The placement of bare plural subjects in Dutch

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Abstract

Although subjects in Dutch normally occur in preverbal position, it is not uncommon for bare plurals to occur in postverbal position. We will show that this variation results from two conflicting constraints. Firstly, subjects are preferred in preverbal position, the standard subject position. Secondly, preverbal subjects should have good topic characteristics, since this position is also the standard position for topics. Hence, non-specific NPs are not preferred in preverbal position. Consequently, a conflict arises for bare plurals as non-specific subjects. This analysis is supported by the results of a sentence production experiment (drag-and-drop). Moreover, a second study showed that these word order preferences are subject to changes in iconicity of topic-focus structure.

1. Introduction

In the production of ordinary Dutch subject-predicate constructions, there is a general preference to place the subject at the beginning of the sentence (Pinto, 1997). Thus, in Dutch the unmarked position for a subject is the preverbal position, while a postverbal position is marked.[1] In addition, it is very common to start a sentence with the element that the sentence is about, i.e. the topic (De Swart & De Hoop, 2000). Fortunately, subjects are good topics: the subject of a sentence is often what the sentence is about. Placing the subject as well as the topic in first, preverbal, position, will therefore go hand in hand in many cases. For example, sentence (1) is about *Piet* 'Pete', which is also the subject of *draagt* 'wears', and the topic of sentence (2) is *de kroonprins* 'the crown prince', which is also the subject of *loopt* 'is walking'.

(1) Piet draagt een hoed.
Pete wears a hat
'Pete wears a hat.'

(2) De kroonprins loopt op straat.
the crown.prince walks on street
'The crown prince is walking in the street.'

While in these examples the topics *Piet* and *de kroonprins* are considered sentence topics, the constituents *een hoed* 'a hat' and *op straat* 'in the street', on the other hand, are in focus. They provide new information about *Piet* and *de kroonprins*, respectively. The general tendency that topics precede focussed constituents in sentences might be ascribed to iconicity: what is uttered first in the sentence is older information than what is uttered later (De Swart & De Hoop, 2000).

A marked word order, i.e. with the subject in postverbal position, can be used for example when some other constituent than the subject is topicalized, as in (3) and in (4).

(3) Deze hoed draagt Piet graag.
this hat wears Pete gladly
'Pete likes to wear this hat.'

(4) In deze kroeg komen veel taalkundigen.
in this pub come many linguists
'Many linguists come to this pub.'

[1] Because Dutch is a V2-language, the finite verb is assumed to surface in C_0 position in main clauses, leaving the Spec-CP position as the only possible preverbal position for the subject. Since the Spec-CP position is the first position of a sentence, no other element can precede a preverbal subject in Dutch main clauses.

In sentence (3), the topic is the object *deze hoed* 'this hat', and in sentence (4), the topic *deze kroeg* 'this pub' is part of a prepositional phrase.

The subjects of sentence (1) and (2) are not only good topics because they are subjects, but also because they are definites. Definites are good topics because they have specific referents. There are, however, types of NP that are not so good topics. One of them is the *bare plural*. Bare plurals are not prototypical topics, because they cannot receive a specific interpretation. This is said to be the result of bare plurals lacking the intrinsic ability to quantify over individuals (Carlson, 1977; Dayal, 2003). Therefore, they are less suitable to convey old information. Still, bare plurals can be subjects. Thus, for bare plurals a conflict exists between the preference to place subjects in sentence-initial position, and the preference to begin a sentence with the topic. A bare plural subject is a bad topic, which makes it a less good candidate for the sentence-initial position, but at the same time, being the subject, it favours the sentence-initial position.

Because of this conflict, bare plural subjects in Dutch are expected to occur postverbally as well as preverbally. The postverbal position is the standard focus position, i.e. the place where new information is expressed. An example of a bare plural subject in postverbal position is given in (5). An expletive (*er* 'there') can appear in the otherwise empty standard subject position (sentence (5a)), but it is also possible that the adjunct (if present) moves to the beginning of the sentence, taking the place of the expletive (sentence (5b)).

(5a)	Er	zwemmen	vliegen	in	mijn	soep.
	there	swim	flies	in	my	soup
	'There are flies swimming in my soup.'					

(5b)	In	mijn	soep	zwemmen	vliegen.
	in	my	soup	swim	flies
	'Flies are swimming in my soup.'				

The bare plural subject *vliegen* 'flies' is in focus, and can only be interpreted existentially here. That is, the flies were not introduced earlier in the discourse, nor is there reference to any particular flies.

Bare plural subjects occur in preverbal position as well. The sentence in (6) is an example.

(6)	Kabouters	wonen	in	paddenstoelen.
	gnomes	live	in	mushrooms
	'Gnomes live in mushrooms.'			

In (6), *kabouters* 'gnomes' clearly is the topic of the sentence. Still, as a bare plural it cannot refer to any specific gnomes, so an interpretation as a specific noun phrase is not possible. But since it is in topic position, it is not likely to convey new information, so an existential interpretation is not predicted either. A possible way a bare plural in topic position can be interpreted is when it gets a generic reading. Sentence (6) is preferably read as a general statement about gnomes, namely that they live in mushrooms.[2] To receive a generic interpretation, however, bare plurals need to be bound by an external generic operator that allows quantification over individuals, because indefinites have no inherent quantificational force (Dayal, 2003; Farkas & De Swart, 2006). Such a type shift from an 'easy', non-quantificational, existential interpretation to a more complex, quantificational, generic interpretation can be considered a

[2] For an account of how generic plurals can have discourse reference, see Farkas and De Swart (2006).

costly operation in terms of language processing (Carlson, 1977; Cohen & Erteschik-Shir, 2002; Partee, 1987). Therefore, a bare plural in the topic position of a sentence is marked.

Another explanation for the difference in interpretation between (5) and (6) could be that it is due to the predicate. Swimming in soup is not something that flies normally do, so a generic interpretation is not very plausible here. By contrast, living in mushrooms is something characteristic of gnomes, so a generic interpretation would be quite obvious. Carlson (1977), for example, argued that English bare plural subjects of *stage level predicates* (predicates bound to a particular situation, like 'to swim') receive an existential reading, while bare plural subjects of *individual level predicates* (predicates not bound to a particular situation, like 'to live') receive a generic reading. Having said this, consider (7a) and (7b).

(7a) Kinderen spelen in de tuin.
children play in the garden
'Children play in the garden.'

(7b) In de tuin spelen kinderen.
in the garden play children
'Children are playing in the garden.'

Here, although the predicate is the same in both sentences, the bare plural can be placed in both preverbal (topic) or in postverbal (focus) position. The interpretation of the bare plural is however different. Sentence (7a) is most likely to be interpreted as a general statement about children, thus receiving a generic interpretation, while the most plausible reading of (7b) is that there are some children playing in the garden, thus receiving an existential interpretation.

Definite plurals, on the other hand, are not easily placed in focus position. In contrast to bare plurals, definites are good topics. Thus, the default position for definite subjects is the topic position, which is also the preverbal standard subject position. Examples (7c) and (7d) illustrate this.

(7c) De kinderen spelen in de tuin.
the children play in the garden
'The children are playing in the garden.'

(7d) In de tuin spelen de kinderen.
in the garden play the children
'In the garden, the children are playing.'

In sentence (7c), the subject *de kinderen* 'the children' is in topic position, and this sentence is perfectly fine. Sentence (7d), in contrast, is less common, and therefore I consider it to be a marked form. Because the subject is definite, there is no a priori reason why one would want to put it in postverbal position, yielding a marked word order. But this does not mean that sentences like (7d) cannot be interpreted easily. Although definites are good topics, they can express new information, and the standard focus position is not a strange position for a definite. A quite natural interpretation of the subject of (7d) would be that it has contrastive focus: it might be contrasted with some other individuals (e.g. adults) who are playing elsewhere (e.g. in the living room) (Choi, 1996).

