

Relative ordering of prepositional phrases in Dutch

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July 2013

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Table of contents

1	Introduction.....	4
2	Literature study.....	6
2.1	Theory 1: Grammar external explanation: Hawkins's PGCH.....	6
2.1.1	Syntactic preferences: Minimize Domains (MiD)	7
2.1.2	Semantic preferences: combinatorial and dependency relations	7
2.1.3	PGCH predictions.....	8
2.1.3.1	English.....	9
2.1.3.2	Japanese.....	10
2.1.4	Predictions for Dutch.....	10
2.1.4.1	D-structure.....	11
2.1.4.2	S-structure.....	11
2.1.5	Critical appraisal of Hawkins	14
2.2	Theory 2: grammar internal explanations	15
2.2.1	Barbiers	15
2.2.2	Cinque	21
2.2.3	Schweikert.....	25
2.2.4	Ruys	28
2.2.5	Summary	29
3	Grammaticality judgement task.....	31
3.1	Method	31
3.2	Results	32
3.3	Conclusion and discussion.....	36
4	Preference task	37
4.1	Method	37
4.1.1	VP-topicalisation.....	37
4.1.2	Extraction	39
4.1.3	MiD and dependency	39
4.2	Results	40
4.2.1	VP-topicalisation.....	40
4.2.2	Extraction	41
4.2.3	Length and dependency.....	42
5	Conclusion and discussion.....	44
5.1	Grammaticality judgement task.....	44
5.2	Preference task	45
5.3	General discussion.....	46
6	Bibliography.....	47
7	Appendices.....	48
7.1	Appendix 1: test sentences in Grammaticality Judgement task	48
7.2	Appendix 2: tables for Grammaticality Judgement Task	50
7.3	Appendix 3: test sentences for Preference Task	56

Acknowledgments

I want to thank all participants for partaking in the experiments and my friends for showing interest in the progression. I owe thanks to Laura Meppelink in particular, for discipline and for placing things in perspective.

I owe thanks to my sister Tessa Sieswerda, who got me back to work, and my brother Eelco Hoogendoorn, who made me finish my work. I thank my mother Ellie Chatrer for her patience and for expressing her support.

Marloes Hemmen and Tessa were so kind as to share their knowledge of statistics with me. I thank Sander van der Woude for the illustrations in this thesis. I am indebted to Machteld de Vos for proofreading at various stages. Naturally, all remaining errors are my own.

Many thanks go out to my supervisor Sjef Barbiers for his feedback and the time and effort he put in supervising me.

1 Introduction

While many aspects of syntax are well classified, variation and limitations on variation in syntax form a non-trivial research domain in characterizing language. Not only are there competing theoretical frameworks that aim to explain variation within languages, but also the empirical characterization for these frameworks sometimes lacks.

A topic that poses a specific challenge in determining the cause of variation, is the ordering of multiple Prepositional Phrases (PP) within a language. On the surface it appears that the relative ordering of these PPs allows a lot of variation, without necessarily altering a sentence meaning. For instance, the English sentences 'John waited for his father in the hallway' and 'John waited in the hallway for his father' have the same meaning, whereas other constituents in the sentence cannot be swapped without it resulting in an infelicitous sentence. The limitations on the scrambling possibilities, both within a language and in between languages, pose a challenge to theorists who aim to describe what (universal) principles underlie sentence structure in general, and multiple PPs in particular.

Specifically in Dutch the variation in multiple PP orderings seems interminable. Like in English, in a sentence with two PPs, the two PPs can be scrambled without this having an effect on the meaning of the sentence. Compare:

Jan _S	heeft _{aux}	met Marie _{PP1}	over voetbal _{PP2}	gesproken
John	has	with Marie	about football	spoken
Jan _S	heeft _{aux}	over voetbal _{PP2}	met Marie _{PP1}	gesproken
John	has	about football	with Marie	spoken

Furthermore, Dutch allows PP-extrapolation, leaving one or more of the PPs right of the verbal element.

Given this seemingly wide range of possibilities in orderings due to movement operations possible in the Dutch sentence, Dutch poses a challenge. Although attempts have been made to describe and explain variation in multiple PP orderings for a limited number of languages, none of those theories seems easily applicable to Dutch or make straightforward predictions. If, given the challenges the word order of Dutch sentences pose, a theory makes correct predictions for the orderings of PP, this would contribute significantly to the veracity of such a theory.

According to John Hawkins (2000, 2004), variation in word order is to a large extent determined by language external elements, most importantly processing. According to him, the cognitive processing of a sentence requires certain elements of a sentence to be placed closer or further apart, in order for hearers to be able to assign semantic or syntactic properties to the respective elements in a sentence. Hawkins did corpus research to test the validity of his claim that ease of processing of both structural and interpretative relations between PPs and the verb (or verbal elements) determines word order for Japanese and English.

However, contrary to Hawkins's convictions and findings, other authors argue in favour of a radically different approach, in which different PP-types – such as temporal, manner or comitative PPs- have an underlying, fixed order. Different languages pose different limitations to movement operations creating variation. Although at surface sentence structure different orders occur, both within one and amongst different languages, a fixed order should be derivable.

As briefly outlined above, according to Hawkins sentence structure is determined by language external elements. Particularly processing is said to play a defining part. According to others, sentence structure

and the limitations on sentence structure is determined by language internal elements, more specifically internal grammar. Several authors have argued in favour of a fixed order of prepositional phrases at deep structure. Whereas Hawkins's hypothesis seems to be challenged by the variety of possible surface orderings in Dutch, the same holds for the theoretical, language internal approaches. As far as known with the author, only Barbiere (1995) applies his own theory to Dutch. Other than that, no reference to Dutch examples it made. This theory has since then developed further away from semantics towards a more syntactic account. I set up a study to examine which of the two theories applies to Dutch sentences with two different PPs. The study consists of a literature study on the one hand and two empirical tests; a grammaticality judgement task and a preference task of sentences with two PPs on the other hand.

The aim of the literature study is to get an overview of what the two different lines of thought as presented above predict for sentences with two PPs in Dutch. I also aim to describe the diagnostics presented in those studies that can be deployed for a pilot study. I will describe both what a language-external theory, such as Hawkins's, predicts, as well as what language-internal explanations predict for Dutch, in order to assess which these two seemingly opposing theories withstands.

This pilot study, involving a grammaticality judgement task and a preference task, seeks to derive if native speakers of Dutch show preference for a fixed order of different thematic PPs and whether length and dependency relation play a part in this. The hypothesis for this study is that an order can be found and that it will show resemblance with the German order found by Schweikert (2005).

2 Literature study

In this chapter I give an overview of theories briefly discussed in the introduction. The two opposing lines of thought were chosen because they disclose an interesting contrast of a language internal versus external explanation. It is conceivable that the theories might not be exact opposites, but could complement each other. I will first discuss Hawkins's Performance-Grammar Correspondence Hypothesis and I will assess to what extent this hypothesis is applicable to Dutch PPs. In section 2.2 I will discuss various other authors, all of whom argue restriction in orderings are determined by grammar.

2.1 Theory 1: Grammar external explanation: Hawkins's PGCH

As stated in the introduction, an explanation for the seemingly random ordering of multiple PPs in Dutch could maybe be found outside syntax, possibly even outside the language faculty. John Hawkins proposes a hypothesis according to which grammar is hugely determined by processing principles – principles not part of a narrow linguistic faculty but a broader psychological one, not specific to language.

According to Hawkins, grammar is heavily influenced by performance. As opposed to scholars who argue that most syntactic features are determined grammar internal, he states that grammars are for the larger part shaped by efficiency in processing language. Hawkins even claims that grammars are simply 'frozen' or 'fixed' performance preferences. In order to account for correspondence between grammars and performance, he proposes the Performance-Grammar Correspondence Hypothesis (hereafter referred to as PGCH):

Grammars have conventionalized syntactic structures in proportion to their degree of preference in performance, as evidenced by patterns of selection in corpora and by ease of processing in psycholinguistic experiments. (Hawkins 2004:3)

How does this claim relate to the problem described in the introduction, i.e. the seemingly random ordering of multiple PPs? Hawkins has devoted much attention to adjacency effects in sentences with multiple PPs (Hawkins 2000, 2004). According to Hawkins, most important to the relative ordering of sentences of the type [V [PP, PP]] is the principle of Minimize Domains (hereafter referred to as MiD), as repeated below:

The human processor prefers to minimize the connected sequences of linguistic forms and their conventionally associated syntactic and semantic properties in which relations of combination and/or dependency are processed. The degree of this preference is proportional to the number of relations whose domains can be minimized in competing sequences or structures, and to the extent of the minimization difference in each domain. (Hawkins 2004:31)¹

Simply put, language users profit from structures in which a relation between forms (syntactically or semantically) can be processed as soon as possible. In practice, this would mean that the components that establish a certain relation should be processed shortly after each other, since not only the forms themselves undergo a delay in processing, but also the relation between them that is dependent on the forms.

In a sentence with two PPs, with an intransitive verb in the VP, the PP adjuncts can alternate in place, as can be seen in (1) and (2):

(1) dat Jan_{aux} op de vroege ochtend_{PP1time} in de tuin_{PP2place} heeft gelopen
that Jan in the early morning in the garden has walked

¹ MiD is one of three principles that Hawkins describes under the flag of efficiency – a key term to PGCH –, the others being Minimize Forms (MiF) and Maximize Online-Processing (MaOP). These three principles are inevitably to a large extent intertwined. Since MiF and MaOP are of secondary importance for this particular topic I have decided to leave them out of this discussion.

(2) dat Jan_{aux} in de tuin_{PP₂place} op de vroege ochtend_{PP₁time} heeft gelopen
that Jan in the garden in the early morning has walked

Both sentences are grammatical, whether the TimePP or the PlacePP precedes the one or the other does not influence grammaticality². However, according to Hawkins, despite equal grammaticality, there will be a preference for one over the other. This is not influenced by the types of thematic PPs, as can be deduced from his PGCH. Instead, the preference is based on processing principles, which in turn are determined by other syntactic and semantic relations. Both the syntactic and semantic relations in play will be discussed below, starting with the former.

2.1.1 Syntactic preferences: Minimize Domains (MiD)

The first relevant principle which according to Hawkins influences the relative ordering of PPs, is the relative weight of the constituents competing for a position adjacent to the verb. The domain that is needed to construct a node and its daughter constituents should be kept as small as possible. In a [VP [PP, PP]]-type sentence, all relevant constituents, three in this case (V, PP and PP) need to be recognized in parsing before the underlying structure of a node VP with two daughter constituents PPs can be spelled out. To minimize this domain in which the syntax of the three constituents is recognized, these constituents should be as close together as possible. Assuming with Hawkins that encountering the head P enables the mapping out of the structure of the entire constituent PP, it also means that the preposition should be close to the dominating V to construct the VP. In order to minimize this domain, one should maximize the amount of structural information that can be derived from as little input as possible, which will enhance structural recognition.

How efficient a string of words is, can be determined by measuring the number of words or phrases that need to be parsed to be able to recognize the Immediate Constituents. Hawkins calculates the ease of processing the underlying structure by determining the IC-to-nonIC/word ratio in the following manner, taking sentence (1) and (2) as an example, repeated below:

(1) John [walks [**in** the garden]_{PP_{place}} [**in** the early morning]_{PP_{time}}]_{VP}
 1 2 3 4 5

(2) John [walks [**in** the early morning]_{PP_{time}} [**in** the garden]_{PP_{place}}]_{VP}
 1 2 3 4 5 6

In the first sentence, five words are needed to be able to assemble the basic information that we are dealing with a VP, containing a V and two PPs; the three Immediate Constituents are recognized in a domain of five words. In the second sentence, a total of six words is needed to derive the very same structure. For the first sentence, the IC-to-word ratio is calculated by dividing the number of IC's by the number of words in the domain of recognition, in this case 3/5=60%. For the second sentence the IC-to-word ratio is 3/6=50%. The higher the ratio; the greater the processing efficiency. If there is a weight difference – determined by number of words – between two PP constituents in a vp[V [PP, PP]] type sentence, this will automatically influence the IC-to-word ratio.

2.1.2 Semantic preferences: combinatorial and dependency relations

Not only the syntax, but also the meaning of the constituents involved plays a part in determining how efficient a certain word order is. Combinatorial or dependency relations between the V and one or both of the adjoining PPs can be of influence to the ordering of PPs. If one of the PPs has a semantic (cor)relation with V, in terms of PGHC it will want to be closer to the V to ease the processing of this relation. The rough division between PPs with or without tighter semantic relation is traditionally one between PPcomplements and PPadjuncts. Roughly, complements, as opposed to adjuncts, are governed by the verb as is shown in the sentence 'John waits for his father in the rain'. Intuitively the verb and the

² There might be slight semantic differences, but grammaticality is not disputed.

PP 'for his father' have a stronger relation than the verb and the PP 'in the rain'. Therefore, 'for his father' is a complement to the verb, and 'in the rain' is an adjunct. However, this provides no clear cut distinction. Therefore Hawkins describes two self-defined types of semantic relations that can interfere with the ordering of multiple PPs, namely combinatorial and dependency relations.

Hawkins gives the following definition of combinatorial relations:

Two categories A and B are in a relationship of combination iff (sic) they occur within the same mother phrase and maximal projections (phrasal combination), or if (sic) they occur within the same lexical co-occurrence frame (lexical combination). (Hawkins 2004:31)

By phrasal combination the elements that constitute an XP together are described ('the' and 'house' in the DP 'the house', 'reads' and 'the book' in the VP 'reads the book', etc.). This phrasal combination does not necessarily have to be expressed through adjacency; the combination relation can be expressed through agreement morphemes all the same, such as in Latin.

An example of lexical combination is case marking the arguments dominated by a verb, as is done in German where verbs can assign case to their complements (f.i. German 'to help' of which its complement noun takes a dative marker 'hilfen' + DAT). Again, the domain in which these relations are processed should be as small as possible to ease processing, which can be done by minimizing the number of terminal elements sufficient for processing a relation.

The second type of relation that Hawkins describes is that of dependency. Roughly, this means that the processing of one form is required in order to assign the correct properties to some other form. Hawkins's definition of lexical dependency is:

Two categories A and B are in a relation of dependency iff the parsing of B requires access to A for the assignment of syntactic or semantic properties to B with respect to which B is zero-specified or ambiguously or polysemously specified. (Hawkins 2004:31-2)

For instance, the meaning of the English verb 'to count', a much used example by Hawkins, is polysemous and therefore dependent on daughter constituents. When accompanied by an NP, as in 'John counted the sweets', the activity of counting is intended, whereas in 'John counted on his mother' the activity of relying on someone is intended. The entire meaning of the verb cannot be constituted from the verb itself; it is dependent on other information in the sentence. If the constituents are separated by other information/constituents, assignment of the right properties and/or meaning is delayed, and in Hawkins's terms not preferred (f.i. in 'John counted as a child the sweets' and 'John counted as a child on his mother').

