Gert-Jan Schoenmakers & Peter de Swart

2019

Adverbial Hurdles in Dutch Scrambling

In

A. Gattnar, R. Hörnig, M. Störzer & S. Featherston (Eds.)

Proceedings of Linguistic Evidence 2018: Experimental Data Drives Linguistic Theory

Tübingen: University of Tübingen

https://publikationen.uni-tuebingen.de/xmlui/handle/10900/87132

In A. Gattnar, R. Hörnig, M. Störzer & S. Featherston (Eds.) (2019). *Proceedings of Linguistic Evidence 2018: Experimental Data Drives Linguistic Theory*. Tübingen: University of Tübingen. https://publikationen.uni-tuebingen.de/xmlui/handle/10900/87132

Adverbial Hurdles in Dutch Scrambling

Gert-Jan Schoenmakers & Peter de Swart
Radboud University, Nijmegen
g.schoenmakers@let.ru.nl; p.deswart@let.ru.nl

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 middlefield of the clause,[1] i.e., the section between the auxiliary (in embedded clauses the complementizer) and the main verb. Scrambling exists in most Germanic languages, albeit in slightly different guises (see Broekhuis, 2008; Vikner, 1994, 2006 for a comparison). This paper is concerned with the Dutch variety only, which is sometimes also referred to as *short scrambling*, *A-scrambling*, or *object shift*. For the sake of simplicity we will refer to the phenomenon as 'scrambling' throughout this paper. An example of Dutch scrambling is given in (1), in which the direct object *de cursus* 'the course' moves across the adverb *onlangs* 'recently'. As a visual aid, adverbs are printed in boldface and direct objects are underlined in the examples throughout the paper.

(1) a. *Patrick heeft **onlangs** de cursus afgerond.* [UNSCRAMBLED]
b. *Patrick heeft de cursus **onlangs** afgerond.* [SCRAMBLED]
'Patrick has 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 features 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. Features that have been argued to determine the object's position in the Dutch middlefield include its anaphoricity, familiarity, and topic-focus structure (Broekhuis, 2008; Broekhuis & Corver, 2016; Delfitto & Corver, 1998; Diesing & Jelinek, 1995; de Hoop, 1996, 2000, 2003; Neeleman & Reinhart, 1998; Verhagen, 1986). Most of the literature on Dutch scrambling shares the intuition that scrambling definite objects induces some kind of interpretation shift in a similar fashion as in sentences with indefinite objects, 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 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. A light verb combines with its object to form a semantic unit. Indefinite objects cannot scramble in sentences with a light verb, whereas definite objects can. The difference is illustrated in (2) and (3) below.

[1] Verhagen (1986, §3.2.2) argues that it is the DP that moves, and not the adverb, as it is the interpretation of the object that changes in the scrambled word order. The assumption that scrambling involves movement is not uncontroversial, see e.g. Broekhuis & Corver (2016, §13.2), van de Koot et al. (2015), and Neeleman (1994) for discussion of movement and movement-free approaches to Dutch scrambling.

(2) a. *dat ik **nog** de was moet doen.*
b. *dat ik de was **nog** moet doen.*
'that I still have to do the laundry.'

(3) a. *dat ik **nog** een plas moet doen.*
b. **dat ik een plas **nog** moet doen.*
'that I still have to take a piss.'

(van der Does & de Hoop, 1998: 396)

Since the scrambled definite object in (2b) is not interpreted as familiar, anaphoric, or topical in the discourse, van der Does & de Hoop 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 sentence judgment task in de Swart & van Bergen (2014). Participants rated sentences with a definite object and a temporal adverb on a 7-point scale. The scrambled and the unscrambled versions of the sentences received similar ratings at the high end of the scale, indicating that both word order variants are equally acceptable to Dutch natives for sentences with definite objects.

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 specificity, as advocated by van der Does & de Hoop, perhaps there are object-external factors that give some insight into the observed variation. In this paper we investigate the role of the adverb in Dutch direct object scrambling. Since the properties of definite objects have been shown to have little to no influence on the scrambling word order variation, we limit our investigations to sentences with definite objects. It has been suggested before that properties of the adverb play a role, but there are no dedicated investigations of their influence on scrambling in sentence production or sentence judgment.[2]

The paper is organized as follows: Section 2 discusses previous experimental studies on the topic of Dutch object scrambling. The results of these studies seem to imply that the adverb also has an influence on scrambling patterns. We suggest that the adverb's structural position (syntax) and scope sensitivity (semantics) can affect a language user's tendency to scramble objects. We test our hypotheses in Section 3 in two sets of experiments each consisting of a rating task and a sentence completion task. Section 4 and 5 contain the general discussion and conclusions of the paper.

2 Empirical approaches to Dutch scrambling

Van Bergen & de Swart (2009, 2010) conducted a large scale corpus study, using the Corpus of Spoken Dutch (CGN, 2006), to document how often direct objects occur in the scrambled position in spontaneous speech. They found that definite objects 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 semantically driven are not compatible with the low numbers in the corpus either. Van Bergen & de Swart also find that, while anaphoricity does have a significant effect on scrambling in general, it is not a significant predictor of definite object scrambling: 14 % of the anaphoric definites scrambled in their data, and non-anaphoric definites only did so in 6 %.

In a set of follow-up experiments de Swart & van Bergen (2011, 2014) further explored the effect of definiteness and anaphoricity on definite object scrambling. They conducted a rating task (which we briefly discussed in Section 1) and two sentence completion tasks, and found that speakers of Dutch do accept the scrambled word order for definite objects as a grammatical

[2] A 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.

option, but fail to actively produce scrambled sentences. Participants in the production experiments 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 temporal adverb. The results of the production experiments indicated that the majority of objects were left unscrambled. This finding is in line with those from the corpus studies, but unexpected given the results from the rating task. De Swart & van Bergen attribute the discrepancy to a task difference, which triggers a 'grammaticality-frequency gap' (Bader & Häussler, 2010; Kempen & Harbusch, 2008). Two word order options might be similar in their grammaticality status, but at the same time show vastly different distributions in language production. The rating task shows that the two orderings are equally acceptable, while the corpus and production data show that there is a clear preference for the unscrambled order in language production.

The production data are nonetheless in sharp contrast with results from a production study by Unsworth (2005, Ch. 5), who investigated the L1 acquisition of scrambling in Dutch. The task she administered combined truth judgment and sentence production, and prompted participants to produce sentences with a definite object and the negation adverb *niet* 'not'.[3] An example is given in the sentences in (4).

(4) a. *Ernie gaat **niet** de giraffe natekenen!* [UNSCRAMBLED]
b. *Ernie gaat de giraffe **niet** natekenen!* [SCRAMBLED]
'Ernie is not going to copy the giraffe!'

(Unsworth, 2005: 217)

The adult control group of the experiment scrambled 98.5 % of the definite objects. Unsworth thus concludes that speakers of Dutch scramble definite objects consistently. Her conclusion conflicts with the corpus findings and the production data in de Swart & van Bergen (2011).

De Swart & van Bergen (2014) later suggest that this contrast might be due to the negation adverb in Unsworth's stimuli, since participants in their own production experiment scrambled only 20 % of the objects across temporal adverbs like *gisteren* 'yesterday' (de Swart & van Bergen, 2011). The class of adverbs is notorious for being extensive and diverse (see, e.g., Ch. 5 in Morzycki, 2016). It is conceivable that different types of adverb cause different ordering preferences (see also Delfitto, 2006). Schaeffer (1997, 2000, 2012), who 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 the syntactic structure. Schaeffer argues that movement of an object across a high adverb is more costly than movement across a low one, because the distance between the object's base and target position is larger (cf. Gibson, 1998, 2000). As a result, the scrambled order becomes less favorable, the higher the syntactic position of the adverb.