The correspondence between marked forms and infrequent (marked) meanings does not hold for the cases in which bare plurals are used. The sentences in (5b) and (7b) have a marked word order, but they don't have a marked interpretation. On the contrary, the most natural interpretation of the subject is an existential one, and the existential reading is consid-

ered the unmarked interpretation for an indefinite NP (Partee, 1987; Van der Does & De Hoop, 1998). The subject occurs postverbally in these sentences, which is the default focus position. A generic reading, on the other hand, for which normally the unmarked word order is used, is considered a marked interpretation. This is because processing requires more effort from the hearer, since generics are quantifications over individuals (Dayal, 2003; Farkas & De Swart, 2006).

Thus, there seems to be a conflict between two constraints. First, there is the preference to begin a sentence with the subject, which could be labelled the *Subject First principle* (Lamers & De Hoop, 2007). Second, there is the preference to place bare plurals in postverbal position. Because in this position bare plurals can get an unmarked existential interpretation, a speaker who places a bare plural subject in postverbal position will express a meaning that is least marked for the hearer to interpret. Satisfaction of one constraint will thus automatically lead to violation of the other for bare plural subjects. For definite plurals no conflict occurs, because the unmarked meaning normally combines with the unmarked word order.

Of course, the conflict described above will not easily surface in normal discourse, because the speaker wants to convey a particular meaning, and s/he will not choose a different word order if that does not lead the hearer to the desired interpretation. However, the conflict does give an explanation for the variation found in Dutch word order with respect to bare plural subjects.

Two questions now arise. The first is whether the difference between bare plurals and definite plurals can be found in production. For bare plurals, variation in the placement, either preverbally or postverbally, is predicted due to the conflict between the Subject First principle and the non-topicality of bare plurals. For definite plurals, no variation in the placement is predicted. As noted, it is not likely to find this difference in spontaneous production within a particular context, because the speaker's intention will automatically lead to both the choice for either a definite or an indefinite NP and the choice of topic and focus. To be able to test the prediction experimentally, an artificial situation has to be created. It is assumed that when no linguistic or situational context is present and the constituents that the speaker may use are given (restricting spontaneous language production), the speaker's preferences as to which meaning he or she wants to convey are neutralized. Consequently, he or she will either choose an unmarked form (word order) or an unmarked meaning, avoiding marked forms and meanings. Thus, to be able to elicit the conflict with bare plural subjects in the speaker, the choice of definite versus indefinite should be fixed, and absolutely no context should be provided, so that there is no a priori preference for some element to be topic or focus. The first hypothesis here is, then, that if the Subject First principle is a very strong constraint (which is very likely, because the preverbal position is by far the most frequent position for the subject in Dutch), subjects will be produced preverbally in most cases, irrespective of their definiteness. The second hypothesis is that if the avoidance of bare plurals in standard topic position is an important constraint, there will also be a number of cases in which subjects are produced postverbally when they are bare plurals, but not when they are definite plurals. These hypotheses were tested in a first drag-and-drop experiment.

The second question is whether deviations from the unmarked word order, i.e. with the subject in preverbal position, can be elicited by manipulating information structure. A question asking for the subject of a sentence places the subject in focus. Thus, the answer to such a question is predicted to have the subject in postverbal focus position. However, this would be a violation of the Subject First principle, because it results in a marked word order. Furthermore, a question asking for another constituent than the subject would place that constituent in postverbal position, which forces the subject to be in preverbal position, which is in accordance with the Subject First principle. However, when the subject is a bare plural, placing it in preverbal position would result in a type shift to a more complex generic interpretation. As-

suming that information structure is more important than either the Subject First principle or the avoidance of a complex type shift, it is predicted that in answers to focus questions the constituent that contains the new information will be put in postverbal position. The hypothesis for the second question is, then, that when information structure is manipulated by asking a focus question, the constituent that contains the new information will be produced postverbally, in the standard focus position, regardless of the type of constituent involved or the definiteness of the subject. This hypothesis was tested in a second drag-and-drop-experiment.

2. Experiment 1

2.1 Method

2.1.1 Participants

Sixteen native speakers of Dutch (9 male, 7 female; mean age 22,5 years) participated in the experiment. They volunteered and did not receive any award for their participation. They had corrected to normal or normal vision and had no neurological disabilities. They all had enough experience in working with a computer so that the drag and drop task did not cause any problems or misunderstandings.

2.1.2 Materials

In the experiment, Dutch intransitive sentences consisting of a plural animate NP, a plural verb in the present tense and a locative PP were used. The NP could either be a bare plural or a definite plural (with a definite article). Because all bare plurals had to be ambiguous between generic and existential readings, no sentences included *kind-level predicates* (i.e. predicates that can only take kinds as their subjects, e.g. 'to be extinct'; see a.o. Carlson, 1977; Dayal, 2003; Farkas & De Swart, 2006). In each sentence, the NP could occur to the left of the verb and the PP to the right, or vice versa. Care was taken that all sentences were perfectly grammatical in either word order.

For the drag-and-drop task, the NP and the PP were presented in two different orders in the middle on the upper part of the computer screen: either the PP was presented on the screen above the NP, or the NP was placed above the PP. Together with the NP appearing in two conditions (bare or definite), this resulted in a set of 4 experimental items. The stimulus material consisted of 28 of such sets. This yielded 28 x 4 = 112 different items. Table 1 summarizes the conditions.

Table 1 Two different conditions (bare or definite) in the experimental items from experiment 1, in two different orders of presentation, with examples of sentences as presented in the experiment. [3] BP = bare plural; DA = plural NP with definite article.

	Order of Presentation	
Plural NPs	PP-NP	NP-PP
BP	in de tuin kinderen ……spelen……	kinderen in de tuin ……spelen……
DA	in de tuin de kinderen ……spelen……	de kinderen in de tuin ……spelen……

[3] in = in; de = the; tuin = garden; kinderen = children; spelen = play

First, the experimental items were distributed over 2 lists, such that the different conditions were spread equally over the lists, all verbs, NPs and PPs occurred equally often on each list and each item occurred only once on a list. Thus, from each set 2 items occurred on a given list, one with the bare NP and one with the definite NP. Care was taken that the order of the NP and the PP of the 2 items were different and that each order occurred equally often on a given list. Each list was divided into 2 blocks, with 44 items per block. From the same set, one of the blocks contained the item with the bare NP, and the other one the item with the definite NP. In this way, items from the same set were kept as far apart as possible from each other.

To each list 32 filler items were added. These filler items consisted of an unaccusative verb and two plural NPs of which the animacy and definiteness were manipulated.[4] Because the experimental items had only 4 items per set, while the filler items had 16 items per set, the filler sentences would dominate the stimulus material. Therefore, 2 additional lists were created. For the experimental items, these lists were duplicates of the 2 lists described above, but the filler items were different, because the 16 items per set were distributed over 4 lists. This resulted in a more balanced proportion of fillers on each list. For a further description of the filler material the reader is referred to Lamers et al. (in preparation). To keep the participants attentive, 8 *response items* were added as well. The response items were distributed randomly over each list. Care was taken that there was no repetition of lexical items between experimental items and filler items or in the response items.

2.1.3 Procedure

The participants were tested individually in an experimental room. They were seated in front of a computer monitor and they had to use a mouse. Participants were instructed to build a grammatically correct Dutch sentence that sounded as naturally as possible, by dragging one of the two phrases appearing on the screen to one of the two slots on either side of the verb with the mouse. After the participant read the written instruction and the experiment was briefly explained, the experiment started with the text *Let op! Het gaat nu beginnen!* ('Attention! It starts now!') appearing on the screen. Next, an asterisk (*) appeared for 800 ms in the middle of the screen. Then, at the same position a verb appeared with dotted lines on both sides. After 1500 ms, the NP and the PP appeared in the upper part of the screen, positioned right above each other (see Fig. 1).[5] By moving the mouse, the cursor, which had the shape of a small white hand, moved over the screen. As soon as the cursor was close enough to one of the phrases so that it could be dragged, the hand closed and the font of the phrase became yellow; if it was close enough to one of the slots next to the verb the colour became white again, indicating that the phrase could be dropped. A subject had 6000 ms to complete a sentence. As soon as one of the phrases was placed in a slot, the other

Figure 1 Example of an experimental item presented on the computer screen.