2.1.3 PGCH predictions

Hawkins's theory makes different predictions for different languages, depending on the position of the verb relative to the object and depending on whether a language is head initial or head final (i.e. whether the head P precedes its argument or whether the head P follows its argument). English – a VO and head initial language – and Japanese – an OV and head final language – provide empirical evidence for Hawkins's claims on the position of multiple PPs.

Hawkins tested MiD and dependency predictions through corpus research (Hawkins 2000, 2004). For MiD the calculating of IC-to-word ratios suffices as demonstrated earlier in the chapter. Because the classic complement-argument distinction is not very rigid, Hawkins developed two tests, in order to determine whether a V and a P have some sort of semantic relation that could influence orderings.

The first test is the Verb Entailment Test, which scrutinizes whether a sentence of the type [V, [PP1, PP2]] entails V independently. For instance, this reveals a difference between 'waiting' and 'counting on':

'waiting for John' entails 'waiting', whereas 'counting on John' does not entail 'counting'. The verb 'counting' and the PP 'on John' must therefore be in a relation, since the verb is dependent on the following PP. Therefore, 'count' would be qualified as a dependent verb (V_d), whereas waiting is qualified as an independent verb (V_i).

The other test is the Pro-Verb Entailment Test, which tests whether V can be replaced with a pro-verb such as 'do something'. This can reveal a difference between verbs such as 'to play' and 'to be dependent'; 'John is playing in the garden' can be substituted by 'John is doing something in the garden', whereas 'John is depending on his father' cannot be substituted by 'John is doing something on his father', indicating that 'on his father' is dependent on the verb. Analogous to the Verb Entailment Test, the Pro-Verb Entailment Test results in the qualification of a PP_d or PP_i .

If indeed there is some sort of relation between one of the PPs and the V, a minimal domain between the two will be preferred to ease production and recognition of the verb. After all, if a V and a dependent PP (PP_d) are separated by a PP that has no lexical relation with the verb (PP_i), assignment of the proper meaning or particular properties is postponed until the head of PP_d is processed. Until that happens, no properties (unassignment) or even the wrong properties (described as *garden path* sentences) are assigned to the verb.

Hawkins used (self assembled) corpora to simply count the number of occurrences of different orderings, for both MiD and dependency. Naturally, syntactic and semantic preferences of multiple PPs can be in competition with each other, for instance when one of the PPs is significantly shorter, resulting in a higher IC-to-word ratio, and when at the same time the longer constituent has a dependency relation with the verb. In this way, the two principles pull in different directions. Equally so, they can reinforce one another when a short PP is also lexically dependent. Based on Hawkins's PGCH, cross-linguistically you expect to find both ordering options or even a combination of both within one language.

2.1.3.1 English

English, being a VO, and head initial language, has a structure which can be represented as:

[V [P-complement] [P-complement]]

In terms of MiD, Hawkins's theory predicts a short-before-long preference of PPs, which is already illustrated in (1) and (2):

(1) John [walks [**in** the garden] [**in** the early morning]]_{VP}
 1 2 3 4 5

(2) John [walks [**in** the early morning] [**in** the garden]]_{VP}
 1 2 3 4 5 6

By placing the shorter locative PP 'in the garden' first, the IC-to-word ratio is reduced, and should, in terms of efficiency, be preferred. This preference of short-before-long is exactly what Hawkins found in his two English corpora: when one of the PPs exceeded the other in word number by seven, the longer PP is placed furthest from the verb in 99% of the cases. When the one PP exceeds the other in length by only one word, there appears to be no strong preference, since in only a small majority (60%) of the sentences the longer PP is placed second (Hawkins 2000).

Since one would expect that PPs in a dependency relation want to be close to their head V, and therefore in the case of English in the leftmost position, we expect it to have an effect on the results of the IC-to-word ratio. In the performance data provided by Hawkins it shows that, when weight of the constituents are equal, a dependent PP precedes the independent PP in 83% of the cases, showing that there is indeed a strong lexical dependency effect. When the two preferences pull in different directions, the effect

of the lexical dependency decreases when the weight of the PP_d relative to the PP_i increases: when PP_d was five words longer than PP_i , it was placed further away from the verb than PP_i in 93% of the cases. When PP_d was longer by just one word, there was still a strong preference for placing PP_d adjacent to V: this is the case in 74% of the sentences.

2.1.3.2 Japanese

Japanese shows the mirror image of English in terms of basic word order; it is an OV and head-final language. Therefore, the mirror image of multiple PPs is also expected to be found; a long-before-short preference. The word order of a language like Japanese can be represented as follows:

[[complement-P], [complement-P] V]

Since calculation of the IC-to-word ratio starts with the head P, and therefore in this case after the complement accompanying the preposition (based on the assumption that the head provides sufficient information for spelling out the correct structure), we expect a long-before-short ordering of PPs, as it will increase the IC-to-word ratio and thereby minimizes the domain.

Hawkins tested this prediction on Japanese NP PP VP sentences (Hawkins 2004:108-110), in which the NP was a direct object containing an accusative case marker *o*, making the data comparable with English, since the case marker will function in the same way as the head P of a PP. When the difference in number of words between the PP and the NP was just one or two, the longer constituent was preposed in a slight minority of the cases; 66%. When the difference was nine words or more, the longer constituent was placed first in 91% of the cases. This is akin to English, where the longer phrase is also placed furthest from the head V.

The direct object is usually a complement and consequently will have a stronger relation with the verb than a PP. Based on that, one would expect to find tighter adjacency of NP to the head than PPs, again depending on the weight. Once more, this is confirmed by Hawkins's data, which shows that even when the NP is five words longer than PP, it will still be adjacent to V in 21% of the sentences. If, on the other hand, the PP is longer than the NP, it will be placed first in almost all the cases. If the difference is a mere one or two words, Hawkins found that 80% will have a PP NP V order.

2.1.4 Predictions for Dutch

For English and Japanese Hawkins's PGCH seems to make fairly accurate predictions about the distribution of different orderings of PPs. Hawkins has tested this prediction on these two languages only (with occasionally examples from for instance Hungarian or German).

However, where it gets more interesting, is in languages with a less straightforward word order, such as Dutch. Dutch is, like Japanese, an OV language, but is in other instances head initial just like English. This is a combination Hawkins has made no predictions for. What makes the matter rather more complex is that Dutch has two types of movement that make the possible surface orderings rather diverse: verb second (V2) and extraposition of PPs (PP-X).

Hawkins makes no mention of the level at which processing principles apply, i.e. before or after the various possible movement operations; at deep structure or sentence structure. The question is what Hawkins's PGCH, and in particular the principle of MiD, predicts for Dutch. Since it is unclear at which level syntactic and semantic processing applies, one can make predictions for both d-structure and s-structure. As will become clear below, whether it applies to the one or the other, both options disclose a number of convolutions in Hawkins's theory when it comes to Dutch.

2.1.4.1 D-structure

As mentioned before, Dutch is an OV language, which means that PPs are base-generated before the verb³. In terms of MiD, that would mean there is no preference in order whatsoever, since the calculating of the IC-to-word ratio starts with the head P of the entire constituent, and Dutch is head initial. Whether the longer or the shorter PP precedes the one or the other, does not influence the IC-to-word ratio:

- (3) vp[pp1[in de vroege morgen] pp2[in de tuin] loopt]
1 2 3 4 5 6 7 8 3/8=38%
- (4) vp[pp2[in het park] pp1[in de vroege morgen] loopt]
1 2 3 4 5 6 7 8 3/8=38%

However, although the IC-to-word ratio remains the same, the sentences are not equally felicitous. With neutral intonation sentence (4) poses a problem to Hawkins's assumption that both orders comparable in terms of processing. This is likely to be explained by Hawkins in terms of dependency.

Since for the recognition of dependency relations the entire PP needs to be processed (as opposed to just the head P), predictions can be made for this principle. In order to avoid un- or even misassignment, it is most efficient to place the dependent PP adjacent to its head V, therefore one would expect PP_d to be in the rightmost position, like in Japanese.

2.1.4.2 S-structure

As hinted at earlier, the surface structure of Dutch shows various possibilities for [PP PP V] orderings, as verb second and PP-extrapolation are both productive movement operations.

Verb second is an operation through which the finite verb in the main clause raises from sentence final to sentence second position, the Complementizer position, moving over the PP (or multiple PPs). When there is just one verb in the clause, this results in a V PP PP structure. However, when dealing with past participles, separable verbs or infinitival verbs (verb clusters), you can get a discontinuous verb cluster, of which possibly both components play a part in MiD or dependency. This applies mostly to separable verbs, of which the verb root carries important meaning and other properties, and of which the separated particle in sentence final position also carries meaning. In these instances you can get the following surface orderings in main clauses:

[Aux PP PP V]: heeft in de ochtend op zijn oude krakkemikkige computer gewerkt

[V PP PP prep]: denkt in de ochtend met een kop slappe thee in zijn hand na

[aux PP PP V V V]: zou in de ochtend met zijn klasgenoten huiswerk gemaakt moeten hebben.

In a subordinate clause, V2 is blocked because a different element is already in C, namely a complement. Therefore, in a subordinate clause all verbs are sentence final.⁴

Besides V2, in Dutch sentences PP-extrapolation is possible, a movement operation through which one or more PPs end up on the right side of the base position of the verb⁵. When this occurs in a regular main clause with only a finite verb, it will not be visible since the finite verb has already moved to C, passing the PP. But when a past participle, particle or (combination of) infinitival verb is still in sentence final position, one or more PPs can occur visibly at the right hand side of the non-finite verb or the preposition of the separable verb or verb cluster. The verbal elements circumstand the PP (or PPs).

³ An alternative position is that PPs are adjoined to the right of V, this view is however outdated and to keep things simple this option is not discussed.

⁴ Unless there is PP-extrapolation.

⁵ The theoretic discussion whether V moves left over PP or PP moves right over V is left aside at the moment.

As for the subordinate clause, verb second plays no part; the verb stays in sentence final position⁶. All the verbs stick together in verb final position, which means they are placed after the PPs. PP-extrapolation can again alter this picture, by placing one or more of the PPs after the verb(s). This makes [PP PP V], [PP V PP] and [V PP PP] orderings possible. Note that V in this case indicated all sorts of verbs, including auxiliaries and past participles.

As shown in table 1, four distinctions can be made for different places of the verb. Subordinate refers to a subordinate clause, in which all elements of the VP remain in sentence final position. Main refers to a main clause in which the verb has raised to sentence second position (verb second). Auxiliary refers to sentences in which an auxiliary verb has raised to sentence second position and the infinite verb, which supposedly carries more meaning, remains in sentence final position. Separable refers to main clauses construed with separable verbs, in which the verb is raised to second position and the particle remains in sentence final position. In addition, PP extrapolation (PP-X) of none, one or two of the PPs can alter the word order in the sentence.

Table 1
Possible Surface Orderings

Place of Verb	No PP-x	1 PP-x	2 PP-x
Subordinate	PP PP V	PP V PP	V PP PP
Main	V PP PP	V PP PP	V PP PP
Auxiliary	aux PP PP V	aux PP V PP	aux V PP PP
Separable	V PP PP Pt	V PP Pt PP	V Pt PP PP

So in Dutch PPs can precede, follow, or circumstand the verb. These different surface orders make different predictions for Dutch in terms of Hawkins's MiD and dependency. The separable verb in a main clause even provides us with an example in which both components might pull in different directions, since it is not evident which of the two elements carries those properties most important for dependency. The prediction each surface order makes is given in the tables below.

Table 2
MiD Predictions for Different Surface Orderings

Place of Verb	No PP-x	1 PP-x	2 PP-x
Subordinate	no preference	short-before long	short-before-long
Main	short-before-long	short-before-long	short-before-long
Auxiliary	no preference	short-before-long	short-before-long
Separable	no preference?	short-before-long	short-before-long

⁶ We leave the fact that extrapolation could involve raising the verb to a lower position than C aside for the moment.

2.1.5 Critical appraisal of Hawkins

Hawkins's PGCH is praised for transcending and bringing together several disciplines within linguistics and giving concrete explanations (Miestamo 2006). Support for his processing predictions for the English language has been found by Francis (Francis 2010). However, at the same time he is criticized for being blinded by his own ideas and overlooking other factors that might compete with the principles he presents. Although considering Hawkins's proposal to be a valuable contribution, Aitchinson (2008) argues that processing might not account for the numerous examples Hawkins provides us with. She argues they could also be explained by the more general principle that languages are guided by analogy. Furthermore, information structure is brought forward as a possibly equally important element in constituent order, although the interaction between processing and information structure remains to be determined (Polinsky 2002).

As demonstrated above, MiD and dependency relations are not fully capable of predicting processing preferences for Dutch. This is particularly trying for Hawkins's PGCH when it comes to D-structure, since it would be unlikely there would be no preference for length whatsoever. The preferences for dependency at d-structure do not seem efficient at all, since these preferences would come of no use to the hearer, who is only faced with an s-structure at which possibly the verb has raised to second position or the PPs have extraposed, resulting in a surface ordering in which PP_d is furthest away from the verb. This problem of who benefits from processing efficiency –speaker or hearer- has been recognized by Hawkins himself (Hawkins 2000), as well as other authors (Miestamo 2006, Polinsky 2002).

Perhaps these movement operations as extraposition and Verb second themselves could be motivated by efficiency and could be seen as a solution. What the motivation could be for verb second in terms of processing however seems unclear, since according to Hawkins VO and OV are equally efficient. PP-extraposition on the other hand might be able to 'save' some inefficient orderings.

However, Hawkins's theory leaves no room for explaining restrictions on extraposition. First of all, heavy NP shift is in Dutch not possible, whereas it would result in more efficient orderings. Second, directional PPs (such as 'to school') seem to behave like small clauses in more than one way, one of them being the disallowance of extraposition. Since structural factors are not included, his PGCH cannot account for categorical exceptions like these, unless he would claim these are due to yet undefined dependency relations.

MiD seems insufficient for making predictions for relative PP orderings. At s-structure it seems somewhat scattered and can still not make preference predictions for all possible orderings, and for d-structure it cannot explain preferences of both speaker and hearer. Possibly, Hawkins's take on PP orderings is too narrow, since he only looks at syntactic and semantic domains *within* the VP. These might not be the only relations concerned when you claim word order is influenced by processing. The head of the VP is also related to other elements in the sentence, in the case of Dutch elements preceding the VP, whereas PPs might in turn be in relations pulling in different directions. By including the higher, structural nodes IP and CP in calculating competing domains, one might be able to make more firm or just other, equally (in)felicitous predictions for Dutch.

2.2 Theory 2: grammar internal explanations

Hawkins's idea that grammars are primarily construed through principles of processing, and his conclusion that orderings of PPs are by no means fixed in grammar, is unsatisfactory for Dutch, as I argued in the previous section. Whereas Hawkins seeks to provide an explanation that stands outside grammar, many others argue that linear orderings are largely or solely determined within grammar. Within this line of thought, there is some discussion on how much of the linear ordering is accounted for by semantics, and how much by syntax. People agree on the fact that both play a role in (constraining) the linear order. Some argue that the focal point should be on semantics, whereas others argue it should be on syntax.