Schaeffer (2000) conducted a 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, as in (5a) below. Crucially, the experimenter used a high adverb (temporal/locative, e.g. *morgen* 'tomorrow'), a low adverb (manner, e.g. *mooi* 'beautifully'), or the negation adverb *niet* 'not' during the perfor-

[3] It is debatable whether negation should be labeled an adverb or a particle due to its deviant distributional behavior. We will refer to *niet* as an adverb in this paper, because it is a modifier of a clause or verbal projection, and because all standard Dutch grammars refer to is as an adverb. We will follow this trend.

mance. A second puppet then expressed a statement using an antonymous adverb (e.g. *lelijk* 'in an ugly way' in (5b) below), which the participant was supposed to correct. An example answer is given in the sentences in (6).

(5) a. *Kijk, een boom! [...] Die ga ik MOOI inkleuren.*
'Look, a tree. [...] I'm going to color it BEAUTIFULLY.'
b. *De boom gaat Koekiemonster LELIJK inkleuren!*
'Cookiemonster is going to color the tree IN-AN-UGLY-WAY!'

(6) a. *Nee, Koekiemonster gaat **MOOI** de boom inkleuren!* [UNSCRAMBLED]
b. *Nee, Koekiemonster gaat de boom **MOOI** inkleuren!* [SCRAMBLED]
'No, Cookiemonster is going to color the tree BEAUTIFULLY!'
(Schaeffer, 2000: 58)

Schaeffer found that the adult control group scrambled definite objects almost categorically, regardless of the structural position of the adverb (88 % across high adverbs, 93 % across low adverbs, 96 % across negation). This finding is in line with Unsworth's results, but in contrast with the corpus findings and de Swart & van Bergen's production data. The size of the difference between Schaeffer's and de Swart & van Bergen's results is especially striking, because both experiments tested scramblable sentences with temporal adverbs. It is worth noting here, though, that the adverbs in Schaeffer's stimuli sentences were contrastive pairs (the affirmative particle *wel* was used as a counterpart to the negation adverb). This approach was adopted deliberately to take the focus off the object, because focus and stress are known to restrict the scrambling possibilities of direct objects (Neeleman & Reinhart, 1998; Verhagen, 1986). However, contrastive emphasis on the adverb also influences word order in Dutch (see Bouma & de Hoop, 2008). It cannot be ruled out that the contrastive set-up of Schaeffer's experiment interfered with her adverb manipulation; her participants might very well have used the scrambled word order for (prosodic) reasons of contrast overruling the putative adverbial effect. Note also that the word *mooi* in (6) may also serve as a secondary predicate to the object in these constructions ('the drawing of the tree is beautiful'). Geuder (2000) and Schäfer (2013) consider such *resultative adverbs* as a distinct class in German. The sentence in (6a) is not possible in German. Perhaps resultative adverbs also restrict the well-formedness of such sentences in Dutch. In this paper, we will exclude this class and once again explore the influence of the structural position of the adverb on Dutch scrambling, in a rating task and a sentence completion task in Section 3.1.

A second property that might influence scrambling is the adverb's scope sensitivity. Adverbs can differ in whether the presence or absence of a certain element in their scope has an effect on the meaning of the sentence (*functional adjuncts* in Ernst, 2002; see also Thomason & Stalnaker, 1973). More 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 Steube (2006) for an analysis of German). This effect is evident for indefinite objects, but can be maintained for definite objects in some cases. A prototypical example of a scope-sensitive adverb is the negation adverb *niet* 'not', which is commonly categorized as a high adverb. The relative order of negation and the definite object denotes either constituent negation or sentential negation (Klima, 1964). If the direct object is in the unscrambled position, it strongly implies a contrast with another possible patient entity. The scrambled word order, on the other hand, elicits sentential negation. The difference is illustrated in (7).

(7) a. *Alvin heeft* ***niet*** *de hond geaaid.* [UNSCRAMBLED]
'As for the dog, Alvin did not pet it.'
b. *Alvin heeft de hond* ***niet*** *geaaid.* [SCRAMBLED]
'Alvin did not pet the dog.'

It is implied in (7a) that Alvin 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 temporal adverbs, see (8).

(8) a. *Alvin heeft* ***gisteren*** *de hond geaaid.* [UNSCRAMBLED]
b. *Alvin heeft de hond* ***gisteren*** *geaaid.* [SCRAMBLED]
'Alvin 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 temporal adverbs because of scope concerns. Speakers of Dutch might avoid 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 temporal adverbs without triggering such an interpretation shift. The incentives to scramble definite objects may therefore well partially depend on the scope sensitivity of the adverb, where true optionality in the sense of van der Does & de Hoop (1998) only exists for the scope-insensitive adverbs. This adverbial difference could theoretically explain the discrepancy between the proportions of scrambled utterances in the production experiments of de Swart & van Bergen (2011) for temporal adverbs on the one hand, and Unsworth (2005) and Schaeffer (2000) 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 there is a clear preference for definite objects to occur in the scrambled position, while others find that they generally remain unscrambled. In the next section we will first reconsider Schaeffer's 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. In a second set of experiments we will explore the influence of the adverb's scope sensitivity on definite object scrambling.

3 Experiments

We will test whether the structural position (Section 3.1) and/or scope sensitivity (Section 3.2) of an adverb influences the object's position in non-contrastive contexts, in two rating tasks and two production tasks. The target items did not have any linguistic context for the target sentences. 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 ratings tasks to project a marked prosodic contour onto the stimulus items. The experiments presented here employ the same basic designs as the experiments in de Swart & van Bergen (2011, 2014). Our goal is to shed more light on the role of properties of the adverb in Dutch scrambling, both in sentence judgment and sentence production.

3.1 Experiment Set 1: Structural position

Recall that Schaeffer (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 across. 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 e.g. Broekhuis & Corver, 2016, §13.2). Schaeffer thus assumes the base order in (9a) for her experiments. Interestingly, various researchers from Germany have advanced an alternative account on syntactic base structure for German, a language that is structurally similar to Dutch. Their account postulates the base position of (certain) low adverbs in the German middlefield below that of the direct object (Frey, 2003, 2015; Frey & Pittner, 1998; Maienborn, 2001; Pittner, 2004; Schäfer, 2013), as in (9b).

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

The assumption that (9b) is the standard order in the German middlefield is based on a number of syntactic criteria proposed in Frey & Pittner (1998). In this contribution we are not able to 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 in the scrambled position in sentences with a low adverb than in sentences with a high adverb (Experiment 1A), and (ii) definite objects appear in the scrambled position more often in sentences with a low adverb than in sentences with a high adverb (Experiment 1B).

Jackendoff's (1972) distinction between predicate adverbs 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) below.

(10)

$$\underbrace{[_{\text{CP}} \ldots C[_{\text{TP}} \ldots T[_{\text{XP}} \ldots X}_{\text{Functional Domain}} \underbrace{[_{v\text{P}} \ldots v[_{\text{VP}} \ldots V \ldots]]]]]}_{\text{Lexical Domain}}$$

(Broekhuis & Corver, 2016: 1121)

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 also 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. *Patrick heeft **snel** de cursus afgerond.* (predicate adverb)
'Patrick finished the course quickly.'
b. *Patrick heeft **helaas** de cursus afgerond.* (clause adverb)
'Unfortunately, Patrick completed the course.'