[4] For example:

(De) politici bevallen (de) journalisten. (Two animates, bare or definite.)
(the) politicians please (the) journalists

(De) vragen bevallen (de) sollicitanten. (Inanimate subject, animate object, bare or definite.)
(the) questions please (the) applicants

[5] The filler items were presented in a similar way as the experimental items.

automatically moved to the empty slot and a sentence had been formed. After that, an asterisk appeared on the screen and the program automatically continued to the next item. When the 6000 ms had passed without a sentence being formed, the next item was started automatically.

Some of the filler items were followed by a word in capitals immediately after a sentence was formed. Here participants had to indicate whether the word had occurred in the sentence they just built by clicking with the mouse on the *ja* 'yes' or *nee* 'no' boxes that appeared on the screen at the same time as the word. These so-called response items served to check whether the subjects paid attention and read the words on the screen carefully.

The screen was black and the text appearing on it was white. The stimuli were presented by making use of the software program *Presentation*. A single experiment consisted of 2 blocks, separated by a short pause.[6] Each experiment was introduced with a practice block of 14 items that were similar to the items in the experimental blocks. The practice block included, in proportion, more response items than the experiment. It took participants approximately 15 minutes to complete the experiment.

2.2 Results

The data of one participant were excluded from the analysis, because this participant showed an overall bias for placing the top constituent in the left slot. In addition, individual items that had reaction times above 3 times the standard deviation from the overall mean were removed from the analysis. This included 5 items. Reaction times of over 2,5 standard deviations from the participant's mean were set to the mean. This included 6 items, equally spread over the conditions. In the response items there was only one case of a wrong answer of one of the participants. From this I conclude that all participants paid enough attention to produce reliable data.

The results of experiment 1 are summarized in Table 2 and Figure 2.

Table 2 Production of the two different word orders in experiment 1, for two types of NP (n=15).

	Produced word order		
Condition	NP-V-PP	PP-V-NP	TOTAL
Bare plural	240	178	418
Definite plural	338	79	417
TOTAL	578	257	835

[6] There was no fixed time for this pause. As soon as the participant indicated that he or she was ready to go on, the next block was started.

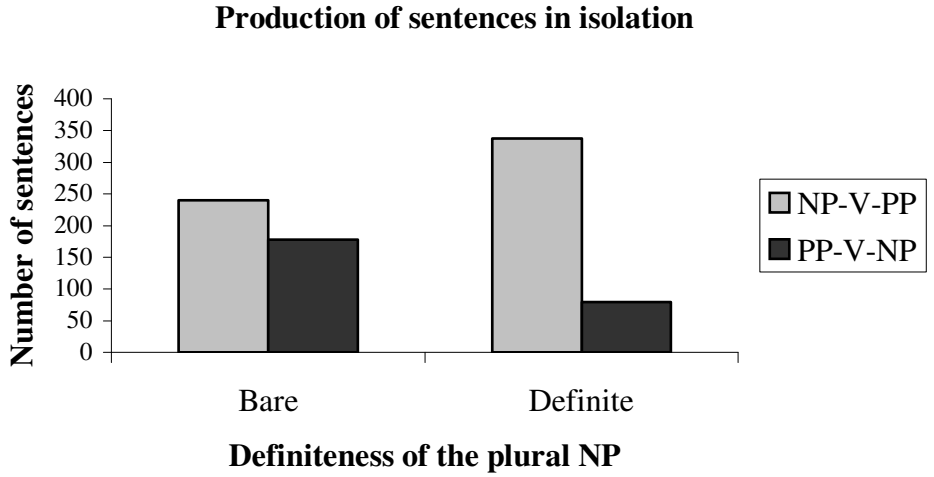

Figure 2 Total number of productions of the two different word orders in the drag-and-drop experiment with sentences presented in isolation, for the two types of NP.

Table 2 and Figure 2 show the total number of produced sentences, without context, in each of the two possible word orders (i.e. with the NP in sentence-initial position, yielding an NP-V-PP construction, or with the PP in sentence-initial position, yielding a PP-V-NP construction) for each type of NP (bare plural, definite plural).

The difference between the two word orders indicates that there is a clear preference to put the NP in first position, for both types of NP. This is consistent with the Subject First principle, which seems to hold also for bare plural subjects, despite their lack of referentiality. As can be seen in Figure 2 (see also Table 2), the difference in the number of produced sentences between the NP-V-PP word order and in the PP-V-NP word order is larger with definite NPs than with bare NPs (338 vs. 79 and 240 vs. 178, respectively). This might suggest that there is a tendency to move bare plurals to postverbal position.

A binary logistic regression analysis was carried out on the data. *NP type*, *picked up constituent* and *order of presentation* were the independent variables; the position where the picked up constituent was dropped was the dependent variable. The order in which the NP and the PP were presented to the participants showed a significant effect (Wald = 22,298; $\hat{\beta}$ = 3,329; p < ,001) on the produced word order in the cases where participants had picked up the PP constituent. *Picked up constituent* was also significant (Wald = 53,551; $\hat{\beta}$ = 7,278; p < ,001), while *NP type* was not (Wald = 1,481; $\hat{\beta}$ = 1,355; p = ,224). A separate analysis of the cases in which the NP constituent was picked up showed no effect of the order of presentation ($\hat{\beta}$ = 2,015; p < ,120). Finding no order of presentation effect for those instances in which participants picked up the NP gives us the possibility to select a subset of the data that is not affected by the order of presentation effect. An overview of the results of this subset of a total of 538 cases is given in Table 3. As in the complete data set, the number of sentences with an NP in sentence-initial position is larger than the number of sentences with a PP in sentence-initial position, for both types of NP (see also Fig. 3).

Table 3 Production of the two different word orders in experiment 1, for two types of NP (n=15). The NP constituent was picked up.

Pick up NP	**Produced word order**		
Condition	NP-V-PP	PP-V-NP	TOTAL
Bare plural	217	19	236

Definite plural	299	3	302
TOTAL	516	22	538

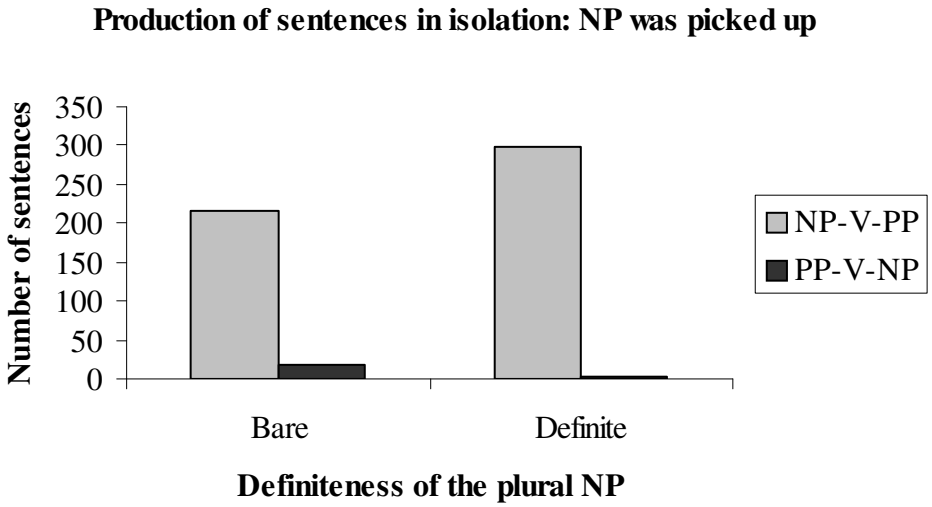

Figure 3 Total number of productions of the two different word orders in the drag-and-drop experiment with sentences presented in isolation, for the two types of NP. Only cases in which the NP constituent was picked up were taken into account.

In this subset of the data, sentences with a PP-V-NP word order are hardly produced. A logical explanation for this pattern can be found in the task the participants had to perform. It seems to be most natural to pick up the constituent that is going to be placed in the left slot. This is not only in line with normal incremental processes, but it also reflects left-right reading order. However, statistical analyses showed that *NP type* (bare or definite) and *produced word order* (NP-V-PP or PP-V-NP) are independent of each other (Wald = 12,313; $\hat{\beta}$ = ,110; p < ,001).