However, each of these theories is formalized in syntax, and each of them provide a number of tests to determine the base position of (a number of) different thematic PPs. This chapter looks into the work of a number of theorists working on adjuncts and/or PPs, namely the work of Barbiers, Cinque – and subsequently Schweikert – and Ruys, to examine to what extent PPs are rigidly ordered. Some of these authors require a more extensive assessment of their theoretical analysis than others. Each analysis is followed by a short summary of the facts and diagnostics encountered. Where possible I will distill from these theories various diagnostics to determine the relative order of different thematic PPs. These diagnostics will provide us with (a number of) different possible base orderings of PPs in Dutch.

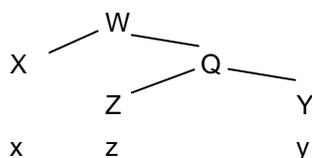
Traditionally, adjuncts, and therefore also adjunct PPs, are treated to adjoin freely to VP, which should match their nature; adjuncts, as opposed to complements, are by definition not obligatory and therefore do not need to have distinct places at which they are generated⁷. In this view there is no one to one relation between form/function and place.

However, when Phrase Structure rules were first introduced by Chomsky (1965), free distribution was regarded as less desirable. The theories discussed below each represent attempts to formalize grammar in a more restrictive way.

2.2.1 Barbiers

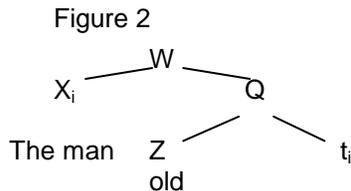
Barbiers interprets the Minimalist Program as formulated by Chomsky in a way that syntactic and semantic representations should correspond to each other. More precisely, the mapping of a syntactic relation should always express the same semantic relation, resulting in a one to one relation. In the current state of affairs in generative grammar, this is not the case at all. The core of Barbiers's proposal is that theoretically the X-bar structure determines all the semantic relations between nodes, as opposed to lexical properties determining these relations. Barbiers (1995) adopts $R(X, Y)$ as the syntactic primitive for semantic interpretation, where the relation between node X and node Y is established by an independent node, resulting in the following structure (Barbiers 1995: 4):

Figure 1



⁷ This is not to say adjuncts can be base generated at any place in the sentence structure, but just that they might be less restricted compared to obligatory complements.

In the example, node Z establishes a relation between X and Y. This is a ternary relation, as it involves two elements that undergo a relation, and an element that constitutes the relation itself. This might be counterintuitive, since relations are often binary, e.g. between a noun and an adjective, or an adjunct PP and its VP. If it is indeed the case that $R(X,Y)$ is the only available relation, Barbiers argues, the only way of constructing a binary relation is by making X and Y identical, reducing the ternary relation to a binary relation $R(X,X)$. The structure illustrating this relation is as follows:



In this example, Z construes a relation between X_i and its trace t_i , which is binary since X_i and t_i are coindexed and therefore identical. Barbiers claims that attributing a property to a constituent always involves reducing a ternary relation to a binary relation. Reduction is made possible by local movement or coindexation. In this view, the X-bar structure generates the semantic relations between the nodes involved, and the terminals determine the content of the relations. The main hypothesis is formulated as follows:

Principle of Semantic Interpretation (PSI)

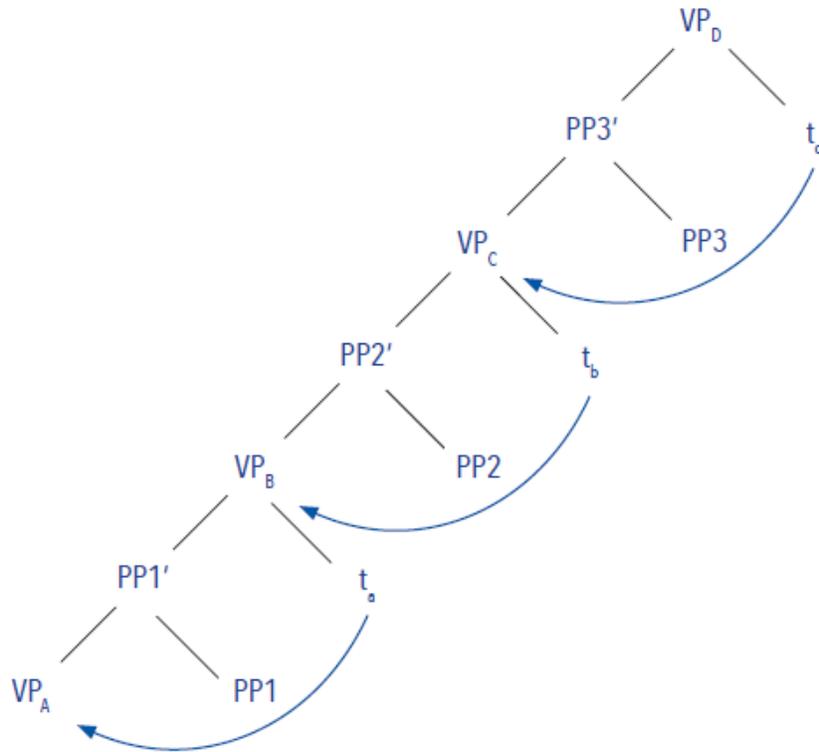
A node Z establishes a S(ematic)-relation between a node X and a node Y iff X immediately c-commands Z and Z immediately c-commands Y;

A node Z is a qualifier of a node X iff Z establishes an S-relation between X and Y, and X and Y are coindexed.

In this proposal, functional projections contribute to semantic interpretation in the same way as lexical projections do. The only trigger for movement is interpretation, i.e. the need to establish a qualification relation, reducing a ternary to a binary relation. This follows from the principle of Full Interpretation, but is more economical than the checking of morphosyntactic features, which, in the Minimalist Program, is taken to be the trigger of movement.

Important for the analysis of the possible orderings of PPs is that movement results in new relations, and therefore has semantic input. Barbiers argues that extraposition of PP adjuncts involves leftward movement of the VP to the Specifier of the PP left-adjoined to it, triggered by the need to establish a qualification relation in which the PP qualifies the VP. This qualification relation is obligatory for the correct interpretation, and can happen overtly (extraposition) or covertly (at LF). When dealing with multiple PPs, each PP qualifies the entire VP-segment it is sister of, as is visualized in figure 3:

Figure 3



A cyclic, Spec-to-Spec movement operation is also possible in this view. However, in terms of Barbiers' proposed PSI, this does lead to different qualification relations, since only the lower VP moves through the specifiers. This results in a situation in which each PP only qualifies the lowest VP. This should also lead to a different interpretation.

Focus particles provide a test to see if PP adjuncts are indeed base generated left of VP, as in terms of PSI they need to c-command (the trace of) their semantic argument. Their semantic argument thus determines their interpretation; a VP in [Spec, FoP] results in a temporal interpretation of the particle, a numeral-containing NP or PP in [Spec, FoP] results in a numeral interpretation. So, with a sentence with both PPs and FoP, the constituent they qualify moves into the Specifier of an adjunct. Depending on what moves into the Spec of FoP, i.e. a PP or VP, you can get different interpretations of the focus particle:

- (7) Jan heeft pas in EEN stad gewerkt
Jan has just in ONE city worked

This sentence can get two distinct interpretations: either Jan has worked only in one city so far (numeral interpretation), or he recently worked in a city (temporal interpretation). The different representations are as follows:

Figure 4
D-structure

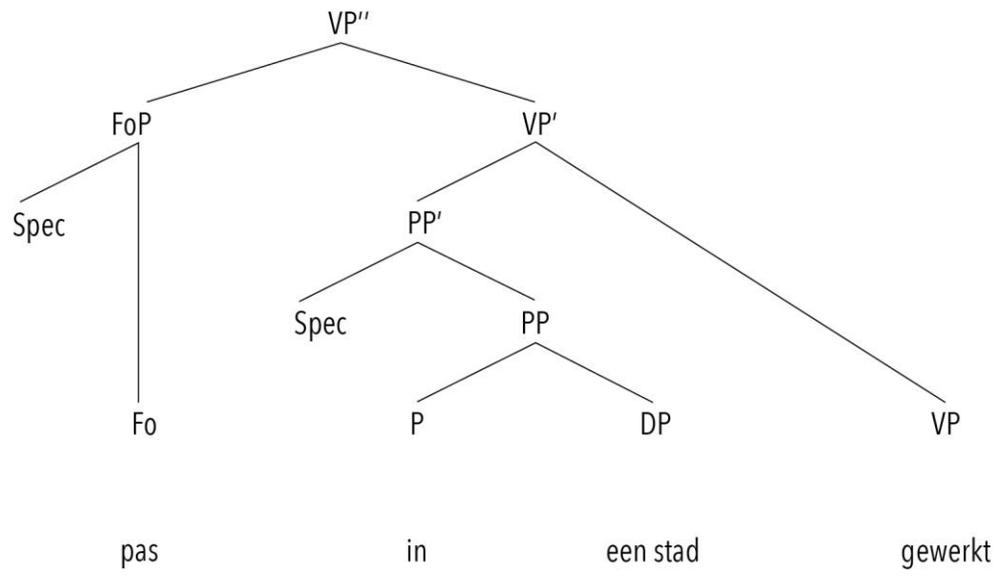


Figure 5

Numeral Interpretation. Movement of PP' into [Spec, FoP] (either overt or covert)

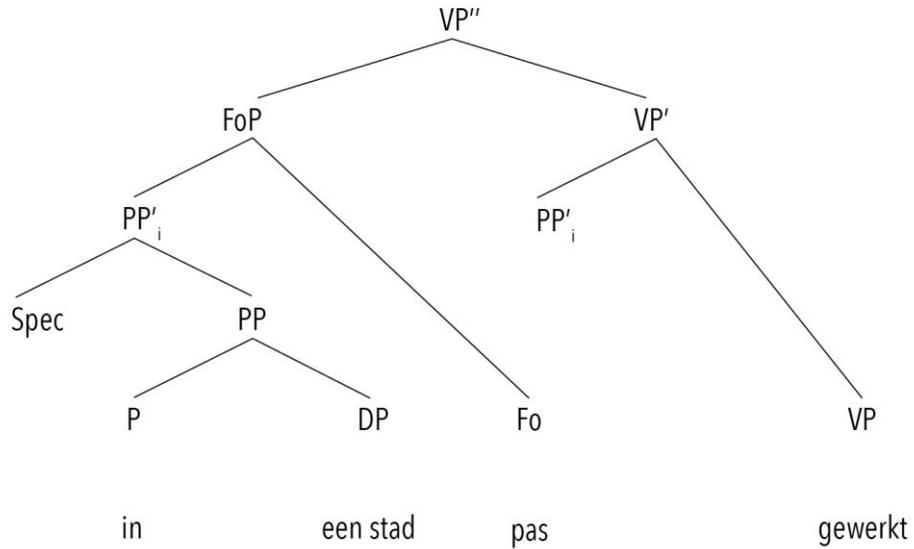
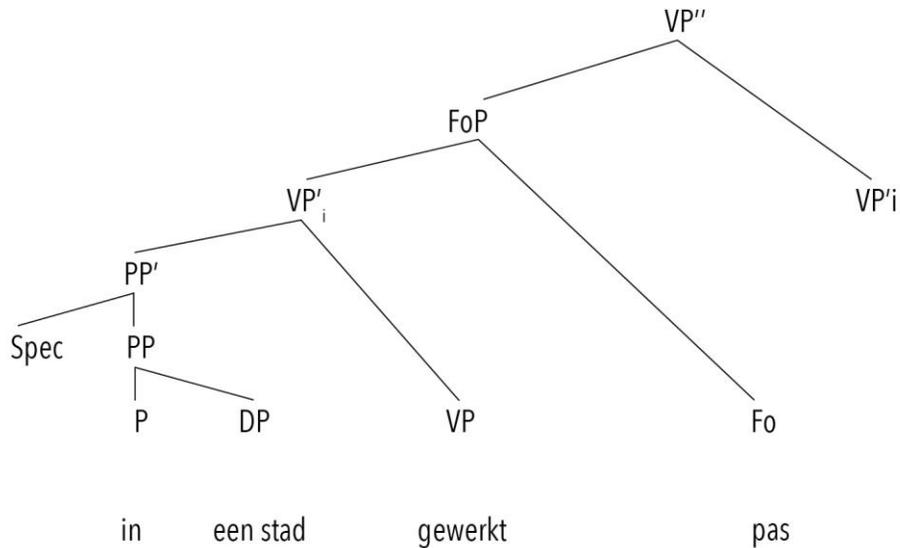


Figure 6

Temporal Interpretation. Movement of VP' into [Spec, FoP]



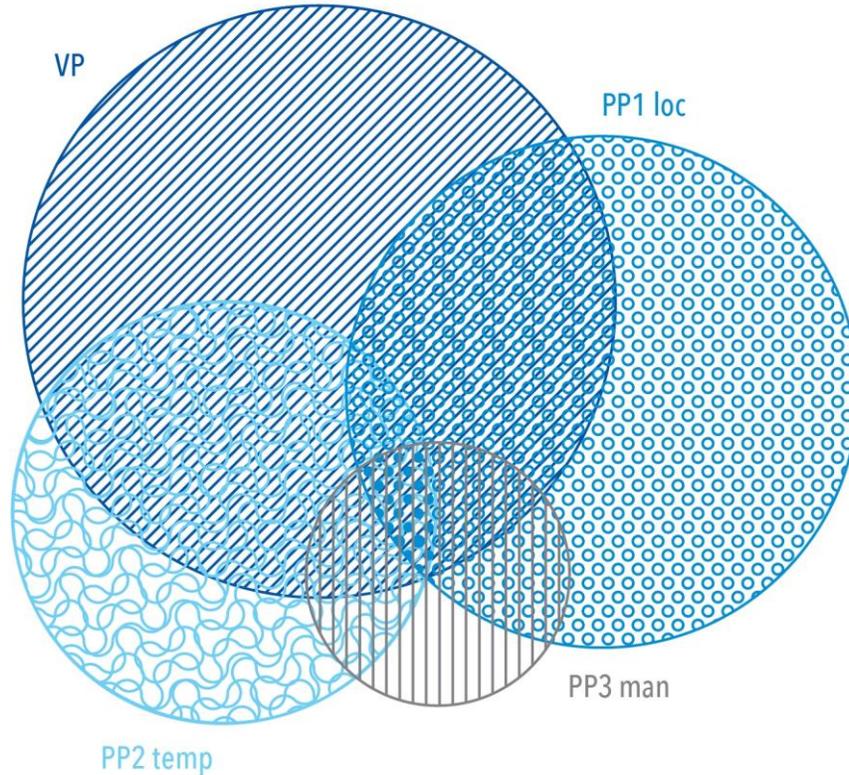
In order to be able to get a temporal interpretation of FoP, the PP and FoP need to be base generated before the verb, as FoP needs to c-command V to get the correct interpretation.