Firstly, predicate adverbs can usually be recognized by using a paraphrase in which the adverb is placed in a second conjunct of the form '…en PRONOUN *doet dat* + ADVERB' ('…and PRONOUN does that' + ADVERB). The idea 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. *Patrick heeft de cursus afgerond en hij deed dat **snel**.*
Patrick has the course finished and he did that quickly
'Patrick finished the course, and he did that quickly.'
b. **Patrick heeft de cursus afgerond en hij deed dat **helaas**.*
Patrick has the course finished and he did that unfortunately

Broekhuis & Corver point out that predicate adverbs delimit the denotation of the verbal predicate. A second test they propose is based on the inferences thus 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, such that sentences with clause adverbs do not necessarily entail the alternative sentences without them. Broekhuis & Corver 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).

(13) a. **Het is **snel** zo dat Jan de cursus heeft afgerond.*
it is quickly the.case that Jan the course has finished
b. *Het is **helaas** zo dat Jan de cursus heeft afgerond.*
it is unfortunately the.case that Jan the course has finished
'It is unfortunately the case that Jan finished the course.'

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). Barbiers (2018) adds that clause adverbs can follow the main verb in Dutch whereas predicate adverbs cannot. The sentences in (14), in which the adverb is extraposed, 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
b. *Elsa heeft gewerkt **misschien***
Elsa has worked perhaps
(Barbiers, 2018: 78)

Broekhuis & Corver finally note that one can turn to the generalization that clause adverbs usually precede predicate adverbs in sentences with multiple adverbs, in virtue of their relative structural positions (cf. Cinque, 1999). According to Barbiers (2018), the cut-off point between clause and predicate adverbs in Dutch is the negation adverb. Note that the negation adverb itself is considered to be a high adverb "located relatively low in the functional domain of the clause" (Broekhuis & Corver, 2016: 1628). Barbiers summarizes the properties of clause adverbs and

predicate adverbs as in Table 1.

Table 1. Complementary distribution of clause and predicate adverbs (Barbiers, 2018: 79)

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

In the following, we will first test whether there is a difference in acceptability judgment for scramblable sentences with high or low adverbs, in Experiment 1A. Next, we will investigate whether an effect of the structural position of the adverb exists in sentence production, in Experiment 1B. Based on the findings in de Swart & van Bergen (2014), we expect the two word orders to receive similar ratings in the rating task. Our hypothesis leads us to expect that in case there is a difference in ratings, Dutch natives have a slight preference for the scrambled order in sentences with low adverbs and for the unscrambled order for sentences with high adverbs. We expect much stronger effects in the production task, based on the findings in de Swart & van Bergen (2011). We predict that definite direct objects occur in the scrambled position in sentences with low adverbs considerably more often than in sentences with high adverbs.

3.1.1 Experiment 1A: Rating task

Method

Participants. 62 native Dutch students (56 female; mean age 19.0, 17-24) participated in an online survey distributed via the SONA participant recruitment system of the Radboud University in Nijmegen for course credit. Data from eight participants were discarded because they systematically gave high ratings to ungrammatical sentences. The results of 54 participants were analyzed.

Factors. The experiment included two factors: ADVERB TYPE (high vs. low) and OBJECT POSITION (scrambled vs. unscrambled), adding up to a total of four conditions: high-scrambled, high-unscrambled, low-scrambled and low-unscrambled.

Materials. 28 sentences were used that contained a subject (all proper nouns), an auxiliary, an adverb (high or low), and a transitive lexical verb with a definite object (all inanimate and singular). Four high and four low adverbs were used that were matched with the object for length in the experiment in order to control for effects of grammatical weight (cf.Wasow, 1997). The stimulus adverbs were selected on the basis of the adverbial tests in Table 1. Half the stimuli were adapted from those used in the rating task in de Swart & van Bergen (2011), the other half were newly created. The sentences were presented in the scrambled (object - adverb) or the unscrambled (adverb - object) order. An example of each condition is given in the sentences in (15) and (16).[4]

[4]One of the reviewers remarked 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, 2003; Frey & Pittner, 1998). We agree that *vakkundig* 'skillfully' was not an ideal candidate for the class of low adverbs, but stress that *vakkundig* passes all the tests in Table 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.

(15) a. *Roos heeft* ***inderdaad*** *het kozijn geverfd.* (HIGH/UNSCRAMBLED)
b. *Roos heeft het kozijn* ***inderdaad*** *geverfd.* (HIGH/SCRAMBLED)
'Indeed, Roos painted the window frame.'

(16) a. *Roos heeft* ***vakkundig*** *het kozijn geverfd.* (LOW/UNSCRAMBLED)
b. *Roos heeft het kozijn* ***vakkundig*** *geverfd.* (LOW/SCRAMBLED)
'Roos painted the window frame skillfully.'

The items were distributed over four lists ensuring that a participant would not see the same sentence twice in a different order or with the same adverb. Participants saw each experimental item in one of four conditions and each condition equally often. Each condition was represented by seven sentences per list. Each list contained 56 fillers most of which were taken and adjusted from the experiment in de Swart & van Bergen (2014). Fillers consisted of transitive and ditransitive sentences without adverbs. Half of the filler items were ungrammatical in either article congruence (structured as *de* 'the' + NOUN.DIM, e.g. **de spijkertje* 'the little nail')[5] 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. No noun phrase or lexical verb occurred more than once throughout the experiment. 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 produce the utterance on the screen. This definition was based on Schütze & Sprouse's (2014) chapter on rating task design, who suggest that the chosen method simulates spoken language to a large extent and, crucially, guides participants to respond to the target items in terms of native speaker ability rather than plausibility or frequency. The ratings were to be given on a 7-point scale, a rating of 1 meaning 'completely not (acceptable) Dutch' and a rating of 7 'completely (acceptable) Dutch'. The questionnaire contained written instructions. After the last experimental block, participants were asked whether they had ideas about the purpose of the experiment.

Results

The mean ratings and standard deviations per condition are presented in Figure 1 below. Note that all conditions were rated at the high end of the scale (5.1 or above). The mean scores and standard deviations of the conditions were the following: 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 ($M = 5.89$, $SD = 1.35$).

For the statistical analysis, the ratings of each participant were normalized by converting them to z-scores. We used the software R version 3.4.3 (R Core Team, 2017) 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. The dependent variable in the model was the normalized rating score, with OBJECT POSITION and ADVERB TYPE as fixed effects. 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 (i.e., the

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

maximum structure). The two-level factors were coded using deviation contrasts (contrasts of $-.5, +.5$). P-values were obtained by using the normal approximation to the t-statistic.