Next, the nature of this dependency was examined using a proportion analysis. Proportions from the numbers in Table 3 were calculated and differences between pairs were tested against the expected values. First, as expected, the difference between the NP-V-PP and the PP-V-NP word order was highly significant for both types of NP (both z's = 4,10; p < ,001). Thus, significantly more NP-initial sentences were produced than PP-initial sentences (92,0% vs. 8,1% of all bare NPs, respectively, and 99,0% vs. 1,0% of all definite NPs, respectively). Additionally, the difference between the bare plural condition and the definite plural condition also appeared to be highly significant for both word orders (both z's = 4,10; p < ,001). More NP-initial sentences were produced with definite NPs than with bare NPs (58,0% vs. 42,1% of all NP-initial sentences, respectively) and more NP-final sentences were produced with bare NPs than with definite NPs (86,4% vs. 13,6% of all NP-final sentences, respectively). This supports the claim that definite plural subjects are more often placed in preverbal position than bare plural subjects, and bare plural subjects are more often placed in postverbal position than definite plural subjects.

To further investigate the pattern of produced sentences picking up a PP, statistical analyses were performed on these cases separately. Recall that for this subset, a significant effect of the order of constituent presentation was found. An overview of the results of this subset of a total of 297 cases is given in Table 4. As can be seen in Figure 4, the number of sentences with a PP in sentence-initial position is larger than the number of sentences with a NP in sentence-initial position, for both types of NP. It is also larger for bare NPs than for definite NPs. As with the cases in which the NP was picked up, a binary logistic regression analysis was carried out. In this analysis, the independent factors were *NP type* (bare or definite) and *order of*

presentation. The dependent variable was the position of the PP in the produced sentence (which corresponds to an NP-V-PP word order when it was produced postverbally and to a PP-V-NP word order when it was produced preverbally). In the subset, the analysis showed a significant effect of *order of presentation* (Wald = 23,104; $\hat{\beta}$ = 4,680; p < ,001) as well as *NP type* (Wald = 18,159; $\hat{\beta}$ = 3,821; p < ,001). This suggests that, despite the effect of the order of presentation, the condition whether the subject was a bare plural or a definite plural contributed significantly to the number of produced sentences in either of the two word orders.

Table 4 Production of the two different word orders in experiment 1, for two types of NP (n=15). The PP constituent was picked up.

Pick up PP	**Produced word order**		
Condition	NP-V-PP	PP-V-NP	TOTAL
Bare plural	23	159	182
Definite plural	39	76	115
TOTAL	62	235	297

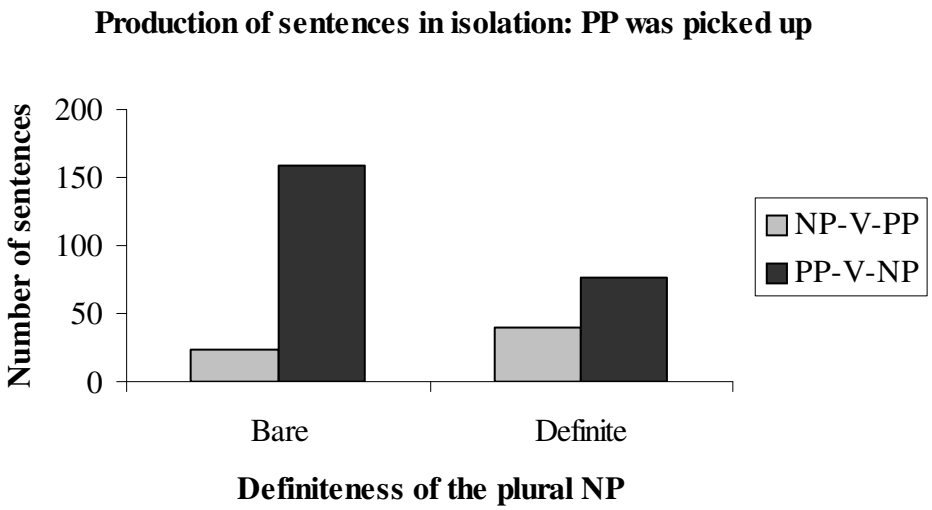

Figure 4 Total number of productions of the two different word orders in the drag-and-drop experiment with sentences presented in isolation, for the two types of NP. Only cases in which the PP constituent was picked up were taken into account.

Next, a proportion analysis was performed on this subset of the data, to determine the direction of the effect. Proportions were calculated for the position of the NP for both NP types (instead of the position of the PP, to make the proportions comparable to those of the cases where the NP was picked up). As in the cases where the NP was picked up, the difference between the NP-V-PP word order and the PP-V-NP word order was found significant for both types of NP (both z's = 4,39; p < ,001). However, the NP was produced more often in postverbal position than in preverbal position (87,4% vs. 12,6% of all bare NPs, respectively, and 66,1% vs. 33,9% of all definite NPs, respectively). This seems to be in contradiction with the Subject First principle. As already described above, the most plausible explanation is that participants had a preference to pick up the constituent that they wanted to drop in the left (preverbal) slot, in correspondence with the left-right reading order and incremental processing. The cases in which the PP was picked up would then for the most part represent sentences for which a PP-V-NP word order was preferred. If the hypothesis that there is a constraint that

avoids bare plurals in preverbal position is correct, it is expected that these cases are mostly sentences with a bare plural subject. This is exactly what was found in the proportion analysis: there are significantly more NP-final sentences with a bare plural subject than with a definite plural subject (67,7% vs. 32,3% of all NP-final sentences, respectively; $z = 4,39$; $p < ,001$). Conversely, there are significantly more NP-initial sentences with a definite plural subject than with a bare plural subject (62,9% vs. 37,1% of all NP-initial sentences, respectively; $z = 4,39$; $p < ,001$).

3. Experiment 2

3.1 Method

3.1.1 Participants

The same subjects participating in experiment 1 participated in experiment 2.

3.1.2 Materials

In the second experiment, the same sentences were used as in the first experiment. In addition, each sentence was preceded by a question. The question could either ask for the NP, in which case it was a who-question, or for the PP, in which case it was a where-question.[7]

Having two types of questions and bare and definite NPs, there were four conditions. As in experiment 1, the order in which the PP and the NP were presented differed, resulting in 8 conditions (2 question types, 2 NP types, 2 orders of presentation). The stimulus material consisted of 28 of such sets of 8 conditions. This yielded 28 x 8 = 224 items, as is exemplified in Table 4.

Table 4 Four different conditions in the experimental items from experiment 2, in two different orders of presentation, with examples of sentences as presented in the experiment. [8] Where = where-question; Who = who-question; BP = bare plural; DA = plural NP with definite article.

		Order of Presentation	
Question Type	**Plural NPs**	PP-NP	NP-PP
Where	BP	in de tuin kinderen Waar spelen kinderen? ……spelen……	kinderen in de tuin Waar spelen kinderen? ……spelen……
Who	BP	in de tuin kinderen Wie spelen in de tuin? ……spelen……	kinderen in de tuin Wie spelen in de tuin? ……spelen……

[7] No inanimate NPs were included in the experimental material, because this would lead to the inclusion of what-questions. In Dutch, like in English, what-questions cannot be used in case of a plural NP, or if not unacceptable, they are awkward (Coppen, Haeseryn & De Vriend, 2002). For example:

??Wat	liggen	in	de	kast?	In	de	kast	liggen	handdoeken.
what	are	in	the	cupboard	in	the	cupboard	are	towels

[8] in = in; de = the; tuin = garden; kinderen = children; spelen = play; waar = where; wie = who

Where	DA	in de tuin de kinderen Waar spelen de kinderen? ……spelen……	de kinderen in de tuin Waar spelen de kinderen ……spelen……
Who	DA	in de tuin de kinderen Wie spelen in de tuin? ……spelen……	de kinderen in de tuin Wie spelen in de tuin? ……spelen……

The material was distributed over 2 lists, such that the different conditions were spread equally over the lists, all verbs, NPs, PPs and question types occurred equally often on each list and each item occurred only once on one of the lists. Thus, from each set 4 items occurred on a given list, 2 with the bare NP and 2 with the definite NP; 2 with a who-question and 2 with a where-question. Care was taken that the order of the NP and the PP of the 4 items differed and that each order occurred equally often on a given list. Each list was divided into 4 blocks, with 44 items per block. Each block contained a different item from a set. In this way, items from the same set were kept as far apart as possible.