So far, we have only dealt with the base position of PPs related to the VP. What remains to be explored, is the positioning of multiple PPs. Following Barbiers' proposal, the position of PPs relative to each other

is determined by a combination of the qualification relations imposed by syntax, and by the lexical meaning of the PPs involved.

The VP denotes a set of events, the lowest PP adjunct that qualifies the VP takes a subset, the next PP takes an even smaller subset, and so on, which can be visualized as follows:

Figure 7



VP	'Graven'
[VP] + PP1	'In de tuin graven'
[VP + PP1] + PP2	'In de ochtend in de tuin graven'
[VP + PP1 + PP2] + PP3	'Met plezier in de ochtend in de tuin graven'
	<i>'With pleasure in the morning in the garden dig'</i>

A test that shows that PPs are base generated before the verb, and that the verb obligatory moves over the PP, is VP-topicalisation. For instance with the neutral order PP2 PP1 V, as in sentence 'Jan zal met een knal_{PP2} op het hek_{PP1} stranden'. As the examples (following Barbiers:1995) below illustrate, topicalisation is only possible if the qualification relations are established before the topicalisation (8a), or if – after topicalisation – constituents are ordered in such a way that qualification relations can still be checked at LF (8b):

- (8a) [Stranden] [op het hek]_{PP1} [met een knal]_{PP2} zal Jan
Stranding on the fence with a bang shall Jan
- (8b) [[Met een knal]_{PP2} [op het hek]_{PP1} stranden]_{VP} zal Jan
With a bang on the fence stranding shall Jan

If neither is the case, VP-topicalisation is not possible, as the possibility to establish the required qualification relations is not preserved. For instance, only fronting the verb changes the qualification relations; therefore it should not be possible.

(8c) *[Stranden] zal Jan [op het hek]_{pp2} [met een knal]_{pp1}

If the PPs are ordered differently, you get a selection of a different subset, since the qualification relations have shifted. Therefore, different PP orderings before the verb are not necessarily ungrammatical, but they result in a different interpretation. Some orderings result in empty sets. These orderings are therefore not wrong in syntax, but implausible in terms of meaning, because they take a different subset.

(9a)⁸ Mooie rode auto's

Pretty red cars

(9b) Rode mooie auto's

Red pretty cars

(9a) refers to a group of red cars, more specifically beautiful red cars, as opposed to the group of red cars that is not beautiful. (9b) refers to the group of beautiful cars, specifically beautiful cars that are red as opposed to any other colour.

PPs lined up after the verb, thus after the checking of qualification relations, do not result in different interpretations. They correspond to the preverbal interpretation they are teamed with.

The interpretation of a PP constituent is determined by the element that moves into its Specifier, serving as the subject of the PP. This subject determines its status as PP Small clause, PP complement or (a type of) PP adjunct. The structure determines the interpretation. As for the relative order of multiple PPs, this is not determined by separate functional projections that are strictly ordered, but arises from semantic subsets. In terms of Barbiers' proposal, VP preposing can serve as diagnostics to derive the most natural order of PPs.

Given this explicit rejection of the idea that different thematic PPs would have different functional projections that have a hierarchy, Barbiers makes no clear predictions with respect to the ordering of PPs. Only VP-topicalisation proves to be a useful diagnostic to test if there is an underlying order.

2.2.2 Cinque

As mentioned above, Cinque (1999) has suggested that, although their place can be hard to retrieve, different types of adverbs do have distinct places at which they are base generated. Adverbial Phrases (AdvPs) are treated as overt manifestations in specifier format of the same functional distinctions as inflectional morphology, functional particles and auxiliaries. Evidence lies in the observation that cross-linguistically, adverbs match in number, type and order with these functional heads.

Cinque extends this approach to AdvPs to adverbial PPs (2002, 2004). According to Cinque, different orderings of PPs are the result of a universal preverbal order of merge, in addition to which the VP 'rolls up', ending left adjacent to the PP (or lowest PP, if there are multiple). The VP can roll up past each subsequent higher PP, either as a whole constituent, raising the lower PP it has just crossed along with it, or leaving the PPs in place, while the relative order of the PPs stays intact. This corresponds to the observation that the order of preverbal PPs found in OV languages correlates to the mirror image of the order of postverbal PPs found in VO languages, but that at the same time height and scope remain unaltered in these different orderings. Contrary to Barbiers, Cinque argues this preverbal order is a

⁸ The same is illustrated with PPs in figures 6 and 7. However, I feel an example with adjectives simpler and therefore illustrates the effect of different subsets better.

universal order of merge of different PP-types. The asymmetry is derivable from a universal order of merge, which can undergo two possible movement operations which were also found in Barbiers' proposal, be it with different names and with a different motivation. With Barbiers the movement is obligatory and fills the need to reduce a ternary to a binary relation. Reasoning as for why the movement occurs is not apparent in Cinque's work.

Figure 8

Pied-piping: The verb raises to a place above Manner, then V+Manner raise to a place above Locative, then V+Manner+Location raise to a place above Temporal, resulting in a reversed V>Manner>Locative>Temporal ordering.

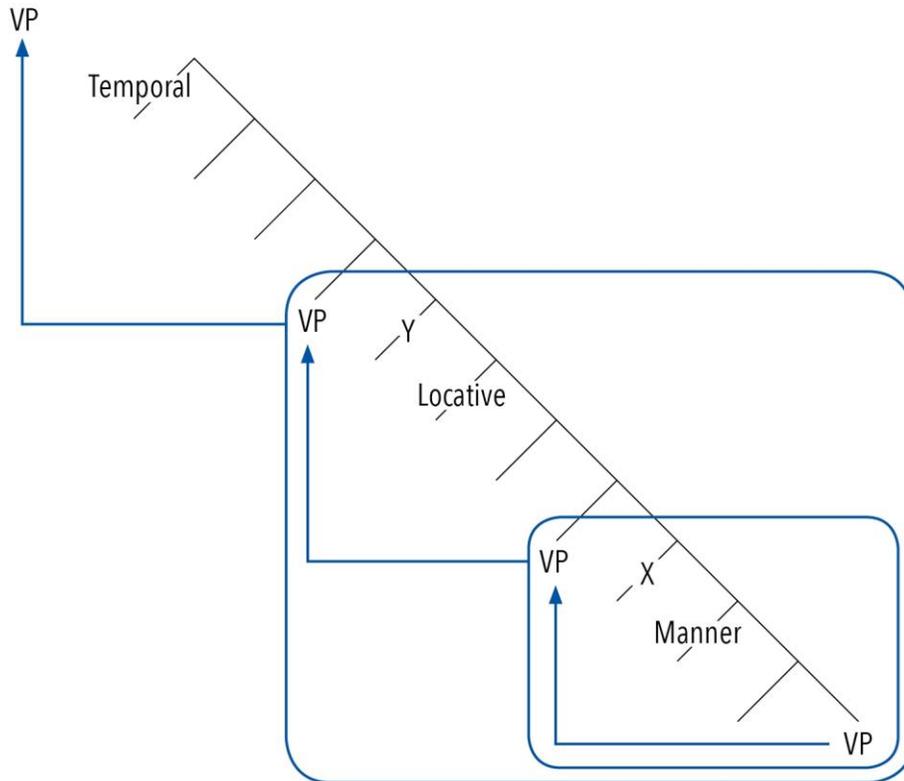
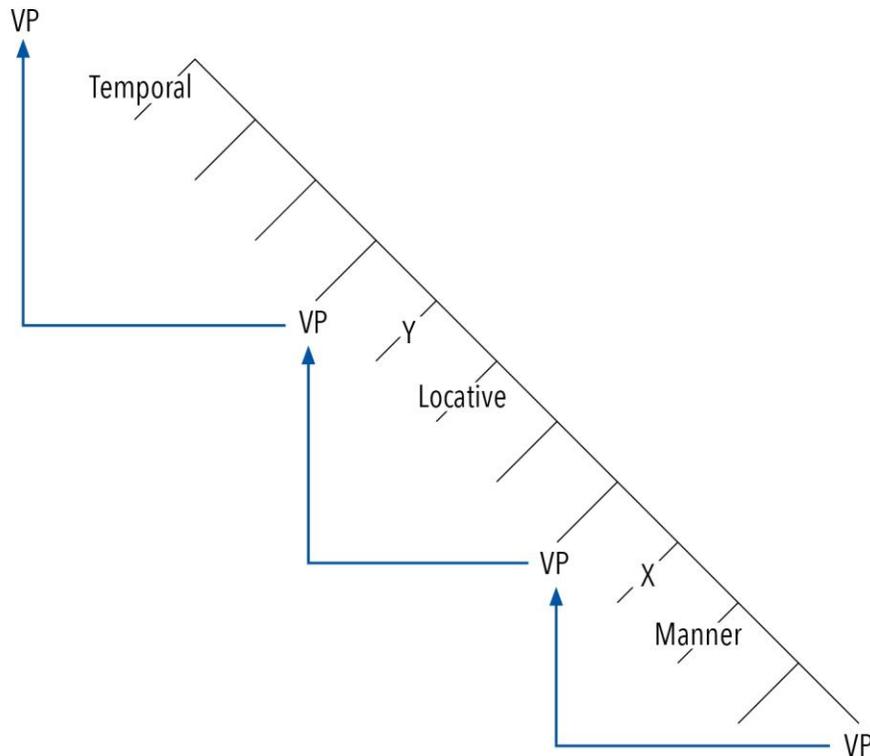


Figure 9

The verb hops around the PPs, leaving the order of merge intact: V>Temporal>Locative>Manner



Support for this theory can be found in Boisson (1981), who has reported that for Temporal, Locative and Manner PPs, only the following orderings are found cross-linguistically:

Temp>Loc>Manner>V

V>Manner>Loc>Temp

V>Temp>Loc>Manner

Given the fact that in Cinque's framework PPs are merged left of V, Temp>Loc>Manner>V is regarded as the canonical order, and the V gets raised by pied-piping, resulting in the reverse order, or by hopping around the PPs, preserving the order of merge after V. The possible result of these two movement operations is V>Manner>Loc>Temp for Pied-piping⁹ and V>Temp>Loc>Manner for the spec-to-spec movement, which matches Boissons reporting.

Cinque argues against a free ordering of PPs, based on five different asymmetries found in PP orderings. Three of these can function as a diagnostic to determine the base position of PPs. The first is asymmetry in double PP idioms. In idioms containing two complement PPs, the idiomatic reading is only available through one of the two possible orderings. Although this does seem to be an argument in favour of a rigid ordering, this particular example cannot function as a diagnostic, since idioms are not very productive.

⁹ In terms of Barbiers's proposal, the V>Temp>Loc>Manner order could have a different meaning, depending on the type of movement. When the XP does not 'move along' with the VP, and the lowest VP only hops *around* the XPs, the qualification relations are different than with head movement. In the logic of Barbiers's approach, head movement, such as in the case of V2, should undergo (covert) roll-up or Spec-toSpec movement, making both types of interpretations available.

A second asymmetry Cinque takes as evidence against a free ordering of PPs, is asymmetry in phonological reduction; reducing the complement of a preposition into a phonological weak form in the second of two PPs is only possible in certain cases, depending on the types of PPs involved. See for instance this example from Cinque (2002):

- (10) John talked to Pete about 'm
- (11) *John talked about Pete to 'm

This asymmetry is also found in Dutch:

- (12) Jan praat met Piet over 'm
John talks to Pete about 'm
- (13)* Jan praat over Piet met 'm
John talks about Pete to 'm

Phonologically reducing the second PP is only possible if the comitative PP precedes the matter PP. This asymmetry can be explained if the to>about order is taken as the canonical order. The other order is derived through focus sensitive movement, and since moving phonologically weak elements into Spec,FocP is not possible, the second sentence is ungrammatical.¹⁰ After all, the movement should result in the righthand constituent receiving focus, which is only possible with a pronoun that has not been reduced. Eddy Ruys also introduces phonologically reduced complements as a diagnostic; I will discuss this at more length later in this chapter.

A third argument Cinque uses against free ordering of PPs lies in the asymmetry in anaphor binding possibilities:

- (14) John talked to the men about each other
- (15) *John talked about the men to each other

In this example, the anaphor 'each other' is c-commanded by the first PP, therefore lack of c-command cannot be the reason the second sentence is ungrammatical (Cinque 2002: fn. 13). Still, Cinque argues, only in the first example can the noun phrase of the first PP be the antecedent to the anaphor. However, more native speakers should be consulted to determine how grammatical (14) is, as English native speakers in the circle of the author have expressed strong opinions against the acceptability of (14). In their opinion 'John talked to the men about each other' is as ungrammatical as the second sentence. The Dutch equivalent 'Jan praatte met zijn vrienden over elkaar' is also ungrammatical. The only way to make the sentence more acceptable (at least for Dutch) is to turn the reciprocal 'each other' into a genitive:

- (16) ?John talked with the men about each other's friends
- (17) *John talked about the men with each other's friends

However, grammaticality is still questionable. Therefore, I will not use this 'test' to determine the order between different types of PPs.

A fourth argument brought about by Cinque is the fact that the possibility of preposition stranding is subject to the place/trace of the PP, first observed by Hornstein and Weinberg (1981):

- (18) Who_i did John talk to t_i about Harry yesterday?
- (19) ??Who_i did John talk about t_i to Harry yesterday?

- (20) Who_i did John talk to Harry about t_i yesterday?
- (21) ??Who_i did John talk about Harry to t_i yesterday?

¹⁰ The analysis is put forward by Cinque. Later in this chapter, we will see that Eddy Ruys discusses a more general constraint, banning the movement of phonologically reduced items.

It appears that prepositions can only strand if the PPs are in a specific (base generated) order, in this case to>about. As with phonological reduction, Ruys (2008) deals with this asymmetry in more detail; I therefore refrain from further discussing this and giving counter examples from Dutch until later.

The fifth and last argument lies in asymmetries with adverbial PP pro-forms. In several languages, when both PPs are reduced to pro-forms, only one of the two orderings is possible. This suggests that PP ordering might not be as free as claimed by some. In Norwegian for instance, a temporal PP can follow a locative PP, and, provided the locative bears stress, a locative PP can follow a temporal PP. However, when both PPs are reduced to pro forms, only the order locative>temporal is possible:

(22) Jeg møtte ham der da

I met him there then

(23) *Jeg møtte ham da der

I met him then there

Of the asymmetries discussed above, three can be used as a diagnostic to determine relative orders between PPs¹¹: phonological reduction, preposition stranding, and adverbial PP pro forms. Note that Cinque's idea of an underlying universal order of merge, through serial movement operations, can result in different surface orderings.

2.2.3 Schweikert

Schweikert (2005) took Barbiers' and Cinque's theory on adjuncts a step further and tested if the idea of rigid ordering also held for PPs modifying the VP in German, depending on their functions, in the hope to discover the basic order of PPs¹². He used three syntactic tests to detect movement. His tests were used to reveal which type of PP correlated to which position, regardless of movements which have already taken place.