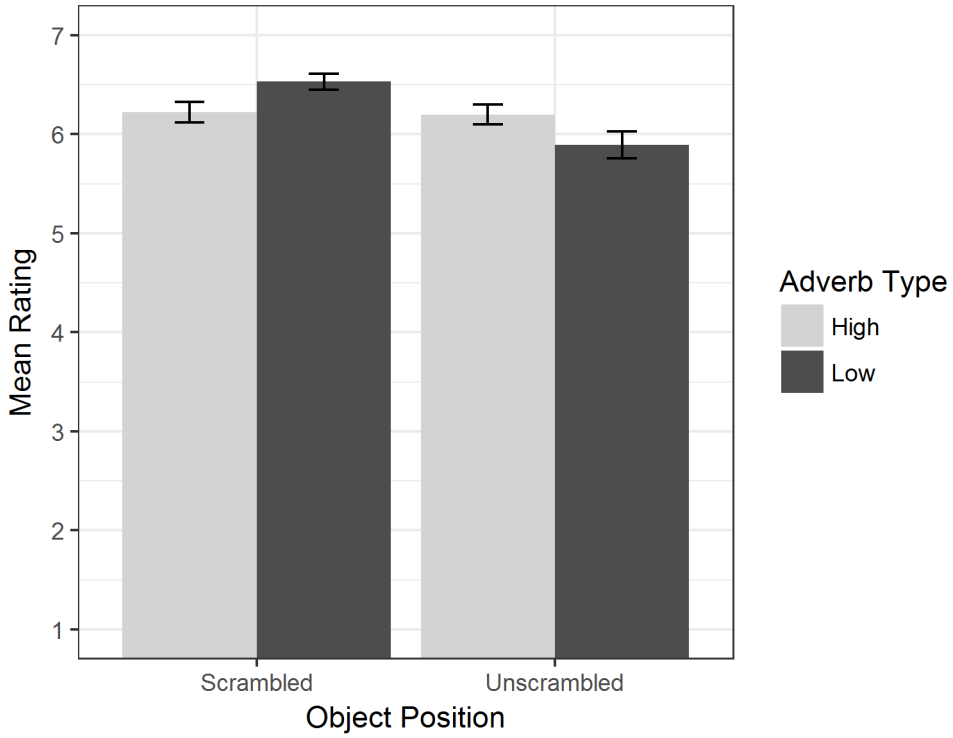

Figure 1. Mean rating per condition

The estimates of the final model are given in Table 2. We did not find a significant effect of ADVERB TYPE ($\beta = -0.00$, $SE = 0.04$, $t = -0.08$, $p = .940$), but we did find a significant effect of OBJECT POSITION ($\beta = 0.16$, $SE = 0.05$, $t = 3.34$, $p < .001$) and a significant interaction effect between ADVERB TYPE and OBJECT POSITION ($\beta = -0.27$, $SE = 0.09$, $t = -3.13$, $p = .002$). That is, the scrambled order was generally preferred over the unscrambled order, but this effect is caused especially by differences in ratings for sentences with low adverbs (see Figure 1).

Table 2. Model specifications of the linear mixed-effects model for Experiment 1A (number of observations: 1512, groups: participant, 54; item, 28)

Fixed effects	β	SE	t-value	p
(Intercept)	0.6299	0.0216	29.132	$< .001$
adverb type	−0.0028	0.0372	−0.076	.940
object position	0.1617	0.0484	3.343	$< .001$
adverb type * object position	−0.2663	0.0850	−3.133	.002

Discussion

The results from this rating experiment are in line with our predictions, which were based on the findings in de Swart & van Bergen (2014). All conditions received scores at the high end of the scale (with mean ratings 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 observation 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 task. The hypothesis is once again that scrambling across low adverbs is better than scrambling across high adverbs. We expect similar effects as in Experiment 1A, but stronger ones. Definite direct objects are expected to occur in the scrambled position in sentences with low adverbs considerably more often than in sentences with high adverbs.

3.1.2 Experiment 1B: Production task

Method

Participants. 24 native Dutch students (18 female; mean age 21.4, 18-25) were recruited from the SONA participant pool of the Radboud University in Nijmegen and participated for course credit. Data from one participant were discarded because they were not audible due to technical error.

Factors. The experiment included the independent variables ADVERB TYPE (high vs. low) and PRESENTATION ORDER (ADV < OBJ vs. OBJ < ADV). The dependent variable was OBJECT POSITION (scrambled vs. unscrambled).

Materials. The experiment was adapted from the production experiments in de Swart & van Bergen (2011), which were written 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 infinite 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. No noun phrase or lexical verb occurred more than once throughout the experiment. 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 NP were presented was balanced. 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 also 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

After transcribing the audio data, a number of utterances turned out not to be target-like. Target-like utterances were defined as grammatical sentences with the adverb and the direct object directly following each other in the middlefield 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 from the analysis (15.22 %). We annotated the remaining utterances for OBJECT POSITION. Figure 2 presents the mean proportions of scrambled objects and the standard deviations.

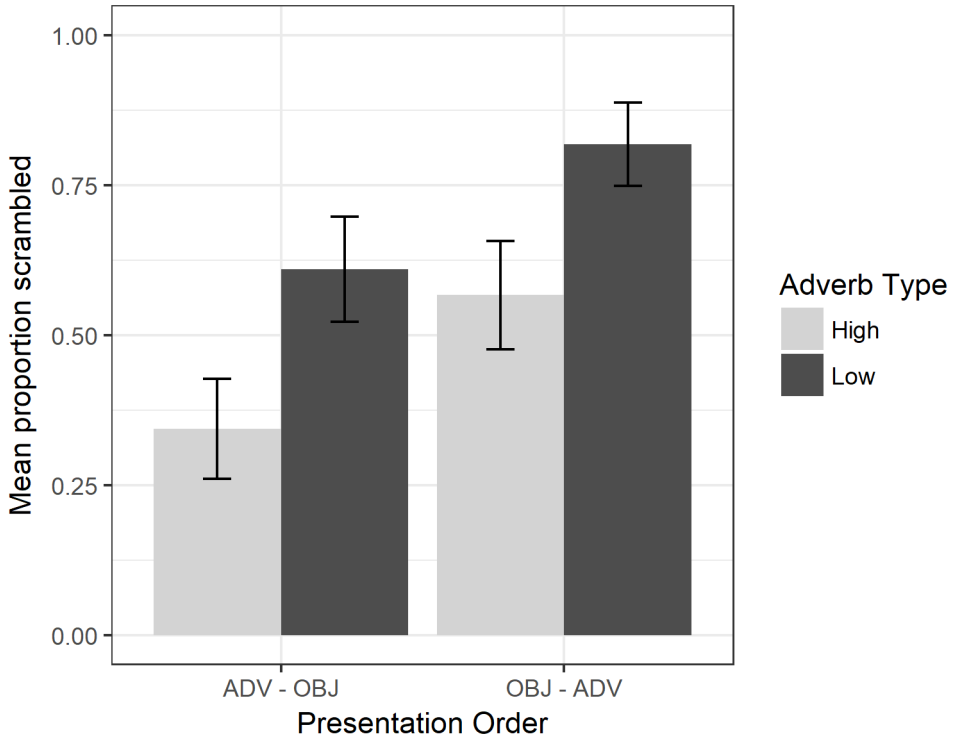

Figure 2. Mean proportion of produced scrambled order and standard deviations per condition

We used the software R version 3.4.3 (R Core Team, 2017) 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, controlling for the order of presentation of the constituents. The binary dependent variable in the model was the object position, with ADVERB TYPE and PRESENTATION ORDER as fixed effects. 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 (i.e., the maximum structure). When the model failed to converge, we simplified the random structure of the model by step-wise removal of the smallest variance component. The final model included intercepts for participants and items, and a by-participant random slope for the effect of presentation order. The two-level factors were coded using deviation contrasts (contrasts of $-.5$, $+.5$). The estimates of the final model are given in Table 3.