To each list 64 filler items were added. These filler items were similar to those of experiment 1, the only difference being the question preceding the drag-and-drop stimulus, as described above. In addition to the filler items, 12 response items were included, randomly distributed over the list. As in experiment 1, care was taken that there was no repetition of lexical items between experimental items and filler items or in the response items. In this experiment lists were also duplicated.

3.1.3 Procedure

Since the procedure for experiment 2 was very similar to that of experiment 1, only differences will be reported. In this experiment, an item started by presenting the question on the screen first (recall that there were two different questions: a who-question consisting of the word *wie* 'who', a verb and a PP, and a where-question consisting of the word *waar* 'where', a verb and an NP). Participants had been instructed to read the question carefully. After 1500 ms, the verb with the dotted lines and the two phrases appeared on the top of the screen. The participant's task was to form a plausible answer to the question. S/he had 5000 ms for this task. This was 1000 ms shorter than in experiment 1, because here the participant had already read the question before the drag-and-drop stimulus appeared on the screen, so s/he knew with which elements a sentence had to be built. The procedure to form the answer to the question was the same as in experiment 1: the participant had to drag and drop one of the phrases to one of the slots beside the verb. When the 5000 ms had passed without a sentence being formed, the next item was started automatically. After each item an asterisk shortly appeared on the screen.

Each participant saw 1 list of 4 blocks. As in experiment 1, participants started with a short practice block with 14 items similar to those in an experimental block. It took participants approximately 25 minutes to complete the experiment.

3.2 Results

All sixteen original partipants were included in the analysis of the data, since none of them showed a deviant pattern. As in experiment 1, individual items that had reaction times of over 3 standard deviations from the overall mean were removed from the analysis. This included 1 item. Reaction times of over 2,5 standard deviations from the participant's mean were set to the mean. This included 30 items, equally spread over the conditions. In the response items

there was only one case of a wrong answer of one of the participants. From this I conclude that all participants paid enough attention to produce reliable data.

The results of experiment 2 are presented in Table 4 and Figure 4.

Table 4 Production of the two different word orders in experiment 2, for two types of NP and with two types of preceding questions (n=16).

		Produced word order		
Question Type	**Condition**	NP-V-PP	PP-V-NP	TOTAL
Where	Bare plural	311	137	448
	Definite plural	323	125	448
Who	Bare plural	374	74	448
	Definite plural	365	82	447
	TOTAL	1373	418	1791

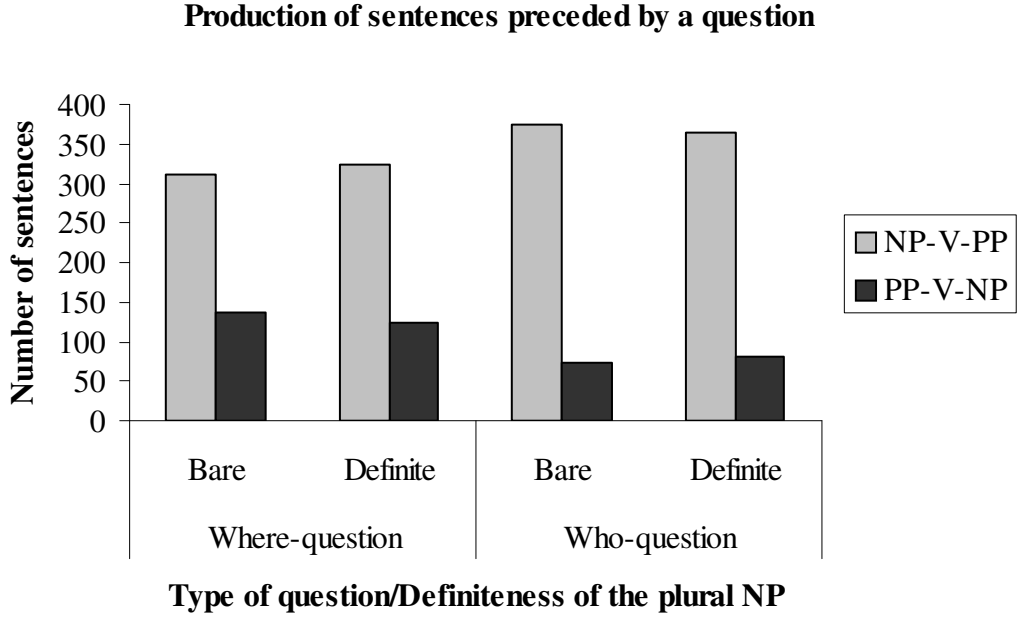

Figure 4 Total number of productions of the two different word orders in experiment 2, for the two types of NP and with two types of preceding questions.

When an item was preceded by a question, the same preference to put the NP in first position, irrespective of definiteness, is observed as in experiment 1 (Table 4 and Figure 4). However, in contrast to the findings in experiment 1, no clear difference in the production of PP-V-NP word orders between bare and definite NPs is found. When preceded by a who-question, a definite NP occurs even slightly more often in postverbal position than a bare NP. This is the opposite of what was predicted.

There is, however, a difference in the number of sentences produced with the PP in first position built after a where-question and after a who-question, with a higher proportion of PP-initial sentences following a where-question than a who-question (262 sentences vs. 156 sentences, respectively, bare and definite combined). If it were the case that the topic-focus structure followed left-right word order in most cases, where-questions should force the PP in the answer to be in standard focus position, and a higher number of NP-initial sentences would be predicted following where-questions than following who-questions. As can be seen in Table 4, this is clearly not the case. There is a proportion of 634 NP-initial sentences for items following a where-sentence and 739 for items following a who-question. Similarly, who-

questions would force the NP in the answer to be in standard focus position, which would cause the PP to be in preverbal position. Thus, items preceded by who-questions were predicted to have higher proportions of PP-initial sentences. This is also inconsistent with the data, which show only 156 PP-initial sentences following a who-question, vs. 262 following a where-question (see Table 4 and Figure 4).

On the data of experiment 2 a binary logistic regression analysis was carried out. *NP type*, *question type*, *picked up constituent* and *order of presentation* were the independent variables. The position where the picked up constituent was dropped was the dependent variable. As in experiment 1, a significant effect of the order of presentation of the constituents on the computer screen was found (Wald = 24,961; $\hat{\beta}$ = 2,985; p < ,001), as well as for the picked up constituent (Wald = 137,555; $\hat{\beta}$ = 16,705; p < ,001). *NP type* and *question type* were not significant (Wald = ,005; $\hat{\beta}$ = 1,013; p = ,946 and Wald = 2,557; $\hat{\beta}$ = 1,368; p = ,110, respectively). In contrast to experiment 1, however, the order of presentation effect appeared in items in which the NP was picked up (Wald = 5,425; $\hat{\beta}$ = 3,271; p = ,020) as well as in items in which the PP was picked up (Wald = 19,304; $\hat{\beta}$ = 2,912; p < ,001). Because in experiment 1 the effect was not significant with the NP as the picked up constituent, these cases were examined more closely for the present experiment as well. A separate analysis of the items preceded by a who-question showed no effect of the order of presentation (Wald = 2,115; $\hat{\beta}$ = 2,654; p = ,146). Finding no order of presentation effect for those instances in which participants picked up the NP and which are preceded by a who-question gives us the possibility to select a subset of the data that is not affected by the order of presentation effect. An overview of the results of this subset of a total of 696 cases is given in Table 5. As in the complete data set, the number of sentences with an NP in sentence-initial position is larger than the number of sentences with a PP in sentence-initial position, for both types of NP (see also Fig. 5).

Table 5 Production of the two different word orders in experiment 2, for two types of NP preceded by a who-question (n=16). Only the cases in which in which the NP was picked up were taken into account.

