anonymized processed (transcribed, annotated) data are shared with the scientific community according to the RU policy, and are available in a dedicated OSF repository (DOI: 10.17605/OSF.IO/D5BWC), under CC-By Attribution 4.0 International license, with two exceptions. First, the historical corpus data are deposited in a DANS database with restricted access only, with Tara Struik as the access grantor. Second, the recorded audio recordings are not publicly accessible, because they contain direct identifiers (voice). Separate README.txt files were added to the data folders with a description of the content of the data-set and the variable encoding keys.

Curriculum vitae

Gert-Jan Schoenmakers was born in Breda, the Netherlands, in 1993. He obtained a Bachelor's degree in Romance Languages & Cultures with a specialization in French from Radboud University in 2014, followed by a Master's degree in General Linguistics in 2015 (*cum laude*) and a Research Master's in Language & Communication Sciences with a specialization in Psycholinguistics in 2017 (*cum laude*). He was employed in various research assistant positions over the course of his studies. In 2017, he started his Ph.D. project in the Grammar & Cognition research group of the Centre for Language Studies at Radboud University, funded through an open competition grant. The results of this research project are described in this thesis.

During his Ph.D. time, Gert-Jan was involved with numerous teaching positions, serving as a lecturer for different courses at various levels within linguistics and communication sciences at Radboud University and at the University of Amsterdam. He supervised a Research Master's thesis, a Bachelor's thesis, and an Honours project at the Faculty of Arts. In 2020 and 2021, Gert-Jan was a teaching assistant at three (online) versions of the NYI Summer- and Winterschool and he was a member of the faculty at the fourth version in 2022. Gert-Jan was a visiting scholar at Stony Brook University in New York (USA) in early 2020, where he worked with Prof. dr. John Frederick Bailyn until the corona pandemic shortened his stay abroad.

Gert-Jan is currently working as a postdoctoral researcher in the Grammar & Cognition research group of the Centre for Language Studies at Radboud University and as a lecturer in the Department of Language and Communication at Radboud University.

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