Table 3. Model specifications of the generalized linear mixed-effects model for Experiment 1B (number of observations: 468, groups: participant, 23; item, 24)

Fixed effects	β	SE	z-value	p
(Intercept)	0.3126	0.3253	0.961	.337
adverb type	−1.7816	0.2739	−6.505	< .001
presentation order	−1.5211	0.4132	−3.681	< .001
adverb type * presentation order	−0.1420	0.5211	−0.273	.785

We found a significant main effect of ADVERB TYPE ($\beta = -1.78$, $SE = 0.27$, $z = -6.51$, $p < .001$) and a significant main effect of ORDER OF PRESENTATION ($\beta = -1.52$, $SE = 0.41$, $z = -3.68$, $p < .001$). The interaction between the two factors failed to reach significance ($\beta = -0.14$, $SE = 0.52$, $z = -0.27$, $p = .785$).

Discussion

The results of our production task 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 across low adverbs significantly more often than across high adverbs. The main effect of ORDER OF PRESENTATION 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 an independent influence of the structural position of the adverb on word order. Furthermore, there was a general preference for the scrambled order in sentences with low adverbs, and a general preference for the unscrambled order in sentences with high adverbs.

The results of our production experiment can be taken as evidence for Schaeffer's (2000) hypothesis that the larger the syntactic distance between the object and the adverb, the more costly the scrambling operation is. Schaeffer did not find an effect of syntactic distance in her own experiment, yet she used contrastive pairs of adverbs in her stimuli to keep the focus off the object. We used isolated sentences in our experiment instead, because matters of contrast are known to affect word order (Bouma & de Hoop, 2008). Our findings suggest that the adverb serves as a syntactic hurdle in Dutch definite object scrambling. Alternatively, the results can be taken as evidence for a syntactic base position of manner adverbs below the direct object (e.g. Frey & Pittner, 1998; Schäfer, 2013).

3.2 Experiment Set 2: Scope sensitivity

In Section 2 we compared the interpretation of the sentences in (7) and (8), repeated below as (17) and (18). A definite object in the scrambled position triggers a different interpretation if the intervening adverb is negation. There is no such interpretation shift if the intervening adverb is a temporal adverb (the difference in interpretation is presented here in the English translations).

(17) a. *Alvin heeft* ***niet*** *de hond geaaid.* [UNSCRAMBLED]
'As for the dog, Alvin did not pet it.'
b. *Alvin heeft de hond* ***niet*** *geaaid.* [SCRAMBLED]
'Alvin did not pet the dog.'

(18) a. *Alvin heeft* ***gisteren*** *de hond geaaid.* [UNSCRAMBLED]
b. *Alvin heeft de hond* ***gisteren*** *geaaid.* [SCRAMBLED]
'Alvin 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*. 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 in the scrambled position in sentences with a scope-sensitive adverb (Experiment 2A), and (ii) definite objects appear in the scrambled position more often in sentences with a scope-sensitive adverb (Experiment 2B).

The rationale is as follows. Recall that the unscrambled word order triggers constituent negation. The constituent negation 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), stating that an utterance should be as informative as is required (for the current purposes of the exchange). A sentence like (17a) 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 scope-insensitive adverbs, like (18), 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 temporal adverbs in the stimuli material of their production task, whereas Unsworth (2005) and Schaeffer (2000) used the negation adverb in theirs. To make our results maximally comparable, we will also test our hypotheses using sentences with the scope-sensitive negation adverb and scope-insensitive temporal adverbs. Note that both types of adverb operate in the higher functional domain of the clause (Broekhuis & Corver, 2016). We expect to replicate the findings of the studies mentioned above. That is, sentences with a temporal adverb are expected to show a preference for the unscrambled word order in the sentence completion task, and sentences with the negation adverb are expected to be uttered in the scrambled order almost categorically (Experiment 2B).

3.2.1 Experiment 2A: Rating task

Method

Participants. 60 native Dutch students (51 female; mean age 19.8, 17-46) participated in an online survey distributed via the SONA participant recruitment system of the Radboud University in Nijmegen for course credit. Data from three participants were discarded because they systematically gave high ratings to ungrammatical sentences. The results of 57 participants were analyzed.

Factors. The experiment included two factors: ADVERB TYPE (negation vs. temporal) and OBJECT POSITION (scrambled vs. unscrambled), adding up to a total of four conditions: negation-scrambled, negation-unscrambled, temporal-scrambled and temporal-unscrambled.

Materials and Procedure. The stimuli sentences were adapted from those in Experiment 1A, such that the adverb manipulation in this experiment was between negation and temporal

adverbs. An example of each condition is given in the sentences in (19) and (20).

(19) a. *Roos heeft **niet** het kozijn geverfd.* (NEGATION/UNSCR.)
b. *Roos heeft het kozijn **niet** geverfd.* (NEGATION/SCR.)
'Roos did not paint the window frame.'

(20) a. *Roos heeft **gisteren** het kozijn geverfd.* (TEMPORAL/UNSCR.)
b. *Roos heeft het kozijn **gisteren** geverfd.* (TEMPORAL/SCR.)
'Roos painted the window frame yesterday.'

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

Results

The mean ratings and standard deviations per condition are presented in Figure 3 below. All but one condition were rated at the high end of the scale (5.1 or above); sentences with the negation adverb and the object in the unscrambled position were rated as neutral ($M = 4.18$, $SD = 1.66$). The mean scores and standard deviations of the other conditions were as follows: temporal-scrambled ($M = 6.18$, $SD = 1.05$); temporal-unscrambled ($M = 6.09$, $SD = 1.22$); negation-scrambled ($M = 6.40$, $SD = 0.95$).

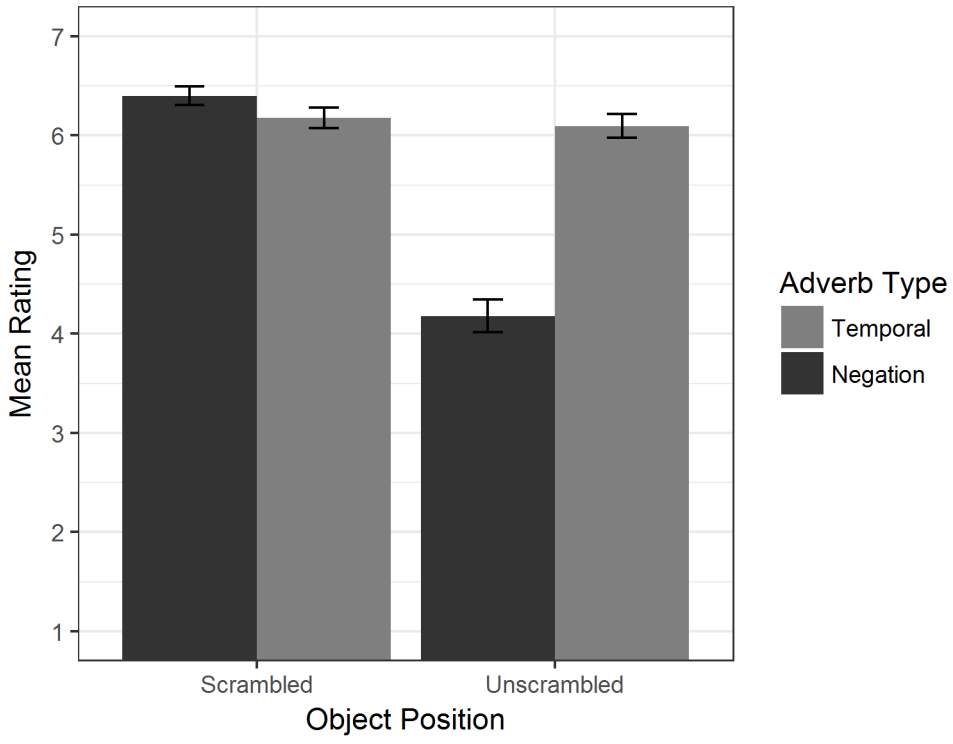

Figure 3. Mean rating per condition

For the statistical analysis, the ratings of each participant were normalized by converting them to z-scores. We used the software R version 3.4.3 (R Core Team, 2017) 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. The dependent variable in the model was the normalized