The first diagnostic tests scope relations in sentences with two operators. If an operator which is embedded deeper in the structure – therefore lower in the syntactic tree – never moves over a higher situated operator, one would not expect scope ambiguity. If it has moved, however, both the originally higher operator scopes over the lower operator and vice versa. Thus, sentences with one PP containing a universal operator and one PP with an existential operator should be able to reveal order hierarchy in their interpretation, as illustrated in the formulae below, where x and y represent different types of PPs:

No movement, no ambiguity

$\forall x (\exists y) \forall$ scoping over \exists

or

$\exists x (\forall y) \exists$ scoping over \forall

Movement, therefore ambiguity

$\exists xi (\forall y ti) \forall$ scoping over trace of \exists and \exists scoping over \forall

$\exists xi \forall y (ti) ???$

or

$\forall xi (\exists y ti) \exists$ scoping over trace of \forall and \forall scoping over \exists

$\forall xi \exists y (ti) ???$

¹¹ Naturally, it remains to be seen exactly how functional they are, when applied to the wide range of different PPs.

¹² Schweikert draws conclusions based on his own intuitions about the acceptability of certain sentences, which he quantified in order to be able to make statistical analysis. He did not, however, include other native speaker's intuitions.

When constructing sentences in which two different types of PPs have different quantifiers, both the order of the types and the order of the quantifiers can be reversed, resulting in four sentences. If it is indeed the case that different types are ordered hierarchically, only one order will give rise to an ambiguous reading. Since the ambiguity is the result of moving the one operator over the other, this should allow us to conclude that sentences with two possible readings do not show the PPs in base position. This argues against possible movements taking place afterwards at LF.

To illustrate this I will give one example, provided by Schweikert (including his acceptability judgements), to show that this does indeed appear to be the case in German. He applied the test to all combinations of thematic roles, one of them being matter PP and temporal PP.

(24) Tony hat an mindesten einem Tag über jede Massenvernichtungswaffe gesprochen

Tony has on at least one day about every weapon of mass destruction spoken

\exists (time) \forall (matter)

?? \forall (matter) \exists (time)

(Clarification: an interpretation in which for every weapon there is at least one day (could be different days) on which Tony spoke about it is highly unlikely)

(25) Tony hat über mindestens eine Massenvernichtungswaffe an jedem Tag gesprochen

Tony has about at least one weapon of mass destruction on every day spoken

\exists (matter) \forall (time)

\forall (time) \exists (matter)

(26) Tony hat über jede Massenvernichtingswaffe an mindesten einem Tag gesprochen

Tony has about every weapon of mass destruction on at least one day spoken

\forall (matter) \exists (time)

\exists (time) \forall (matter)

(27) Tony hat an jedem Tag über mindestens eine Massenvernichtungswaffe gesprochen

Tony has on every day about at least one weapon of mass destruction spoken

\forall (time) \exists (matter)

* \exists (matter) \forall (time)

The sentences in which the matter PP precedes the time PP are ambiguous, as opposed to the sentences in which the time PP precedes the matter PP. This indicates that in the former case movement has taken place. Therefore, Schweikert concludes timePPs are base generated higher than matter PPs.

The second test Schweikert uses, relies on informational focus. In the German Mittelfeld the latter of two constituents can bear informational focus, whereas the first constituent can only bear focus when it is base generated higher. So, when the sentence is reformulated as a question in which one of the two PPs is questioned, the possible answers to that question provide a way to detect movement. If the answer to the question allows only one order to the PPs (the questioned PP will be in the latter position, bearing stress), this role must have been base generated lower. If, however, two answers are possible, one of them being the PP in initial position and bearing focus, this indicates that the thematic role questioned is base generated higher than the other. This asymmetry has also been observed between direct objects and indirect objects, and this test should be able to reveal if different types of PPs are base generated in distinct places.

Schweikert finds that, using this test, they indeed do. To illustrate this I have adopted the following example in which the base sentence had a Benefactive and a Temporal PP:

- (28) Donald hat am Dienstag für Georg gelogen
Donald has on Tuesday for Georg lied

When questioning the Temporal ('Wann hat Donald für Georg gelogen?'), two answers are possible:

- (29) Donald hat für Georg am Dienstag gelogen
Donald has for Georg on Tuesday lied
- (30) Donald hat am Dienstag für Georg gelogen
Donald has on Tuesday for Georg lied

But when questioning the Benefactive ('Für wem hat Donald am Dienstag gelogen?', '*For whom has Donald on Tuesday lied?*'), only one answer is fully possible:

- (31) Donald hat am Dienstag für Georg gelogen
- (32)??Donald hat für Georg am Dienstag gelogen

The fact that one cannot reply to the question about the benefactive with an answer in which the benefactive PP precedes the temporal whilst receiving stress, means the benefactive is not base generated above the temporal PP.

The last of three tests reported by Schweikert also involves scope ambiguity, this time between an interrogative operator and a universal quantifier, which can also reveal movement. If the interrogative is base generated above the universal quantifier, and from there on moves to sentence initial position (which is what happens in Germanic languages), the wh-element c-commands the quantifier. In this way, only one answer is possible:

- (33) Who reads all the books?
John reads all the books

If, however, the interrogative is base generated below the universal quantifier, and moves from this position to sentence initial position, you get scope ambiguity. The quantifier scopes over the trace of the interrogative, and the interrogative, once moved, scopes over the universal quantifier. In sentence (34) the interrogative is scoping over \forall ; only one answer as in (33). In sentence (35) \forall is taking scope over the trace of the interrogative and once moved the interrogative also scopes over the universal quantifier; the answer can be a list of pairs as well as the first answer.

- (34) Which book did all the boys read?
All the boys read the Minimalist Program.
- (35) Which book_i did all the boys _{t_i} read?
All the boys read the Minimalist Program.
Bob read "Aspects", Bill read "Barriers" and John read "The Minimalist Program".

Again, Schweikert applied this test to all possible combinations of PP types in German, for instance the combination of Comitative and Temporal PPs. Only when you question the Comitative, you can easily get a list of pairs as an answer:

- (36) Mit welchem Freund hat Georg in jedem Jahr Krieg gespielt?
Georg hat in 2002 mit Tony und Gerhard gespielt, in 2003 mit Tony und José, in 2004 mit Tony und Silvio.

(37) Wann hat Georg mit jedem Freund Krieg gespielt?

?? Georg hat mit Tony in 2002 Krieg gespielt, mit Gerhard in 2003 Krieg gespielt, mit Silvio in 2004.

Therefore, Schweikert concludes the Temporal is base generated higher than the Comitative.

Schweikert concludes, based on the three tests described above, that the underlying order of thematic PPs is as follows:

Evidential>Temporal>Locative>Comitative>Benefactive>Reason>Source>Goal>
Malefactive>Instrumental/Means/Path>Matter>Manner

The three tests all gave the same results; only the relative ordering of instrumental/means and path is left undetermined. What Schweikert also found, is that the bigger the relative distance between the different PPs used in the middlefield is, the clearer judgements are. This suggests that the functional projections, although not overtly present, do have an effect on scrambling. The 'further' a PP has to scramble, the harder it gets.

2.2.4 Ruys

Eddy Ruys (2005, 2008) focuses solely on the preverbal, unmarked order of different types of PPs in Dutch. Variation in surface word order can mean these types can be base generated at different positions, or can be the result of a different type of movement; scrambling.

(38) dat Laura niet [in dit huis] had gewoond

that Laura not [in this house] had lived

(39) dat Laura [in dit huis] niet had gewoond

that Laura [in this house] not had lived

Not only can PPs scramble with each other, but also with other elements present in the middlefield, such as negation in the example above. Two restrictions on scrambling have led Ruys to formulate the P [x] generalization, which in turn can be used to determine the unmarked position of PPs:

P [x] generalization

[P_i] may occur only where [P_{pro}] may occur

What follows from the generalization, is that the distribution of stranded P (P_i) and a PP containing a weak complement/unstressed pronoun (P_{pro}) are the same (see also Cinque). The first observation is that once a PP has moved from base position, it cannot be extracted from. This is called the Freezing constraint (see also Hornstein en Weinberg 1981).

(40) Het huis waar_i Laura niet [t_i in] had gewoond

The house where Laura not in had lived

(41) *Het huis waar_i Laura [t_i in] niet had gewoond

The house where Laura in not had lived

It can be used as a test: once a PP allows stranding, it is in base position. Therefore, following the example above, the unmarked order is [neg] [PPloc], since only this order allows extraction.

This derives the order between a thematic PP and negation, but can also be used for different thematic PPs.

However, comitative-matter sentence do not seem to behave in a similar way. 'De man waar Jan mee t_i over het onderwerp had gepraat' and 'Het onderwerp waar Jan over t_i met Piet had gepraat' are both possible. It would be interesting to find out to what extent comitative-matter can be ordered at all or whether or not they are interchangeable.

The other observation is that a PP can only be scrambled if the complement of P bears stress.

(42) dat Laura niet met 'm_{PPcom} had gewoond

that Laura not with 'm had lived

(43) *dat Laura met 'm_{PPcom} niet had gewoond

that Laura with 'm not had lived

This second test explains the freezing constraint; if the complement of a moved PP must be stressed, it cannot be a trace, for trace cannot be stressed in the first place. Since preposition stranding leaves a trace, preposition stranding is not possible if it is not in base position.

The order of elements in the Dutch middlefield which Ruys derives through the two tests resulting from the P[x] generalization is as follows:

OB	APPred	PPInstr	PPBy	PPArg	V
NEG			PPBen	PPDat	
			PPDir		
			PPPred		

Note that this is the unmarked order, not the base generated order. DP arguments such as the direct object and AP predicates move obligatory to a higher projection for Case/Agreement. PP arguments, datives, directionals and predicates do not co-occur within one sentence, therefore no relative ordering between them can be established. Ruys did not find a rigid ordering between PP passive by phrases and PP Benefactives.

Although the tests are not applicable to all types of thematic PPs, because, in terms of interpretation, certain combinations of PPs do not occur, Ruys' research does result in a fixed ordering of certain PPs. Because some PPs do not occur together in a sentence, the relative order between them cannot be established.

2.2.5 Summary

All of the authors discussed in this chapter, argue that PP-orderings are restricted to some extent by grammar, as opposed to Hawkins who argues that orderings are determined by processing.

The first author discussed here is Barbiers. He uses VP-topicalisation to show that there is a neutral PP-order that needs to be maintained in order for a sentence to keep the same semantic interpretation.

Taking into account that he does not see this as a fixed order, I will use the VP-topicalisation test to try and determine whether there is such an order.

As opposed to Barbiers, Cinque argues that each PPtype has a distinct functional projection and that these have a rigid ordering. Two of his diagnostics have proven to be applicable to Dutch in the above. These are the extraction and reduction tests that the third author, Ruys, has also put forward.

Although Schweikert's syntactic tests – quantifier scope, informational focus and pair list reading – should function as a diagnostic for Dutch as well, it is outside the scope of this thesis to include these in the experiment. As Schweikert applied his tests to a very wide range of thematic PPs, and because he derives a fairly rigid order, the order he has derived through these tests for German will be used as a lead and hypothesis for the anticipated results of the other tests. Interestingly, Ruys has, using other tests than Schweikert, derived a different ordering of benefactive and instrumental PPs in Dutch compared to Schweikert's findings in German. Furthermore, comitative-matter sentences appear to behave differently. These differences found in order are the immediate causes for the following empirical section of this thesis. Since Schweikert has derived an order, including numerous different PP-types, this will be taken as a lead:

Evidential>Temporal>Locative>Comitative>Benefactive>Reason>Source>Goal>
Malefactive>Instrumental/Means/Path>Matter>Manner

3 Grammaticality judgement task

This chapter discusses the grammaticality judgement task (GJT). This task aims to examine to what extent the theories discussed in the previous chapter can be empirically validated, testing intuitions of native speakers of Dutch. The GJT tests speakers' intuitions on the grammaticality of orders of different PP-types. Our hope is that this task will indicate which PP-types might be interesting for further research.

3.1 Method

Test sentences

I developed 82 test sentences in Dutch, based on the findings in the literature study, in which three variables were included in different combinations¹³. The sentences were recorded with a voice recorder and were placed online on the website ThesisTools. Participants received an invitation to partake per email with a link to the website. The author was able to log on to the website where results were documented in an Excel sheet. In this grammaticality judgement task participants were asked to rate each of the 82 sentences they were presented with in terms of grammaticality.

Participants

Friends of the author were approached and asked to participate in the experiment. There are no demographic data of the participants recorded. All participants were native speakers of Dutch.

Measure

Participants were asked to judge the grammaticality of the test sentences on a scale from 1 to 5, in which 1 was not grammatical and 5 was grammatical.

Variables

Three variables were integrated in the test sentences.

1 whether the PP is in base position (as found in Schweikert) when a diagnostic is applied

In a sentence with two PPs, there are two different orders for the PPs and two positions where a diagnostic could be applied. This makes up four different options, as for instance with extraction in these sentences with a matter and a benefactive PP:

- (44) Het onderwerp_i waar Piet over_{rPPmat} voor Greenpeace_{PPben} had gesproken
The topic which Pete about for Greenpeace had spoken
- (45) Het onderwerp_i waar Piet voor_{PPben} Greenpeace over_{rPPmat} had gesproken
The topic which Pete for Greenpeace about had spoken
- (46) De organisatie_i waar Piet voor_{PPmat} over het onderwerp_{PPben} had gesproken
The organization which Pete for about the topic had spoken
- (47) De organisatie_i waar Piet over het onderwerp_{PPben} voor_{PPmat} had gesproken
The organization which Pete about the topic for had spoken

Following the Freezing Constraint, the non-neutral order with a diagnostic applied to the scrambled, leftmost PP (as in (44)) is expected to score lower. In the results section, I will compare each of the four options with each other to find out if participants indeed showed that this was not preferred, taking

¹³ For a full list of test sentences used, see appendix 1

Schweikert's derived order as a lead. If a reverse preference is found, this could argue for a different order than Schweikert has found.

2 the used diagnostic (reduction or extraction)

For this first pilot study, the two diagnostics extraction and reduction were selected in order to obtain sight on the validity of various theories. Although both diagnostics are compatible with the chosen PP combinations, some might be regarded as more forced.

3 place of the verb

Extraction cannot take place after extraposition, therefore for this test PP PP V orderings are included. In the reduction test, the place of the verb unfortunately alternated. Test sentences had word orders with V PP PP, PP V PP and PP PP V. For the extraction test, the interaction with the place of verb is not well described, therefore sentences with PP PP V orders would have been best for a pilot study.

Subgroups

The focus on extraction and reduction limits the number of PP-types that can be included. The following four PP-types have been selected:

- Comitative
- Benefactive
- Instrumental
- Matter

This results in six combinations in total, each constituting a subgroup; comitative-benefactive, comitative-instrumental, comitative-matter, benefactive-instrumental, benefactive-matter and instrumental-matter. This includes two PP-types which appear earlier in the order derived by Schweikert (comitative and benefactive), as well as two PP-types that appear later in the order (instrumental and matter), as reported in section 2.2.3.