NP pick up		**Produced word order**		
Question Type	**Condition**	NP-V-PP	PP-V-NP	TOTAL
Who	Bare plural	345	6	351
	Definite plural	339	6	345
	TOTAL	684	12	696

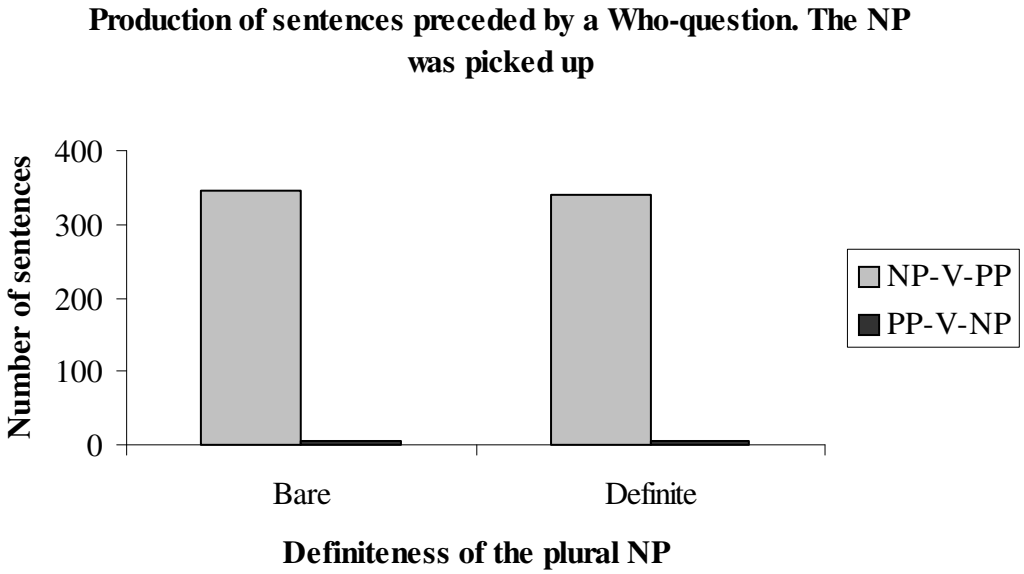

Figure 5 Total number of productions of the two different word orders in experiment 2, for the two types of NP, preceded by a who-question. Only the cases in which the NP was picked up were taken into account.

By only considering these items, almost all differences between the bare and definite condition that were found in Table 4 and Figure 4 have disappeared. The number of NP-V-PP word orders is about the same for bare plural subjects as for definite plural subjects. Furthermore, there are only a few cases of a PP-V-NP word order left (see Fig. 5). Statistical analyses showed that *NP type* was not significant (χ^2 = ,001; p = ,959) (Wald = ,003; $\hat{\beta}$ = 1,030; p = ,959) [Chi-square of bin regr?]. This is in contrast to the first experiment, in which the sentences were presented without any context. These results suggest that the effect of bare versus definite plural subjects is eliminated when information structure is manipulated. To see if these results generalize to the sentences preceded by a where-question, a binary logistic regression analysis was performed on these cases. This showed no effect of definiteness for sentences preceded by a where-question (Wald = ,874; $\hat{\beta}$ = ,553; p = ,350). At the same time, the effect of the order of presentation found in the overall analysis for cases in which the NP was picked up had lost significance (Wald = 3,378; $\hat{\beta}$ = 4,245; p = ,066).

To further investigate the pattern of produced sentences picking up a PP, statistical analyses were performed on these cases separately. Recall that for this subset, a significant effect of the order of constituent presentation was found. An overview of the results of this subset of a total of 509 cases is given in Table 6. As can be seen in Figure 6, the number of sentences with a PP in sentence-initial position is larger than the number of sentences with an NP in sentence-initial position, for both types of NP. It is also larger for sentences preceded by a where-question than for sentences preceded by a who-question. The difference between bare NPs and definite NPs seems not so large. A binary logistic regression analysis was carried out on the subset. In this analysis, the independent factors were *NP type*, *question type* and *order of presentation*. The dependent variable was the position of the PP in the produced sentence (which corresponds to an NP-V-PP word order when it was produced postverbally and to a PP-V-NP word order when it was produced preverbally). In the subset, the analysis showed a significant effect of the order of presentation (Wald = 19,304; $\hat{\beta}$ = 2,912; p < ,001), while NP type was not significant, as expected (Wald = ,147; $\hat{\beta}$ = 1,087; p = ,701). Question type was marginally significant (Wald = 3,721; $\hat{\beta}$ = 1,527; p = ,054). This suggests that all differences between sentences with bare and definite plurals and between sentences preceded by who-questions and where-questions are to be ascribed to the effect of the order of presentation.

Thus, when a PP was picked up, the position where it was dropped was only determined by whether it originated from the top or the bottom slot.

Table 6 Production of the two different word orders in experiment 2, for two types of NP and with two types of preceding questions (n=16). The PP was picked up.

PP pick up		**Produced word order**		
Question Type	**Condition**	NP-V-PP	PP-V-NP	TOTAL
Where	Bare plural	26	130	156
	Definite plural	33	121	154
Who	Bare plural	29	68	97
	Definite plural	26	76	102
	TOTAL	114	395	509

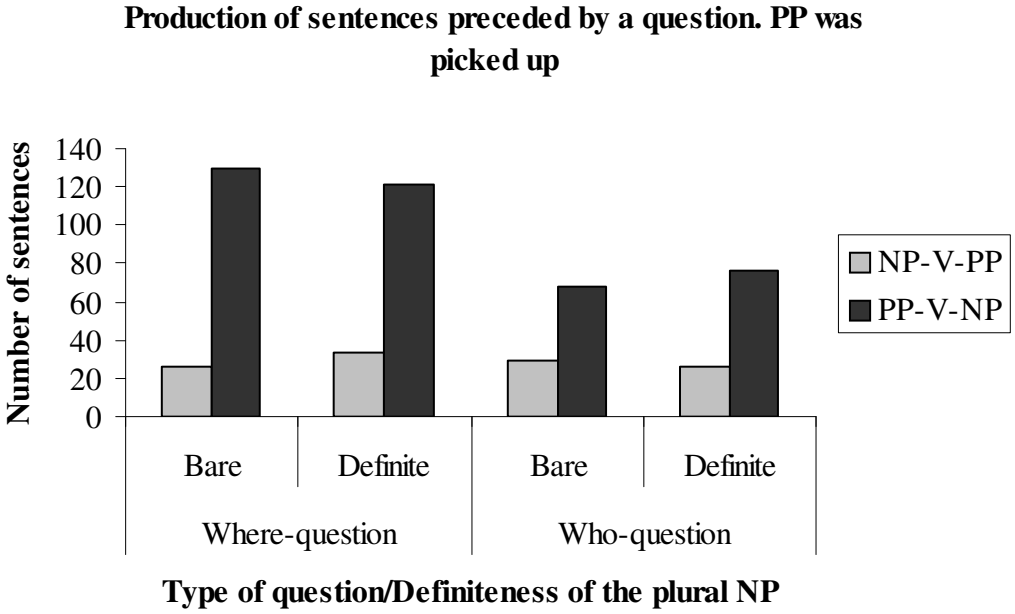

Figure 4 Total number of productions of the two different word orders in experiment 2, for the two types of NP and with two types of preceding questions. Only the cases in which the PP was picked up were taken into account.

4. Analysis of the results

In the experiments described above, three hypotheses were tested:
I) If the Subject First principle is a very strong constraint, subjects will be produced preverbally in most cases, irrespective of their definiteness.
II) If the avoidance of bare plurals in standard topic position is an important constraint, there will also be a number of cases in which subjects are produced postverbally when they are bare plurals, but not when they are definite plurals.
III) When information structure is manipulated by asking a focus question, the constituent that contains the new information will be produced postverbally, in the standard focus position, regardless of the type of constituent involved or the definiteness of the subject.