rating score, with OBJECT POSITION and ADVERB TYPE as fixed effects. We entered intercepts for participants and items into the model as random effects, as well as by-subject and by-item random slopes for the effect of both independent variables and their interaction (i.e., the maximum structure). The two-level factors were coded using deviation contrasts (contrasts of $-.5$, $+.5$). P-values were obtained by using the normal approximation to the t-statistic.

The estimates of the final model are given in Table 4. We found significant main effects of ADVERB TYPE ($\beta = -0.38$, $SE = 0.06$, $t = -6.53$, $p < .001$) and OBJECT POSITION ($\beta = 0.51$, $SE = 0.04$, $t = 11.39$, $p < .001$), as well as an interaction effect between the two ($\beta = 0.91$, $SE = 0.08$, $t = 12.16$, $p < .001$).[6] A sentence with the negation adverb is significantly less acceptable than a sentence with a temporal adverb, but only if the definite object appears in the unscrambled position.

Table 4. Model specifications of the linear mixed-effects model for Experiment 2A (number of observations: 1569, groups: participant, 57; item, 28)

Fixed effects	β	SE	t-value	p
(Intercept)	0.5043	0.0243	20.721	$< .001$
adverb type	−0.3763	0.0576	−6.530	$< .001$
object position	0.5050	0.0443	11.391	$< .001$
adverb type * object position	0.9146	0.0752	12.161	$< .001$

Discussion

The results of this rating task replicate the findings in de Swart & van Bergen (2014) for sentences with temporal adverbs, as both word orders are equally acceptable. This finding is in line with our hypothesis, as the two word order options do not trigger different interpretations if the adverb is a temporal adverb. The present experiment additionally reveals a difference in acceptability of the orderings for sentences with the negation adverb. Sentences in which the definite object precedes the negation adverb receive higher ratings. This finding can be attributed to the different readings that the negation adverb elicits depending on its position relative to the definite object. The unscrambled word order triggers a contrastive reading (constituent negation), but the experiment provides no (contextual) contrast. Unscrambled sentences with the negation adverb may thus have felt incomplete and unnatural to our participants, causing them to give lower ratings. The mean rating of the negation-unscrambled condition was nonetheless not at the low end of the scale. The neutral rating is probably due to the fact that, even though they are a bit awkward, these sentences are still grammatical and interpretable. The interpretation shift that the negation adverb elicits thus leads to a decrease in ratings for sentences in the unscrambled ordering, while no such difference exists for sentences with a temporal adverb.

We will once again test our hypothesis in a production experiment, and compare our results to those in de Swart & van Bergen (2011), Unsworth (2005) and Schaeffer (2000). We expect participants to show a preference for the scrambled order in sentences with the negation adverb, and a similar preference for the unscrambled order in sentences with temporal adverbs.

[6]Seven participants noticed the adverb manipulation, and, especially, the awkward positioning of the negation adverb. A reanalysis excluding the data of these participants was qualitatively similar.

3.2.2 Experiment 2B: Production task

Method

Participants. 50 native Dutch students (44 female; mean age 20.4, 18-26) were recruited from the SONA participant pool of the Radboud University in Nijmegen and participated for course credit. Data from two participants were not audible due to a technical error and were discarded.

Factors. The experiment included the independent variables ADVERB TYPE (negation vs. temporal) and PRESENTATION ORDER (ADV < OBJ vs. OBJ < ADV). The dependent variable was OBJECT POSITION (scrambled vs. unscrambled).

Materials and Procedure. The stimuli sentences were minimally changed from those in Experiment 1B, such that the adverb manipulation in this experiment was between negation and temporal adverbs. The further design and procedure of this experiment were identical to Experiment 1B.

Results

After transcribing the audio data, a number of utterances turned out not to be target-like. We used the same definition for target-like utterances as in Experiment 1B. The utterances that were not target-like were discarded from the analysis (4.3 %). We annotated the remaining utterances for OBJECT POSITION. Figure 4 presents the mean proportions of scrambled objects and standard deviations in the remaining utterances.

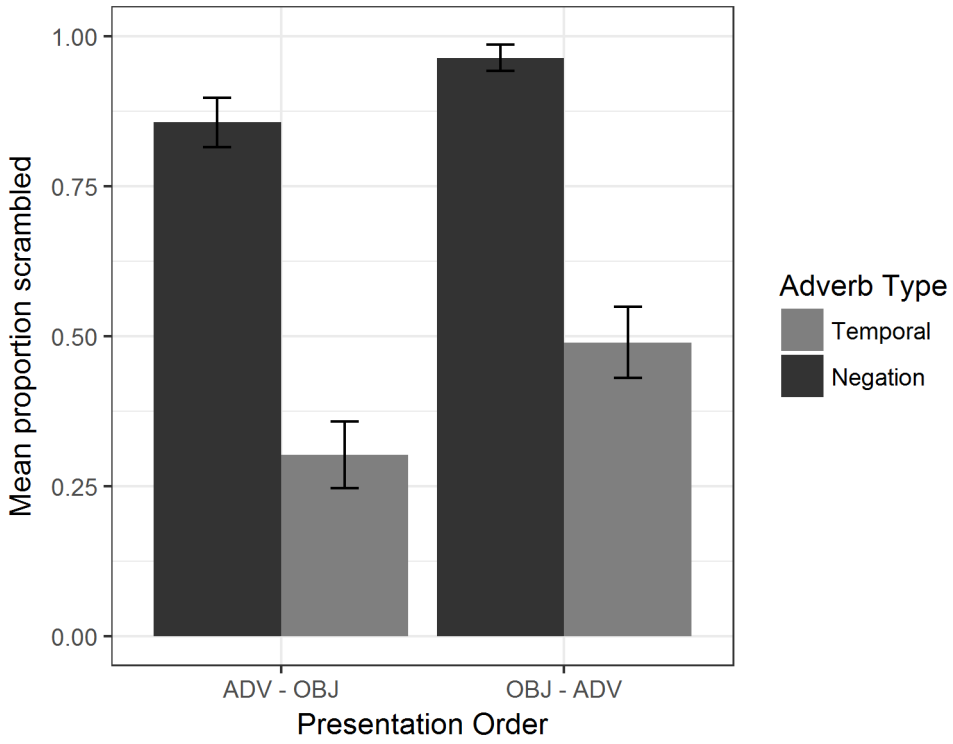

Figure 4. Mean proportion of produced scrambled order and standard deviations per condition

We used the software R version 3.4.3 (R Core Team, 2017) 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, controlling for the order of presentation of the constituents. The binary dependent variable in the model was the object position, with ADVERB TYPE and PRESENTATION ORDER as fixed effects. 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 (i.e., the maximum structure). When the model failed to converge, we simplified the random structure of the model by step-wise removal of the smallest variance component. The final model included intercepts for participants and items, and a by-participant random slope for the effect of presentation order. The two-level factors were coded using deviations contrasts (contrasts of $-.5$, $+.5$). The estimates of the final model are given in Table 5.