Statistical analysis

Data were analyzed using SPSS Statistics version 20, IBM. To assess the correlation between the different variables and the outcome for each subgroup, we performed chi-square analysis and in order to assess association, kendall's tau-c and gamma were calculated.. In order to perform this analysis, we considered outcome, measured on a scale 1-5, to be a numeric variable.

3.2 Results

Thirty people were approached; 25 people filled in the questionnaire, two of which were not included in the analysis because they had not filled in the questionnaire entirely. This resulted in 23 people that could be included in the analysis. In the following I will discuss the results for every subgroup as defined above. In each subgroup, the four different options of variable one (interaction of order of PPs and which of the two PPs is manipulated) will be compared to each other. Given the limited number of participants and test sentences, the used diagnostic and place of verb were ignored in the analysis. This will be discussed further in the conclusion and discussion section.

Significant and otherwise remarkable results will be reported in this section. For full results, please see appendix 7.2.

Subgroup 1 - Comitative-Benefactive

(e.g. Hans heeft met de rector_{PPcom} voor de leerling_{PPben} gesproken - *Hans has with the principal_{PPcom} for the pupil_{PPben} spoken*)

The first subgroup is related to the comitative-benefactive ordering, which consists of 27 different sentences in total.

Order/place of diagnostic interaction	Number of test sentences
Comitatie-Benefactive	6
Benefactive- Comitatie	7
Comitative- Benefactive	8
Benefactive-Comitative	6

One of the participants did not fill in a valid answer in a test sentence with inverted PP order with the left PP manipulated (thus one of the sentences which would expectedly score lower). In the statistical calculations, the average answer for the sentences of all participants was used instead, rounded off to a whole number.

The mean scores (*M*) for the four sentences types ranged from 3.28 to 3.38, with standard deviations (*SD*) ranging from 1.35 to 1.50. No significant differences were found using the chi-square test.

The **benefactive-comitative** sentences, were – based on the discussion of literature and previous findings – expected to score lower. In this Grammaticality Judgement Task participants scored this type of sentence the lowest based on average and the standard deviation was larger than other sentence types within the subgroup. Participants therefore seemed to be slightly more outspoken, not necessarily more negative about this sentence type.

See table 8 in Appendix 7.2 for full results

Subgroup 2 – Comitative-Instrumental

(e.g. Kees heeft met zijn moeder_{PPcom} met de vulpen_{PPben} de brief geschreven – *Kees has with his mother_{PPcom} with the pen_{PPben} the letter written*)

Subgroup 2 consists of eight sentences, the distribution over the different orders is as follows:

Order/place of diagnostic interaction	Number of test sentences
Comitative-instrumental	1, used twice
Instrumental- comitative	1
Comitative- instrumental	3
Instrumental-comitative	2

There is no variation in testtype or position of verbal elements, as only sentences with extraction as testtype and sentences with verbal elements to the right of the PPs could be constructed.

Comparing the scores of **comitative-instrumental** (*M* = 1.93, *SD* = 1.17) and **comitative-instrumental** (*M* = 3.59, *SD* = 1.33) subgroup yielded significant difference, $\chi^2(4) = 35.71$, $p < 0.001$ with a strong association (tau = 0.58, gamma = 0.71). However, the minimum expected count was 4.5 and therefore too small to interpret the chi-square.

The only comparison within this subgroup of which the expected count was at least five and of which at least eighty percent of cells had a value of five or more, that yielded significant differences, was the **comitative-instrumental** (*M* = 3.59, *SD* = 1.36) compared to the **instrumental-comitative** (*M* = 2.65, *SD* = 1.43), $\chi^2(4) = 13.07$, $p = 0.01$. As expected, the sentences type in which the scrambled PP was manipulated, indeed scored lower. The association is reasonable strong (tau = -0.35, gamma = -0.44).

Although not significantly, **comitative**-instrumental ($M = 1.93$, $SD = 1.71$) sentences scored lower than the three other sentences types in the subgroup.

See table 9 in Appendix 7.2 for full results

Subgroup 3 – Comitative-Matter

(e.g. Marie heeft met haar moeder_{PPcom} over de vriend_{PPmat} gesproken – *Marie has with her mother_{PPcom} about the friend_{PPmat} spoken*)

Subgroup 3 consists of nineteen sentences, the distribution over different orders/manipulated PP is as follows:

Order/place of diagnostic interaction	Number of test sentences
Comitative-matter	5
Matter-comitative	5
Comitative-matter	4
Matter-comitative	5

One of the participants did not fill in a valid answer in a test sentence with neutral PP order with the righthand PP manipulated (**comitative-matter**). In the statistical calculations, the average answer of all participants for this sentence was used instead, rounded off to a whole number.

Matter-comitative ($M = 2.43$, $SD = 1.40$) scored significantly lower than **matter-comitative** ($M = 3.25$, $SD = 1.47$), $\chi^2(4) = 10.43$, $p = 0.034$. The association was reasonable ($\tau = 0.31$, $\gamma = 0.39$). **Matter-comitative** also scored significantly lower than **comitative-matter** ($M = 3.50$, $SD = 1.33$), $\chi^2(4) = 17.09$, $p = 0.02$, with a reasonably strong association ($\tau = 0.40$, $\gamma = 0.50$).

Comitative-matter ($M = 1.87$, $SD = 1.18$) sentences scored the lowest of all sentence types but no significant differences compared to these sentence types were found.

See table 10 in Appendix 7.2 for full results

Subgroup 4 – Benefactive-Instrumental

(e.g. Van Gogh heeft voor een klant_{PPben} met een penseel_{PPinstr} geschilderd – *Van Gogh has for a client_{PPben} with a paint brush_{PPinstr} painted*)

Subgroup 4 is related to the benefactive-instrumental sentences, which consists of 4 different sentences in total.

Order/place of diagnostic interaction	Number of test sentences
Benefactive-Instrumental	1
Instrumental-Benefactive	1
Benefactive-Instrumental	1
Instrumental-Benefactive	1

The mean scores (M) for the four sentences types ranged from 3.04 to 4.22, with standard deviations (SD) ranging from 0.72 to 1.52. No significant differences were found using the chi-square test.

Benefactive-instrumental was the sentence type that scored lowest ($M = 3.04$, $SD = 1.52$).

See table 11 in Appendix 7.2 for full results

Subgroup 5 – Benefactive-Matter

(e.g. Piet heeft voor Greenpeace_{PPben} over het onderwerp_{PPmat} gesproken – *Piet has for Greenpeace_{PPben} about the topic_{PPmat} spoken*)

Subgroup 5 consists of twenty sentences, the distribution over different orders/manipulated PP is as follows:

Order/place of diagnostic interaction	Number of test sentences
Benefactive-Matter	5
Matter-Benefactive	5
Benefactive-Matter	5
Matter-Benefactive	5

One of the participants did not fill in a valid answer in a test sentence with inverse PP order with the unscrambled PP (benefactive) manipulated. Furthermore, one of the participants did not fill in a valid answer for a sentence with neutral PP order with the lefthand (benefactive) PP being manipulated. In the statistical calculations, the average answer of all participants for these respective sentences was used instead, rounded off to a whole number.

Matter-**benefactive** ($M = 2.67$, $SD = 1.32$) scored significantly lower than **benefactive-matter** ($M = 3.37$, $SD = 1.40$) test sentences, $\chi^2(4) = 17.74$, $p = 0.001$ with a fairly weak to reasonably strong association ($\tau = 0.28$, $\gamma = 0.35$). In addition, **matter-benefactive** ($M = 2.50$, $SD = 1.25$) scored significantly lower than **benefactive-matter** ($M = 3.16$, $SD = 1.45$), $\chi^2(4) = 20.32$, $p < 0.001$. The association is fairly strong ($\tau = -0.31$, $\gamma = -0.38$). **Matter-benefactive** also scored significantly lower than **benefactive-matter**, $\chi^2(4) = 32.19$, $p < 0.001$, the association is reasonably strong ($\tau = 0.39$, $\gamma = 0.48$).

See table 12 in Appendix 7.2 for full results

Subgroup 6 – Instrumental-Matter

(e.g. Peter heeft met een vulpen_{PPinstr} over het onderwerp_{PPmat} geschreven – *Piet has with a pen_{PPinstr} about the topic_{PPmat} written*)

Subgroup 6 is related to the instrumental-matter sentences, which consists of 4 different sentences in total.

Order/place of diagnostic interaction	Number of test sentences
Instrumental-Matter	1
Instrumental-Matter	1
Matter-Instrumental	1
Matter-Instrumental	1

The mean scores (M) for the four sentences types ranged from 2.96 to 4.48, with standard deviations (SD) ranging from 0.82 to 1.57. No significant differences were found using the chi-square test. **Matter-instrumental** ($M = 2.96$, $SD = 1.57$) scored lowest.

See table 13 in Appendix 7.2 for full results

3.3 Conclusion and discussion

The results presented in the previous paragraph indicate that, for two out of the six subgroups, one sentence type scores significantly lower than two other sentence types. For the matter-comitative test sentences, this is the order in which scrambled PP is manipulated, which is in line with the theory. This would indicate that comitative PPs are base generated higher than matter PPs. From the four PP-types that were included in the study, matter and comitative PPs lie furthest apart in the hierarchy detected by Schweikert. Therefore, these sentences are expected to give the most significant results. However, the non-scrambled order, in which the righthand PP is manipulated, scored lower, although not significantly, than the expected sentence type.

For the matter-benefactive subgroup, the sentences type with scrambled PP being manipulated, also scored significantly lower than two other sentence types, implying that benefactive PPs are base generated higher than matter PPs. This is also the order Schweikert found. However, this sentence type did not score significantly lower than the sentences in which the order is scrambled, and the righthand PP is manipulated. In fact, this sentence type did score significantly lower than non-scrambled sentences in which the lefthand PP was manipulated. Based on the theory, there is no expected difference between these sentences.

In the comitative-instrumental subgroup, sentence type in which scrambled PP is manipulated, got significantly lower scores than the neutral PP order in which the righthand PP is manipulated. The comitative-instrumental order, which, according to the order Schweiker found is hypothesized to be the neutral order, had the lowest average score of all sentence types when the comitative PP was manipulated. Compared to Schweikert, this would direct to a reverse base order, in which instrumental PPs are base generated before comitative PP. In terms of the P[x]-generalization, this would mean that applying reduction or extraction to a comitative PP (scrambled) to the left of the instrumental PP, should be regarded as less grammatical. However, this difference was not significant.

In the other subgroups, no significant results regarding the first variable were found. In some other subgroups significant chi-square values were found, but the requirement of a minimum expected count of five was not met (see tables 9, 10 11 and 13 in the section Appendix 7.3) or more than 20% of cells had a minimum expected count of less than five (see tables 11 and 13 in section Appendix 7.3). The number of test sentences and the number of participants is very small. Therefore a follow-up study is desired.

4 Preference task

Because the Grammaticality judgement task did not yield interpretable significant results, we have opted for a follow up study in which other diagnostics were included. It can be sub classified in three minor tests. The first two follow straight from the Grammaticality judgement task (GJT) and are to assess if and which underlying order of PPs can be derived. The third test intends to test the new variables length and dependency, following Hawkins's PGCH.

4.1 Method

Participants

As in the GJT, friends of the author were approached and asked to participate in the experiment. All twelve participants were native speakers of Dutch. One participant spoke German fluently as a second language, having lived and being schooled in Germany in her early teenage years. All participants have finished or were in the final stages of finishing a university degree. Ages range from 24 years to 67 years old, with an average age of 33 years old.

Measure

For each subtest, participants were presented two sentences which formed minimal pairs, read out by the presenter. First, participants were asked if they regarded both sentences as grammatical. Second, they were asked if they had a preference for one sentence over the other, or no preference at all. Rating preference rather than grammaticality on an absolute scale may be expected to improve signal to noise ratio, as this circumvents the subjective matter of rating on an arbitrary scale.

Statistical analysis

We are aiming for a simple outcome measure that is representative of the general thrust of the theory, as the most simple test may be expected to yield significant results more readily compared to a more complicated test, involving more variables and confounding factors. Each of the three subtests required different analyses.

4.1.1 VP-topicalisation

In this test, participants were presented with sentences in which the combination of PP-types varied (manner, matter, benefactive, comitative or instrumental), giving a total of ten investigated PP combinations.

For each PP combination, two binary variables are investigated: the first is PP1-V versus PP2-V topicalisation (which PP the sentence starts with), and the second variable is double versus single topicalisation (if one or both PPs are at the start of the sentence). The numbers 1 and 2 represent possible PP-types. This leads to two pairs of test sentences. Within each pair, the PP1 versus PP2 topicalisation is varied, and the participant is asked to give a relative judgement of the preferred grammar. This is rated on a 3-point scale, whereby +1 represents a preference in accordance with the theory, -1 the opposite, and 0 no preference.

Table 4¹⁴*Possible Test sentences per PP-Type Combination*

Topicalised PP	Single PP	Double PP
PP1-V	PP1 V ... PP2	PP1PP2 V ...
PP2-V	PP2 V ... PP1	PP2PP1 V ...

Following the literature study, our hypothesis is that if there is a fixed base order of PPs, this would impose restrictions on PP topicalisation. For instance, manner is thought to be base generated before matter. Thus, in this topicalisation test, it is expected that if only one of the two PPs is topicalised with the verb, participants would regard test sentences with mannerPP topicalised as grammatical, since the mannerPP is the PP adjacent to the verb. If this is indeed confirmed, they are also expected, when topicalizing both PPs with the verb, to prefer a matter>manner>verb topicalisation over matter>manner?>verb topicalisation. If the reverse order is in fact the base order, opposite preferences will appear.

(48) Jan heeft met veel elan_{manner} over de paardensport_{matter} gesproken
Jan has with diligence about equestrian sport spoken

Table 5¹⁵*Possible Test sentences for manner-matter PP-Type Combination*

Topicalised element	Single PP	Double PP
PP1-V	Met veel elan gesproken heeft Jan over de paardensport	Met veel elan over de paardensport gesproken heeft Jan
PP2-V	Over de paardensport gesproken heeft Jan met veel elan	Over de paardensport met veel elan gesproken heeft Jan

We take the product between the outcome for the two pairs as our outcome measure, for the theory predicts the existence of an interaction between these two variables. If both pairs are rated by participants in accordance with the theory of Barbiers, the outcome measure is $+1*+1=+1$. The exact opposite pattern is also allowed according to Barbiers, as he does not argue in favour of particular order. The opposite judgements would give the same outcome measure of $-1*-1=+1$. In this way there is still a hierarchy, but a hierarchy contrary to what Schweikert found. Should only one of the sentences fit the theory, but not the other, this ought to be regarded as evidence against the theory ($-1*+1=-1$). The outcome -1 argues against the restrictions described by Barbiers, as apparently the hierarchy does not hold when topicalising. Should the statistics of this outcome measure be significantly positive over the whole dataset, this should be seen as support for the theory.