The first hypothesis – subjects will be produced preverbally in most cases – was verified by the results of experiment 1. As was shown, both for bare plural subjects and for definite plural

subjects the NP-V-PP word order was produced in the majority of the cases. This means that there was an overall preference to place the subject in preverbal position, regardless of its definiteness.[9] From this we can conclude that the Subject First principle is a strong constraint in Dutch.

The second hypothesis – bare plural subjects are produced postverbally more than definite plural subjects – is also supported by the results of experiment 1. When the subject is a bare plural, it is more often placed in postverbal position than when it is a definite plural. This is consistent with the prediction that non-specific NPs will be avoided in preverbal position. Recall that in postverbal position, bare plurals normally obtain an unmarked (i.e. existential) interpretation, while in preverbal position a type shift to a more complex generic reading is required. However, it is clear that these considerations may be of less importance than the syntactic preference to start with the subject of the sentence. Apparently, the fact that with bare plurals this unmarked word order leads to a more complex (i.e. generic) interpretation is a minor problem for the participants.

The third hypothesis – new information is produced postverbally –, which was tested in experiment 2, is only partially supported by the data. The analyses showed that manipulation of information structure indeed cancelled the effect of the definiteness of the NP found in experiment 1, as predicted: the differences in produced word orders between sentences with a bare plural subject and a definite plural subject have disappeared. However, the overwhelming majority of sentences produced after both who- and where-questions have the subject in the initial position, resulting in many NP-V-PP and few PP-V-NP word orders, irrespective of the definiteness of the NP. This suggests that while the preference to avoid bare plurals in standard topic position seems to be overruled by manipulation of information structure, the Subject First principle remains a strong constraint. More importantly, the constituent that was asked for in the question (i.e. the NP in a sentence preceded by a who-question and the PP in a sentence preceded by a where-question) was not produced in postverbal, standard focus position in the majority of cases, as was predicted. On the contrary, sentences preceded by a where-question have more PPs in preverbal position than sentences preceded by a who-question. Conversely, sentences preceded by a who-question have more NPs in preverbal position than sentences preceded by a where-question. This means that the hypothesis that the constituent containing the new information will be produced in postverbal, standard focus position is falsified by these data. Instead, the new information – information that was asked for in the question (i.e. the answer to the question) – is put in sentence-initial position. The old information – the constituent that was already mentioned in the question – then automatically ends up in sentence-final position. This results in a situation in which the preference to start a sentence with the topic and to postpone new information to a postverbal position seems to be violated. It is likely that some other preference is at work here, which is strong enough to overcome the effect of definiteness and of iconicity of topic-focus structure, but which is not as strong as the Subject First principle.

I suggest the following explanation. The constituent that the question asked for consists of new information, information that is desired by the poser of the question. The remaining material in the sentence is old information; it is identical to the material in the preceding question. In natural language, it seems very inefficient to start the answer to a question by repeat-

[9] Recall that in the drag-and-drop experiment participants could pick up the NP (the subject) or the PP, and drop it on either side of the verb. The remaining slot was then automatically filled in. Picking up the NP and placing it in preverbal position thus yielded the same result as picking up the PP and placing it in postverbal position. One could argue that placing the PP postverbally cannot be considered evidence for a subject first preference, but rather points to a preference to avoid preverbal PPs. A binary logistic regression analysis only considering constituents that were placed preverbally revealed however that there is still a significant difference between the bare and definite condition with respect to which constituent (NP or PP) is placed preverbally (Wald = 39,825; $\hat{\beta}$ = ,350; p < ,001), despite a significant order of presentation effect (Wald = 5,916; $\hat{\beta}$ = ,664; p = ,015).

ing part of that question. It is clearly more common to come straight to the point and give the desired information as soon as possible. Often, the complete answer to a question consists only of the new information. The rest is considered redundant and is therefore usually omitted from the sentence.

In the experiment, producing elliptic sentences was not possible: participants could only answer in complete sentences. It might have been the case, however, that this did not keep them from starting their answer with the new information right away. The new information asked for by a where-question is in the PP, for a who-question it is in the NP. If the new hypothesis is correct, answers to where-questions should therefore be PP-initial; answers to who-questions should be NP-initial. Table 4 and Figure 4 indeed show a higher proportion of PP-initial sentences for the where-question than for the who-question. However, NP-initial sentences are far more frequent in both conditions, again showing the superiority of the Subject First principle.

Above, I discussed various constraints on the production of sentences. These constraints could be strong or weak, and the stronger ones could overrule the weaker ones. The Subject First principle, for example, was found to be a very strong constraint, which seemed to be more important than the constraint to avoid non-specific NPs in preverbal position. Such a discussion in terms of constraints lends itself perfectly for an Optimality Theoretic approach (Prince & Smolensky, 1993). I will now present an OT analysis of the findings described above. First, I will define the relevant constraints introduced earlier in a more systematic way. Then, I will give the ordering of the constraints that leads to the optimal outcomes. Finally, I will propose an analysis that can explain the different proportions of optimal and sub-optimal sentences in the number of produced sentences.

The constraints I will use in the OT analysis are the following:

SUBJECTFIRST:	start a sentence with the subject.
*PRE/NSPEC:	avoid non-specific NPs in preverbal position.[10]
TOPICFIRST:	start a sentence with the topic.
ANSWERQ:	start the answer to a question with the new information.

For experiment 1, in which participants were not presented with any context, only the first two constraints are relevant, since without any preceding context topic, focus, old and new information cannot be determined. We have already seen that the Subject First principle was the stronger constraint: subjects were put in preverbal position, regardless of their definiteness. The OT tableaux should thus look like this:

(8) OT syntax tableau: optimal placement for bare plural subjects

	input: bare plural subject	SUBJECTFIRST	*PRE/NSPEC
☞	Kinderen spelen in de tuin[11]		*
	In de tuin spelen kinderen	*	

(9) OT syntax tableau: optimal placement for definite plural subjects

	input: bare plural subject	SUBJECTFIRST	*PRE/NSPEC
☞	De kinderen spelen in de tuin		

[10] This constraint was introduced by Yang and Van Bergen (2007), as part of a constraint hierarchy that accounted for Differential Object Marking in Chinese.

[11] kinderen = children; spelen = play; in = in; de = the; tuin = garden

	In de tuin spelen de kinderen	*	

As can be seen in tableaux (8) and (9), placing the subject, either bare or definite, in postverbal position yields a violation of SUBJECT FIRST. Bare plural subjects in preverbal position violate *PRE/NSPEC, but since this constraint is ranked lower, the violation of SUBJECTFIRST is fatal.

For experiment 2, in which participants were presented with a question to which they had to form the answer, all four constraints have to be taken into account. As noted above, manipulation of topic-focus structure by posing a question overrules the constraint to avoid non-specific NPs in preverbal position: all differences between bare and definite plurals are levelled out. This means that TOPICFIRST should be ranked higher than *PRE/NSPEC. It was also found that new information was put in sentence-initial position rather than in postverbal, standard focus position. For this preference I introduce the constraint ANSWERQ, which should outrank TOPICFIRST, but not SUBJECTFIRST, as the latter remains the most important (most subjects are produced preverbally, independent from the other conditions). Thus, the tableaux for production of sentences preceded by a question should be like the following:

(10) OT syntax tableau: optimal placement for bare plural subjects preceded by a Who-question

	input: Wie spelen in de tuin?, bare plural subject	SUBJECT-FIRST	ANSWERQ	TOPICFIRST	*PRE/NSPEC
☞	Kinderen spelen in de tuin			*	*
	In de tuin spelen kinderen	*	*		

(11) OT syntax tableau: optimal placement for definite plural subjects preceded by a Who-question

	input: Wie spelen in de tuin?, definite plural subject	SUBJECT-FIRST	ANSWERQ	TOPICFIRST	*PRE/NSPEC
☞	De kinderen spelen in de tuin			*	
	In de tuin spelen de kinderen	*	*		

(12) OT syntax tableau: optimal placement for bare plural subjects preceded by a Where-question

	input: Waar spelen kinderen?, bare plural subject	SUBJECT-FIRST	ANSWERQ	TOPICFIRST	*PRE/NSPEC
☞	Kinderen spelen in de tuin		*		*
	In de tuin spelen kinderen	*		*	

(13) OT syntax tableau: optimal placement for definite plural subjects preceded by a Where-question

	input: Waar spelen de kinderen?, definite plural subject	SUBJECT-FIRST	ANSWERQ	TOPICFIRST	*PRE/NSPEC
☞	De kinderen spelen in de tuin		*		
	In de tuin spelen de kinderen	*		*	

In tableau (10), *in de tuin* 'in the garden' appears in the who-question and thus should be the topic of the answer. The first candidate does not have the topic in sentence-initial position and therefore violates TOPICFIRST. It also violates *PRE/NSPEC, because it has a bare plural in preverbal position. Still, the first candidate, with the subject in initial position, is the optimal

one, because the second candidate violates SUBJECTFIRST, the highest ranked constraint. The second candidate also violates ANSWERQ, because this sentence does not start with the new information (i.e. 'the children'). The definite plural subjects in tableau (11) have a similar analysis, the only difference being that *PRE/NSPEC does not apply here.