Table 5. Model specifications of the generalized linear mixed-effects model for Experiment 2B (number of observations: 1102, groups: participant, 48; item, 24)

Fixed effects	β	SE	z-value	p
(Intercept)	1.3495	0.2331	5.789	$<$ .001
adverb type	3.8651	0.2825	13.681	$<$ .001
presentation order	-1.5451	0.3764	-4.104	$<$ .001
adverb type * presentation order	-1.0674	0.5516	-1.935	.053

We found a significant main effect of ORDER OF PRESENTATION ($\beta = -1.55$, $SE = 0.38$, $z = -4.10$, $p < .001$). That is, participants tended to follow the order of the words on the computer screen in their speech. Still, we also found a significant main effect of ADVERB TYPE ($\beta = 3.87$, $SE = 0.28$, $z = 13.68$, $p < .001$). Definite objects were clearly placed in the scrambled position more often if the adverb was temporal than if it was the negation adverb. The interaction effect between the two failed to reach significance ($\beta = -1.07$, $SE = 0.55$, $z = -1.94$, $p = .053$).

Discussion

Figure 4 shows that definite objects are scrambled across the negation adverb in the vast majority of utterances. The statistics suggest in addition that the main effect of ADVERB TYPE was modulated by the ORDER OF PRESENTATION, as per the near-significance of the interaction effect, but this tendency is most likely to be a ceiling effect. More important is the main effect of ADVERB TYPE. The definite object was scrambled across the negation adverb in about nine out of ten utterances, and across the temporal adverb in approximately 30 % of the utterances. This finding is in line with our predictions and replicates the findings in de Swart & van Bergen (2011), Unsworth (2005) and Schaeffer (2000). The type of adverb thus plays a crucial role in explaining the discrepancy between the results of these studies. If the relative positioning of the definite object and the adverb influences the meaning of the sentence, language users avoid expressing the marked meaning. We have shown that whether an adverb is scope-sensitive or not has a direct consequence on the incentives of a language user to scramble a definite object.

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.

The sentence judgment task in Experiment 1A indicated that both word orders are accept-

able as grammatical options in Dutch for sentences with a definite object and a predicate adverb or a 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 ratings when the object was in the scrambled position. The preference for the scrambled order for sentences with a low adverb is much clearer from the results of the production task in Experiment 1B. Dutch natives used the scrambled word order considerably more often 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* (Bader & Häussler, 2010; Kempen & Harbusch, 2008; cf. de Swart & van Bergen, 2011): even though two word order options are equally acceptable, one of them may be used more frequently in production.

Our results can be taken as evidence for the hypothesis that the structural position of the adverb influences definite direct object scrambling in Dutch, such that the adverb constitutes a syntactic hurdle that constrains object movement (cf. Schaeffer, 2000). The lower the structural position of the adverb, the better it is to scramble the object. 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 this analysis. Either conclusion may be premature, however, since some of the stimulus adverbs and not others were arguably also scope-sensitive. Evaluative adverbs like *helaas* 'unfortunately', for instance, may be taken to induce an interpretation shift just like the negation adverb does. This effect is strengthened by intonation, which is known to be an important factor in scrambling constructions (Neeleman & Reinhart, 1998; see also Beaver & Clark, 2008). Scope sensitivity could thus have been a confounding variable in our 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 if the prosodic contours of the stimuli items are controlled for (e.g. in an experiment with audio stimuli). Moreover, participants in our rating tasks were presented with V2-structures whereas participants in our production tasks were to produce VL-structures. It is conceivable that the clause type also influenced word ordering preferences in the middlefield.

In the second set of experiments we investigated the influence of the adverb's scope sensitivity on Dutch definite object scrambling. The sentence judgment task in Experiment 2A indicated that sentences with temporal adverbs receive equally high ratings in the two orderings. We did find a difference in ratings for the negation adverb, such that sentences in the unscrambled word order received a neutral rating whereas sentences in the scrambled word order were rated at the high end of the scale. The scope sensitivity of the adverb thus clearly affects sentence appreciation. Furthermore, the scope sensitivity of the adverb seems to be one of the main motivations to scramble objects in language production. The production task in Experiment 2B shows that definite objects are scrambled across the negation adverb almost categorically. There was more variation for utterances with scope-insensitive temporal adverbs. Our language production findings can be used to explain the discrepancies between the results of Schaeffer (2000), de Swart & van Bergen (2011) and Unsworth (2005).

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 the adverb in the Dutch middlefield as of yet is relatively understudied, especially experimentally. Nevertheless, it is evident from the results of our experiments that there is some effect of the adverb's syntactic and semantic characteristics on its placement relative to the direct object.

References

Bader, M., & Häussler, J. (2010). Toward a model of grammaticality judgments. *Journal of Linguistics*, *46*(2), 273–330.

Barbiers, S. (2018). Adverbs in strange places. *Nederlandse Taalkunde*, *23*(1), 57–88.

Bates, D., Mächler, M., Bolker, B., & Walker, S. (2015). Fitting linear mixed-effects models using lme4. *Journal of Statistical Software*, *67*(1), 1–48.

Beaver, D., & Clark, B. (2008). *Sense and Sensitivity: How Focus Determines Meaning*. Oxford: Wiley-Blackwell.

van Bergen, G., & de Swart, P. (2009). Definiteness and scrambling in Dutch: Where theory meets practice. In A. Schardl, M. Walkow, & M. Abdurrahman (Eds.), *Proceedings of NELS 38* (pp. 89–100). Amherst, MA: GLSA.

van Bergen, G., & de Swart, P. (2010). Scrambling in spoken Dutch. Definiteness versus weight as determinants of word order variation. *Corpus Linguistics and Linguistic Theory*, *6*(2), 267–295.

Bouma, G., & de Hoop, H. (2008). Unscrambled pronouns in Dutch. *Linguistic Inquiry*, *39*, 669–677.

Breen, M. (2014). Empirical investigations on the role of implicit prosody in sentence processing. *Language and Linguistics Compass*, *8*(2), 37–50.

Broekhuis, H. (2008). *Derivations and Evaluations: Object Shift in the Germanic Languages*. Berlin/New York, NY: Mouton de Gruyter.

Broekhuis, H., & Corver, N. (2016). *Syntax of Dutch, Vol. 3: Verbs and Verb Phrases*. Amsterdam: Amsterdam University Press.

CGN. (2006). *Corpus Gesproken Nederlands, v2.0*. Electronic Resource: http://lands.let.ru.nl/cgn/home.htm.

Cinque, G. (1999). *Adverbs and Functional Heads: A Cross-Linguistic Perspective.* Oxford: Oxford University Press.

Delfitto, D. (2006). Adverb classes and adverb placement. In M. Everaert & H. van Riemsdijk (Eds.), *The Blackwell Companion to Syntax, Vol. I* (pp. 83–120). Oxford: Blackwell Publishing.

Delfitto, D., & Corver, N. (1998). Feature primitives and the syntax of specificity. *Italian Journal of Linguistics*, *10*, 281–334.