Furthermore, we consider the sum of the relative grammaticality judgements of two pairs, leading to a 5-point scale (-2...+2). This allows us to discriminate between affirmation of the order derived by Schweikert (+2), and the opposite order (-2).

The statistics over the population of these quantities are calculated for each PP-combination individually. Since the theory does not predict a difference between the PP-combinations, the statistics are also computed for the dataset as a single population, lumping all PP-combinations together.¹⁶

¹⁴ Expected interaction marked in bold.

¹⁵ Expected interaction marked in bold.

¹⁶ See appendix 3.1 for test sentences.

4.1.2 Extraction

In this test, similar to the sentences used in the GJT, participants were again presented with two minimal pairs with two different PPs (locative, benefactive, instrumental or comitative, all types which allow extraction). The two variables included in the two minimal pairs were the PP-type from which extraction had taken place, and the place of stranded P relative to the intact PP. So, from one of the two PPs the complement noun was extracted and moved to the front of the sentence, leaving the P stranded. The position of stranded P was either left or right of the second PP which had remained intact. See for instance the following two couplets:

- (49) De oceaan waar Greenpeace in voor de walvissen had gedobberd
The ocean which Greenpeace in for the whales had floated
- (50) De oceaan waar Greenpeace voor de walvissen in had gedobberd
The ocean which Greenpeace for the whales in had floated
- (51) De walvissen waar Greenpeace voor in de oceaan had gedobberd
The whales which Greenpeace for in the ocean had floated
- (52) De walvissen waar Greenpeace in de oceaan voor had gedobberd
The whales which Greenpeace in the ocean for had floated

Following the literature on restrictions on extraction, one of the sentences in which stranded P is left is expected to be regarded as less or not grammatical at all, since extraction from scrambled PP is not possible. If, in this example, locative-benefactive is indeed the correct word order as Schweikert found, it is the sentence in which the complement has been extracted from benefactive PP that is expected to be regarded as less- or ungrammatical as the stranded P is not in base position but has scrambled.¹⁷

Formally testing the data obtained against the theoretical predictions would require the design of complex outcome measures, which we consider outside the scope of this thesis. Instead, these data will be subjectively evaluated for congruence with the theory.

4.1.3 MiD and dependency

Following Hawkins's PGCH, we tested both preferences for length and for dependency, and the interference between these two preferences.

All sentences were subordinate or auxiliary sentences. Either no PP, one PP of both PPs had been extracted from the main clause, ending up to the right-hand side of the verb. Main clause sentences were excluded to minimize the number of test sentences as this was no relevant addition: in the subordinate and auxiliary sentences the surface order V PP PP already occurs when both PPs have been extraposed. Separable verbs were also excluded¹⁸.

For MiD (length of PP), one pair of PP-types (benefactive-instrumental) was selected. Again, participants were presented with minimal pairs of which they were asked if and if so which preference they had. Given the variation in verb type (subordinate or auxiliary) and extraposition (none, one or two), six combinations were possible. For each combination two sentence pairs were construed, in which PP length and relative position of PPs were variable. See for instance the two pairs of test sentences for subordinate, no PP-extraposition in an instrumental-benefactive combination:

¹⁷ See appendix 3.2 for test sentences.

¹⁸ See section 2.1.4 for motivation.

- (53) Jan zegt dat hij voor zijn zwaar dementerende moeder met een bezem heeft geveegd
John says that he for his heavily dementing mother with a broom has swiped
 Jan zegt dat hij met een bezem voor zijn zwaar dementerende moeder heeft geveegd
John says that he for his heavily dementing mother with a broom has swiped
- (54) Loes zegt dat ze voor Henk met allerlei interessante ingrediënten heeft gekookt
Loes says that she for Henk with various interesting ingredients has cooked
 Loes zegt dat ze met allerlei interessante ingrediënten voor Henk heeft gekookt
Loes says that she with various interesting ingredients for Henk has cooked

The same was done for dependency. However, this time not the length but dependency formed a variable. PP-type was not classified in this subtest, because dependent PPs cannot be classified in these terms.

- (55) Jan zegt dat hij in een lachbui tijdens de film is uitgebarsten
Jan says that he in a laughing fit during the film has burst out
 Jan zegt dat hij tijdens de film in een lachbui is uitgebarsten
Jan says that he during the film in a laughing fit has burst out

Since preferences for MiD and dependency can interfere with each other, for instance when a shorter PP is dependent, but places further from the verb, the interference of these preferences was also tested. Test sentences were construed in the same manner as with dependency, and as a variable length of PP was added, doubling the number of test sentences.¹⁹

As with the extraction preference task, formally testing the data obtained against the theoretical predictions would require the design of complex outcome measures, which we consider beyond the scope of this thesis. No statistical tests were applied, the data are subjectively evaluated for congruence with the theory.

4.2 Results

4.2.1 VP-topicalisation

In the method (4.1.1) we defined a measure of correspondence of the data and the theory. This outcome measure is designed such that if it yields a positive value the data are in correspondence with the theory and if it yields a negative outcome this indicates that it goes against the theory. We can compute this statistics either over the complete dataset or over the PP categories.

For the dataset as a whole, no significant correlation with the theory, either negative or positive, could be discerned. For the individual PP-type combinations, the anticipated outcome as described in the method section was found in two of the ten combinations, namely for the matter-comitative sentence pairs and the benefactive-comitative sentence pairs. Most values are tightly clustered around zero, but benefactive-comitative outcomes can be said to be in correspondence with the theory according to 95% confidence criterion interval. The matter-comitative value is close, but only borderline significant (see figure 10).

¹⁹ See appendix 3.3 for test sentences.

Figure 10

Distribution of Estimated Effect Size (Mean Scores)

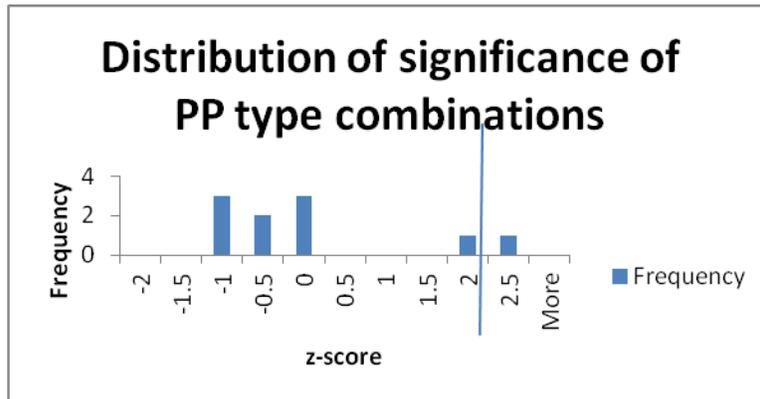


Figure 10 illustrates the distribution of z-scores for the different PP-type combinations, with a vertical line at 1.96. As the figure shows, only one (namely benefactive-comitative) has a z-score higher than 1.96. About this PP-type combination, it can be said with 95% certainty that the outcome is indeed bigger than 0, with 0 meaning 'no effect'. For all other PP-type combinations no claims of such certainty can be made.

It should be noted that when performing ten tests with a 95% confidence criterion (the ten PPtype combinations in this case), the expected number of spurious significant results is 0.5 ($0.05 \cdot 10$).

Of the other eight PP-type combinations, none showed significant results confirming the hypothesized order. Neither did these sentence pairs yield results that indicated a reverse order.

4.2.2 Extraction

In the extraction test, we aim to test if the order of PPs found by Schweikert as presented in 2.2.3 can also be found for Dutch. The expected pattern is confirmed in none of the sentence pairs. That is, extraction from the scrambled PP is expected to be less or not possible, but none of the preferences given confirmed this prediction.

Participants were given the opportunity to indicate if they thought one or both of the sentences was ungrammatical. They were also asked to give a preference. This means that in the analyses the sentences were scored on a three point scale: ungrammatical, grammatical (not preferred) or grammatical (preferred). There is not a single way to reduce these data to a single outcome measure; to illustrate that the expected pattern is not found, the data were interpreted in two slightly different ways. When counting the 'ungrammatical' sentences and the 'grammatical' (both preferred and not preferred) sentences for each group, the 'ungrammatical' score was never given most in the sentences in which this was expected. Also, when adding 'ungrammatical' and 'nonpreferred' sentences and comparing the addition to the 'preferred' sentences, the ungrammatical/nonpreferred group still did not exceed the 'preferred' group in the sentences in which this was expected. See for instance the scores for the sentences below in table 6:

Table 6

Cumulative Scores for Locative-Benefactive sentences in Extraction Test

Test Sentence	Ungrammatical	Grammatical (preferred)	Grammatical (not preferred)
(56) De oceaan waar Greenpeace in _{PPloc} voor de walvissen _{PPben} had gedobberd	7	1	4
(57) De oceaan waar Greenpeace voor de walvissen _{PPben} in _{PPloc} had gedobberd	1	10	1
(58) De walvissen waar Greenpeace voor _{PPben} in de oceaan _{PPloc} had gedobberd	1	6	5
(59) De walvissen waar Greenpeace in de oceaan _{PPloc} voor _{PPben} had gedobberd	0	4	8

The column under 'Ungrammatical' indicates the number of people who found the sentence ungrammatical, the column second from right those who indicated the sentence as grammatical (preferred) and the righthand column the number of people who found the sentence grammatical (unpreferred). So for sentence (56) and (57), when asked to compare those two sentences, seven people judged (56) as ungrammatical and one (57) as grammatical. Ten out of twelve people preferred (57) to (56), and one participant preferred (56) to (57). Of these four sentences, it is expected that (58) would be rated as less grammatical. However, only one person regarded the sentence as ungrammatical, and half the participants even preferred the sentence to (59).

Both ways of interpreting the data strongly argue against the theory. In fact, for a number of PP-type combinations, we found the exact opposite of what was expected. When comparing the number of 'ungrammatical' sentences to other scores, a reverse order from what Schweikert expected could be deduced. In the exemplary sentences above, (56) is regarded as least favourite, with only one preferred reply and over half ungrammatical responses. This would indicate that extraction from the locative PP in leftmost –scrambled- position is banned, and that the relative underlying order would be benefactive-locative, contrary to what Schweikert found for German.

This reversed pattern can be, next to locative-benefactive pair, observed for the locative-instrumental and locative comitative sentence pairs. For the locative-instrumental sentences, the $PP_{instr_extraction}-PP_{loc}$ sentence was regarded ungrammatical by one participant and preferred by five. The $PP_{loc_extraction}-PP_{instr}$ sentence on the other hand was regarded ungrammatical by five participants and preferred by one, suggesting that extraction from scrambled locative PP is banned whereas this was expected for instrumental PPs. The ungrammaticality score for locative-comitative is slightly lower, but still a four to one difference indicating that the locative has stranded. On average, these sentence are still regarded as fairly grammatical, but compared to the sentences were it was expected they score worse. This would suggest a base position for locative PP lower than benefactive, instrumental and comitative PP, contrary to what Schweikert observed for German. This is highly remarkable for these frequently used PP-types, high similarity to a related language such as German is expected based on analogy. Further research should determine whether indeed there is such a big difference in PP-orders of these languages.

4.2.3 Length and dependency

For the third of the three subtests, predictions were largely confirmed. For MiD, the sentences in which a prediction²⁰ could be made, the outcome corresponded to the literature. Sometimes the group of

²⁰ See section 2.1.4 for MiD predictions in table 2.

respondents showed no real preference, but never did they prefer the opposite from what was expected. For the sentences for which Hawkins made no prediction, respondents gave different answers and the group showed no real preference.

For dependency even stronger effects were observed²¹. In the test sentences, both an option in which only one of the PPs was dependent was included ('praten over het onderwerp'), as well as an option in which the verb and PP were dependent on each other (uitbarsten in een lachbui). Particularly with the latter the anticipated preference was not only confirmed, the other order was often regarded as ungrammatical by the majority of participants. Similar to MiD, in the sentences in which no preference was predicted, respondents gave various answers, but often expressing no preference for one of the two sentences.

For the sentences in which both length of PP and dependency varied, again predictions made were grossly confirmed. As with MiD, in some cases there was no real differentiation in the preference for one sentence over the other, but never was the opposite preferred. Again, similar to the dependency sentences, preferences were much stronger for the V_d PP_d (uitbarsten in een lachbui) sentences, in which the predicted non-preferred order was often judged ungrammatical. When V_d and PP_d are not adjacent, the majority of participants deemed the sentence ungrammatical. For those orders for which Hawkins makes no prediction, because preference for length and dependency pull in different directions, dependency often 'wins' over length, with participants showing preference for adjacency over short-before-long orderings. See table 7, which reports the outcome for two sentences for which, based on MiD and dependency predictions, it was unclear for which participant would (and if they would, which) express a preference.

Table 7²²
Scores for test sentences with conflicting MiD/dependency predictions (auxiliary verb)

Test Sentence	Preference	Ungrammatical	Grammatical (preferred)	Grammatical (not preferred)	Correspondence to theory
(78)	x Dependency	0	10	2	Preference for PPD-adjacency
	x MiD	4	0	8	
(80)	x Dependency	1	4	7	No strong preferences
	x MiD	0	3	9	

Sentence pair (78) is a pair in which the verb is dependent, as well as the PP (uitbarsten in een lachbui). For this sentence a preference for adjacency is observed, despite the PP_d being a longer phrase which increases the IC-to-word ratio. The order in which V_d and PP_d are not adjacent but separated by a short PP that was not dependent, was even regarded by 4 out of ten participants. In sentence pair (80) only one of the PPs was dependent and the verb itself was independent. Again, MiD and adjacency predictions pull in different directions. In this test sentence, the group of participants showed no overall preference for dependency or adjacency. Some individuals preferred the one option over the other, but those participants that did express a preference did not agree.

²¹ See section 2.1.4 for dependency predictions in table 3.

²² See section 7 appendix 7.3.3 for test sentences.

5 Conclusion and discussion

5.1 Grammaticality judgement task

In all six subgroups, none of test sentence types yielded significantly lower results than all three other sentence types. Schweikert's findings of a fixed ordering of PPs in German could not be reproduced in this grammaticality judgement task for Dutch, which gives rise to questioning the validity of the theory that PP-types have a base position that can be traced back in native speaker's intuitions.

The matter PP, which is lowest in Schweikert's hierarchy, did score results in some cases that suggest that the PP-type does indeed have a place base generated lower than comitative and benefactive PPs. Please note that the sentence type with scrambled, manipulated matter PP scores significantly lower than two out of three other sentence types. The underlying relative order for matter and instrumental PPs (subgroup 6) is hard to assess based on the grammaticality judgement task, since this subgroup consisted only of four sentences. No significant differences were found.

Based on the outcome of this study, there is an indication that comitative and instrumental PPs have a reverse underlying order compared to what Schweikert retrieved, in which instrumental PPs are higher in the hierarchy. However, there are no significant differences with the other test types, therefore further research is needed.