In tableaux (12) and (13), in which a where-question is in the input, the violation pattern for SUBJECTFIRST and *PRE/NSPEC is the same as for tableaux (10) and (11). However, the pattern for ANSWERQ and TOPICFIRST is reversed. Nevertheless, the first candidates, with the subjects in initial position, come out as optimal, because SUBJECTFIRST is still the highest ranked constraint.

The above OT analysis corresponds to the results of the two experiments in that the NP-V-PP word order (subject in preverbal position) always comes out as optimal and this is also the word order of most produced sentences (cf. Fig. 2 and 4). However, in the experiments, significant differences in the number of produced sentences between conditions were found as well. The above analysis cannot account for these differences. Because of the strict domination of the constraints, a lower ranked constraint can never become more important than a higher ranked constraint to yield a different outcome.[12] Strict domination of constraints, however, does not mean that lower constraints can never have any influence on the outcomes. Indeed, the violation(s) determine(s) which candidate is optimal (and thus should always be the winner), but that does not mean that suboptimal candidates never occur. Lower ranked constraints can contribute to the pattern of which candidates are more and which are less frequent, although their strength fades as they are lower in the ranking.

To make the lower ranked constraints contribute to the outcome of the OT analysis, I propose to give weights to the constraints. The higher the constraint, the higher is its weight. In my analysis, to the highest constraint (SUBJECTFIRST) a weight of 1 was assigned. Every subsequent constraint in the ranking got a weight half the value of its left neighbour. In this way, an in principle infinite number of constraints can be included, without the weights getting to zero or even negative: all constraints included have an effect on the harmony value of the output, however small. Thus, the weights for the four constraints defined above are as follows:

SUBJECTFIRST:	1
ANSWERQ:	0,5
TOPICFIRST:	0,25
*PRE/NSPEC:	0,125

Every violation of a constraint is multiplied by the corresponding weight. Now, for every candidate a value can be calculated by adding up the weighted violations for that candidate. By dividing this value by the total value of weighted violations for all candidates, a proportion is obtained that, when subtracted from 1, could be seen as the frequency of that candidate. I will give an example with tableau (13), repeated here as (13a), with weights added.

(13a) OT syntax tableau: optimal placement for definite plural subjects preceded by a Where-question

	input: Waar spelen de kinderen?, definite plural subject	SUBJECT-FIRST	ANSWERQ	TOPICFIRST	*PRE/NSPEC
	Weights	*1*	*0,5*	*0,25*	*0,125*
☞	1. De kinderen spelen in de tuin		*		
	2. In de tuin spelen de kinderen	*		*	

[12] Unless you take a stochastic OT approach, see Boersma and Hayes (2001).

The weighted violation value for candidate 1 is (1 x 0,5 =) 0,5, while it is (1 x 1 + 1 x 0,25 =) 1,25 for candidate 2. The total weighted violation value is then 1,75, giving the proportions 0,286 and 0,714 for candidate 1 and 2, respectively. Because the proportions now represent the total of the violations of a candidate, where they should represent the total of the satisfactions, they should be subtracted from 1. This gives 0,714 for candidate 1 and 0,286 for candidate 2. The frequency of occurrence of *De kinderen spelen in de tuin* 'The children are playing in the garden' should thus be 71,4%, while for *In de tuin spelen de kinderen* 'In the garden, children are playing' it should be 28,6%.

The calculations are made for all six tableaux (8) to (13), and the resulting percentages are summarized in table 6. For the production of sentences without a preceding question the constraints ANSWERQ and TOPICFIRST are irrelevant, so here *PRE/NSPEC got a weight of 0,5.

Table 6 Predicted frequency percentages for the production of sentences with a bare plural or definite plural subject, calculated on the basis of weighted violation values.

Question type	**Definiteness of the NP**	**Predicted frequency percentages**	
		NP-V-PP	**PP-V-NP**
No question	Bare plural	66,7%	33,3%
	Definite plural	100%	0%
Who	Bare plural	80%	20%
	Definite plural	85,7%	14,3%
Where	Bare plural	66,7%	33,3%
	Definite plural	71,4%	28,6%

The percentages presented in Table 6 can be compared to the proportions found in the two drag-and-drop experiments. To this end, Tables 2 and 4 above are combined and from the numbers percentages are calculated. The result is shown in Table 7.

Table 7 Production of the two different word orders in experiment 1 and 2, for two types of NP and with two types of preceding questions (n=31). Percentages of the total number of produced sentences per condition.

Question Type	**Definiteness of the NP**	**Produced word order**		
		NP-V-PP	PP-V-NP	TOTAL
No question	Bare plural	57,4%	42,6%	418
	Definite plural	81,1%	18,9%	417
Who	Bare plural	83,5%	16,5%	448
	Definite plural	81,7%	18,3%	447
Where	Bare plural	69,4%	30,6%	448
	Definite plural	72,1%	27,9%	448
	TOTAL	74,3%	25,7%	2626

Comparing Table 7 to Table 6, the percentages of the actually produced sentences correspond nicely to the percentages predicted by the weighted OT model. In most conditions they deviate only slightly from each other. In sentences with a definite plural subject and no context given, in 18,9% of the cases a PP-V-NP word order was produced, while the model would predict none. Also, when preceded by a who-question, NP-V-PP word orders were expected to be slightly more frequent than PP-V-NP word orders. The data show the opposite, but the differences remain small.

5. Conclusion

In this thesis, I have shown that bare plural subjects in Dutch can occur either pre- or postverbally, while definite plural subjects are normally produced in preverbal position. I have argued that this can be explained by the fact that bare plurals cannot be interpreted specifically, which makes them less good candidates for a position that is usually occupied by the topic of the sentence. However, the preference to start a sentence with the subject is so important, that it can overrule the preference to avoid preverbal non-specific NPs. The results of the first drag-and-drop experiment indeed show a clear preference for the subject to be put in sentence-initial position, and significantly more cases of postverbal subjects in the bare plural condition than in the definite plural condition were found.

I have further shown that these differences in placement between bare and definite plural subjects can be levelled out by manipulating topic-focus structure. In a second drag-and-drop experiment, posing a question that made either the NP or the PP the new information in the answer to be produced diminished the effect of definiteness on the produced word order. However, manipulating information structure could not overrule the Subject First principle: subjects were still highly preferred in sentence-initial position. Furthermore, the new information was not put in postverbal position, the standard focus position, as expected. On the contrary: there were significantly more cases where the new information was placed preverbally. This led to the conclusion that participants were trying to answer the questions like they would in colloquial speech: only giving the new information, and not repeating the old information from the question, since this is redundant information. Because in the experiment answering in complete sentences was inevitable, the old information was repeated. Once the first constituent was picked up and put in a position, the second constituent was placed in the remaining position by an automatic process.

Finally, an OT analysis that took into account the constraints that were assumed to be at work in the two drag-and-drop experiments (two in the first, four in the second) correctly predicted the optimal outcomes found in the results. To be able to see the effect of the lower ranked constraints, I proposed to weight the constraints such that proportions could be calculated that would represent the frequencies of occurrence of suboptimal candidates. This approach seemed to predict the proportions found in the experiments remarkably well, especially for the second experiment.

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