Diesing, M., & Jelinek, E. (1995). Distributing arguments. *Natural Language Semantics*, *3*(2), 123–176.

van der Does, J., & de Hoop, H. (1998). Type-shifting and scrambled definites. *Journal of Semantics*, *15*, 393–416.

Ernst, T. (2002). *The Syntax of Adjuncts*. Cambridge: Cambridge University Press.

Ernst, T. (2004). Principles of adverbial distribution in the lower clause. *Lingua*, *114*, 755–777.

Fodor, J. (2002). Prosodic disambiguation in silent reading. In M. Hirotani (Ed.), *Proceedings of NELS* (Vol. 32, pp. 113–132). Amherst, MA: GLSA.

Frey, W. (2003). Syntactic conditions on adjunct classes. In E. Lang, C. Maienborn, & C. Fabricius-Hansen (Eds.), *Modifying Adjuncts* (pp. 163–209). Berlin/New York, NY: Mouton de Gruyter.

Frey, W. (2015). Word order. In T. Kiss & A. Alexiadou (Eds.), *Handbook Syntax – Theory and Analysis, Vol. 1* (pp. 514–562). Berlin: de Gruyter.

Frey, W., & Pittner, K. (1998). Zur Positionierung der Adjunkte im deutschen Mittelfeld. *Linguistische Berichte*, *176*, 489–534.

Geuder, W. (2000). *Oriented Adverbs: Issues in the Lexical Semantics of Event Adverbs* (Doctoral dissertation, University of Tübingen, Tübingen).

Gibson, E. (1998). Linguistic complexity: Locality of syntactic dependencies. *Cognition*, *68*(1), 1–76.

Gibson, E. (2000). The dependency locality theory: A distance-based theory of linguistic complexity. *Image, Language, Brain*, 95–126.

Grice, P. (1975). Logic and conversation. In P. Cole & J. Morgan (Eds.), *Syntax and Semantics, vol. 3* (pp. 45–58). New York, NY: Academic Press.

de Hoop, H. (1996). *Case Configuration and Noun Phrase Interpretation*. New York, NY/London: Garland Publishing.

de Hoop, H. (2000). /Ot/je en scrambling in het Nederlands. In J. Hoeksema, V. Sánchez-Valencia, & T. van der Wouden (Eds.), *Tabu: Bulletin voor Taalwetenschap* (Vol. 30, *3-4*, pp. 97–113). Groningen: Grafisch Centrum Rijksuniversiteit Groningen.

de Hoop, H. (2003). Scrambling in Dutch: Optionality and optimality. In S. Karimi (Ed.), *Word Order and Scrambling* (pp. 201–216). Oxford: Blackwell.

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

Kempen, G., & Harbusch, K. (2008). Comparing linguistic judgments and corpus frequencies as windows on grammatical competence: A study of argument linearization in German clauses. In A. Steube (Ed.), *The Discourse Potential of Underspecified Structures* (pp. 179–192). Berlin/New York, NY: de Gruyter.

Klima, E. (1964). Negation in English. In J. Fodor & J. Katz (Eds.), *The Structure of Language. Readings in the Philosophy of Language.* (pp. 246–323). Englewood Cliffs, NJ: Prentica-Hall, Inc.

van de Koot, H., Silva, R., Felser, C., & Sato, M. (2015). Does Dutch a-scrambling involve movement? Evidence from antecedent priming. *The Linguistic Review*, *32*(4), 739–776.

Maienborn, C. (2001). On the position and interpretation of locative modifiers. *Natural Language Semantics*, *9*, 191–240.

Morzycki, M. (2016). *Modification*. Cambridge: Cambridge University Press.

Neeleman, A. (1994). Scrambling as a D-structure phenomenon. In N. Corver & H. van Riemsdijk (Eds.), *Studies on Scrambling: Movement and Non-movement Approaches to Free Word-Order Phenomena* (pp. 387–430). Berlin: Mouton de Gruyter.

Neeleman, A., & Reinhart, T. (1998). Scrambling and the PF interface. In M. Butt & W. Geuder (Eds.), *The Projection of Arguments* (pp. 309–353). Stanford, CA: CSLI Publications.

Pittner, K. (2004). Where syntax and semantics meet: Adverbial positions in the German middle field. In J. Austin, S. Engelberg, & G. Rauh (Eds.), *Adverbials: The Interplay between Meaning, Context, and Syntactic Structure* (pp. 253–287). Amsterdam/Philadelphia, PA: John Benjamins.

R Core Team. (2017). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing. Vienna, Austria. Retrieved from https://www.R-project.org/

Schaeffer, J. (1997). *Direct Object Scrambling in Dutch and Italian Child Language* (Doctoral dissertation, University of California, Los Angeles, CA).

Schaeffer, J. (2000). *The Acquisition of Direct Object Scrambling and Clitic Placement: Syntax and Pragmatics.* Amsterdam: John Benjamins.

Schaeffer, J. (2012). *Specific Language Impairment: Evidence for the Division of Labor and the Interaction between Grammar and Pragmatics*. Saarbrücken: Lambert Academic Publishing.

Schäfer, M. (2013). *Positions and Interpretations. German Adverbial Adjectives at the Syntax-Semantics Interface*. Berlin/Boston, MA: De Gruyter Mouton.

Schneider, W., Eschman, A., & Zuccolotto, A. (2012). *E-Prime User's Guide.* Psychology Software Tools, Inc. Pittsburgh, PA.

Schütze, C., & Sprouse, J. (2014). Judgment data. In R. Podesva & D. Sharma (Eds.), *Research Methods in Linguistics* (pp. 27–50). Cambridge: Cambridge University Press.

Steube, A. (2006). The influence of operators on the interpretation of DPs and PPs in German information structure. In V. Molnár & S. Winkler (Eds.), *The Architecture of Focus (=Studies in Generative Grammar 82)* (pp. 489–516). Berlin/New York, NY: de Gruyter.

de Swart, P., & van Bergen, G. (2011). *Definiteness and Adverb-Object Order in Dutch*. Manuscript University of Groningen and Université Catholique Louvain-La-Neuve.

de Swart, P., & van Bergen, G. (2014). Unscrambling the lexical nature of weak definites. In A. Aguilar-Guevara, B. L. Bruyn, & J. Zwarts (Eds.), *Weak Referentiality* (pp. 287–310). Amsterdam: Benjamins.

Thomason, R., & Stalnaker, R. (1973). A semantic theory of adverbs. *Linguistic Inquiry*, *4*(2), 195–220.

Unsworth, S. (2005). *Child L2, Adult L2, Child L1: Differences and Similarities. A Study on the Acquisition of Direct Object Scrambling in Dutch* (Doctoral dissertation, Utrecht University).

Verhagen, A. (1986). *Linguistic Theory and the Function of Word Order in Dutch: A Study on Interpretive Aspects of the Order of Adverbials and Noun Phrases* (Doctoral dissertation, Dordrecht).

Vikner, S. (1994). Scandinavian object shift and West-Germanic scrambling. In N. Corver & H. van Riemsdijk (Eds.), *Studies on Scrambling: Movement and Non-movement Approaches to Free Word-Order Phenomena* (pp. 487–517). Berlin/New York, NY: Mouton de Gruyter.

Vikner, S. (2006). Object shift. In M. Everaert & H. van Riemsdijk (Eds.), *The Blackwell Companion to Syntax, Volume I* (pp. 392–436). Oxford: Blackwell Publishing.

Wasow, T. (1997). Remarks on grammatical weight. *Language Variation and Change*, *9*(1), 81–105.