Schweikert found judgements sharpened when the distance of the two PPs in the hierarchy increased (Schweikert 2004). Therefore, I expected that the instrumental-matter and the comitative-benefactive combinations would give less clear results than the other four subgroups, since these two lie close aside in the hierarchy. The former group of the two only had one sentence per sentence type, which is not enough to interpret its outcome. The comitative-benefactive subgroup consisted of 27 sentences. This is one of the larger subgroups and no significant results were found. Therefore, it appears that participants did find it harder to judge these sentences than in other subgroups where the two thematic PPs supposedly lie further apart. However, this was also the subgroup which has two other variables (place of verb and type of diagnostic) included, which is likely to have an effect and could explain why throughout the group preferences were more homogeneous than in other subgroups. The benefactive-instrumental subgroup consists of PP-types that, according to Schweikert, lie further apart. Based on the fact that no significant differences were found, one could argue that participants also found it harder to judge these sentences. However, as with instrumental-matter subgroup, there was only one sentence per sentence type.

The main strength of the study lies in the fact that it is the first of its kind conducted for Dutch, therefore providing a first empirical exploration on the relative ordering of PPs in Dutch. Previously, speakers' intuitions have not been used to empirically test theories. Furthermore, the fact that the test sentences for this first task were recorded and presented auditorily excluded variation in intonation which can alter interpretation significantly. The auditive presentation limited participants in their freedom to apply their own intonation to sentences had they been presented visually.

Given the number of variables incorporated in the test sentences, the number of participants as well as the number of test sentences per subgroup was too small for the study to provide unambiguous results. The only variable of which the relation with the outcome was tested, was the order/place of diagnostic interaction. The two other variables, interaction with place of verb (present in test sentences of subgroups 1 and 2) and diagnostic used (present in subgroups 1,3 and 5) were ignored since this would make expected counts lower, making it harder to find (significant) differences. This could have influenced the

results. Furthermore, the group of participants was a very homogeneous group of academically educated friends from the author's group of friends, all within their twenties or thirties.

The lack of empirical support for Schweikert's theory could be explained by the fact that there is no fixed order, but that the ordering is determined by other, language external processes, as for instance Hawkins argues. Alternative explanations for the generated results could be found in Hawkins's principle of MiD or relations of dependency. The sentences in this study did not have variation in length of PP, therefore at this stage I am unable to assess the legitimacy of Hawkins's claim that lengths of PP is a relevant factor. Based on his assumption that difference in length of PPs influences their ordering (MiD), and given the fact that this sort of variation was not included in the set-up of the test, one could expect that there would be no preference for either order as shown by participants. Only in the comitative-instrumental subgroup, the sentences in which the instrumental PP was manipulated had an extra object NP 'de brief' that alternated in order with the instrumental PP. Since it is the only subgroup in which MiD was to play a role, no comparisons and therefore no conclusions regarding this could be made.

However, dependency relations between the verb and one or more of the PPs could be of influence. As argued earlier, it is hard to determine what such a relation consists of and equally hard how to determine whether there is one. In the experimental set up, separable verbs were excluded. Since dependency relations were avoided when constructing the sentences and therefore cannot be traced, the results of this test cannot tell anything about the validity of Hawkins's arguments. Further research remains necessary to assess if MiD or dependency provide a better explanation for preferences in order.

Although Schweikert's results cannot be reproduced in this task, his conclusions need not immediately be rejected. The possible interference of methodological flaws should not be overlooked. Moreover, the diagnostics incorporated in this test are different from the ones Schweikert used, as he focused more on scopal properties of the PPs. Therefore, it would also be interesting to compare the results to the order proposed by Ruys, which alters in the benefactive-instrumental order from Schweikert. However, this subgroup is one of the groups of which too little sentences are incorporated to draw conclusions.

For the first variable of the test – the position of a PP when a diagnostic is applied – I expected to find a pattern sentences in which a scrambled PP was manipulated would score lower than other three types. The fact that this prediction was not borne out throughout the study could undermine the theory of a language internal order of PPs. It can also be explained by the fact that the number of test sentences for each subgroup is not big enough.

5.2 Preference task

The first two of three preference tasks were to derive if, and if so which, an underlying order of PP-types can be derived. As with the grammaticality judgement task, the results overall did not confirm the theory.

Two of the ten PP-combinations did yield significant results in the VP-topicalisation test; the matter-comitative and benefactive-comitative sentences. These can be interpreted in congruence with the theory, as the anticipated interaction between the two pairs is observed. For the benefactive-comitative sentence pairs, the product of the results was 1 in four out of twelve times and in all of those cases the sum was +2 (with a sum of +2 indicating it is in congruence with the theory, and -2 that an opposite order is preferred). For the matter-comitative pair the product of the results was 1 in three out of twelve times, again in all of those cases the sum was +2. Subsequently, these two (borderline) significant results confirm Schweikert's found PP order. Interestingly, none of the PP-type combinations yielded the opposite results, although the theory leaves room for this option. After all, Barbiers does not argue in favour of a fixed order, but a more natural order leaving the option of a different order than Schweikert's

open. Other orders can be possible, which would mean that participants could have preferred the reverse interaction pattern.

The extraction test did not yield results that confirmed Schweikert's order; in fact, the reverse order can be deduced from the results concerning all sentences with a locative PP. This could be interpreted as a base position of locative PPs to the right of the other PP-types tested. Alternatively, this could be accounted for by the fact that the locative PPs do not have an equal adjunct status compared to the other PP-types. The length does not differ and therefore cannot be an explanation. Hawkins's pro-test and pro-verb entailment test do not indicate that the locative PP and/or the V in these test sentences are dependent, and therefore cannot account for a preference of participants to place the locative right of other PPs or next to the verb.

Length and dependency predictions were grossly confirmed by the data. This is not very surprising, as only the sentences that were least challenging for the theory were included. Further research should reveal to what extent the theory stands when for instance separable verbs are included in the tests, and when other conceivable combinatorial relations beyond the VP are included.

5.3 General discussion

In the introduction it was stated that this study seeks to derive if native speakers of Dutch show preference for a fixed order of multiple PPs, and if so which. Our hypothesis, based on extensive literature on this topic, was that there would be such an order and that this would resemble Schweikert's (2005) findings for German.

As was discussed in the previous paragraphs, neither of the tasks performed in this study yielded results indicating that there is a fixed order of PPs in Dutch. The grammaticality judgment task indicates that the matter PP is base generated lower than comitative and benefactive PPs. The results of the comitative-instrumental subgroup suggests that possibly the underlying order is the opposite of what Schweikert has found previously. The VP-topicalisation preference test showed hearers' preference in line with Schweikert's order for two out of ten combinations, for the other eight no preference was deduced. However, in the extraction and reduction tests a reverse order was found for combinations involving a locative PP. As suggested above, this could be caused by a different interpretation of the PP locative as an adjunct. These tests should be run on a bigger scale in order to determine whether the conclusions drawn here are indeed bigger trends and can be interpreted as an empirical argument against the language universal theories on PP orderings.

Hawkins's predictions on the effect of relative length of PPs and the dependency relations with the verb are largely confirmed by the preference task. This could indicate that processing plays an important part in judging the grammaticality of word order, specifically multiple PPs. The validation is limited, given the fact that other interesting word orders specific to Dutch that challenge Hawkins's theory most, in particular separable verbs, were not included. In addition the effect of length and dependency of larger structural domains with other functional projections ought to be assessed.

This study therefore shows none of the theories discussed here validated by empirical data. This could be an indication that these theories in general fail to account for the variation and limitations on variation in syntax found in natural language, or that the Dutch language in particular poses interesting questions in the matter. Further research however is needed in order to determine whether this is indeed the case, as the theories are neither refuted by the empirical results presented here. Translating these theories into tests that can generate empirical data that either validate or refute these theories remains a challenge.

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7 Appendices

7.1 Appendix 1: test sentences in Grammaticality Judgement task

Extraction

Subgroup 1: Comitative-Benefactive

De broer waar Hans voor met zijn zus boodschappen heeft gedaan
De zus waar Hans voor zijn broer mee boodschappen heeft gedaan
De zus waar Hans voor zijn broer boodschappen mee heeft gedaan
De leerling waar Hans voor met de rector heeft gesproken
De rector waar Hans voor de leerling mee heeft gesproken
De broer waar Hans met zijn zus voor boodschappen heeft gedaan
De zus waar Hans mee voor zijn broer boodschappen heeft gedaan
De leerling waar Hans met de rector voor heeft gesproken
De rector waar Hans mee voor de leerling heeft gesproken
De broer waar Hans met zijn zus boodschappen voor heeft gedaan

Subgroup 2: Comitative instrumental

De vulpen waar Kees mee met zijn moeder de brief heeft geschreven
De telefoon waar Kees mee met zijn moeder heeft gesproken
De ouder waar Kees met de telefoon mee heeft gesproken
De ouder waar Kees mee met de telefoon heeft gesproken
De ouder waar Kees mee met de telefoon heeft gesproken
De telefoon waar Kees met zijn moeder mee heeft gesproken
De vulpen waar Kees met zijn moeder mee de brief heeft geschreven
De vulpen waar Kees met zijn moeder de brief mee heeft geschreven

Subgroup 3: Comitative-Matter

De vriend waar Marie over met haar moeder had gesproken
De zus waar Marie over haar vriend mee had gesproken
De vriend waar Marie met haar moeder over had gesproken
De zus waar Marie mee over haar vriend had gesproken

Subgroup 4: Benefactive-Instrumental

De klant waar Van Gogh met een penseel voor heeft geschilderd
Het penseel waar Van Gogh mee voor een klant heeft geschilderd
De klant waar Van Gogh voor met een penseel heeft geschilderd
Het penseel van Van Gogh met een klant mee geeft geschilderd

Subgroup 5: Benefactive-Matter

Het onderwerp waar Piet over voor Greenpeace had gesproken
De milieuorganisatie waar Piet over zure regen voor had gesproken
Het onderwerp waar Piet voor Greenpeace over had gesproken
De milieuorganisatie waar Piet voor over zure regen had gesproken

Subgroup 6: Instrumental-matter

Het onderwerp waar Peter over met een vulpen had geschreven
De vulpen waar Peter over het onderwerp mee had geschreven
Het onderwerp waar Peter met een vulpen over had geschreven
De vulpen waar Peter mee over het onderwerp had geschreven

Reduction

Subgroup 1: Comitative-Benefactive

Marleen zegt dat ze met 'm voor Ineke boodschappen heeft gedaan
Marleen heeft met 'm boodschappen gedaan voor Ineke
Marleen heeft met 'm voor Ineke boodschappen gedaan
Marleen deed boodschappen met 'm voor Ineke
Marleen zegt dat ze met Ineke voor 'm boodschappen heeft gedaan
Marleen heeft met Ineke voor 'm boodschappen gedaan
Marleen heeft met Ineke boodschappen gedaan voor 'm
Marleen deed boodschappen met Ineke voor 'm
Marleen zegt dat ze voor Ineke met 'm boodschappen heeft gedaan
Marleen heeft voor Ineke met 'm boodschappen gedaan
Marleen heeft voor Ineke boodschappen gedaan met 'm
Marleen deed boodschappen voor Ineke met 'm
Marleen zegt dat ze voor 'm met Ineke boodschappen heeft gedaan
Marleen heeft voor 'm met Ineke boodschappen gedaan
Marleen heeft voor 'm boodschappen gedaan met Ineke
Marleen deed boodschappen voor 'm met Ineke

Subgroup 3: Comitative-Matter

Esme zegt dat zij met 'm over het weer heeft gesproken
Esme heeft met 'm over het weer gesproken
Esme heeft met 'm gesproken over het weer
Esme sprak met 'm over het weer
Piet zegt dat hij met Jose over 'm heeft gesproken
Piet heeft met Jose over 'm gesproken
Piet heeft met Jose gesproken over 'm
Piet sprak met Jose over 'm
Esme zegt dat zij over het weer met 'm heeft gesproken
Esme heeft over het weer met 'm gesproken
Esme heeft over het weer gesproken met 'm
Esme sprak over het weer met 'm
Piet zegt dat hij over 'm met Jose heeft gesproken
Piet heeft over 'm met Jose gesproken
Piet heeft over 'm gesproken met Jose
Piet sprak over 'm met Jose

Subgroup 5: Benefactive-Matter

Truus zegt dat zij voor 'm over het onderwerp heeft gesproken
Truus heeft voor 'm over het onderwerp gesproken
Truus heeft voor 'm gesproken over het onderwerp
Cato zegt dat zij voor Laura over 'm heeft gesproken
Marie sprak voor 'm over het onderwerp
Cato heeft voor Laura over 'm gesproken
Cato heeft voor Laura gesproken over 'm
Cato sprak voor Laura over 'm
Truus zegt dat zij over het onderwerp voor 'm heeft gesproken
Marie heeft over het onderwerp voor 'm gesproken
Truus heeft over het onderwerp gesproken voor 'm
Cato heeft over 'm voor Laura gesproken
Marie sprak over het onderwerp voor 'm
Cato zegt dat ze over 'm voor Laura heeft gesproken
Cato heeft over 'm gesproken voor Laura
Cato sprak over 'm voor Laura

7.2 Appendix 2: tables for Grammaticality Judgement Task

Table 8

Scores for comitative-benefactive test sentences

Score	Measure	Com- ben	Com- Ben	Ben- com	Com- ben	Ben- com	Ben- com	Com- Ben	Ben- com	Ben- com	Com- Ben	Ben- com	Com- ben
1	%(count)	10.9 (15)	14.7 (27)	11.8 (19)	10.9 (15)	18.1 (25)	11.8 (19)	14.7 (27)	18.1 (25)	11.8 (19)	14.7 (27)	18.1 (25)	10.9 (15)
2	%(count)	19.6 (27)	19.6 (36)	18 (29)	19.6 (27)	18.1 (25)	18 (29)	19.6 (36)	18.1 (25)	18 (29)	19.6 (36)	18.1 (25)	19.6 (27)
3	%(count)	18.1 (25)	10.3 (19)	19.3 (31)	18.1 (25)	12.3 (17)	19.3 (31)	10.3 (19)	12.3 (17)	19.3 (31)	10.3 (19)	12.3 (17)	18.1 (25)
4	%(count)	24.6 (34)	23.9 (44)	22.4 (36)	24.6 (34)	21 (29)	22.4 (36)	23.9 (44)	21 (29)	22.4 (36)	23.9 (44)	21 (29)	24.6 (34)
5	%(count)	26.8 (37)	31.5 (58)	28.6 (46)	26.8 (37)	30.4 (42)	28.6 (46)	31.5 (58)	30.4 (42)	28.6 (46)	31.5 (58)	30.4 (42)	26.8 (37)
Mean		3.37	3.38	3.38	3.37	3.28	3.38	3.38	3.28	3.38	3.38	3.28	3.37
SD		1.35	1.46	1.37	1.35	1.50	1.37	1.46	1.50	1.37	1.46	1.50	1.35
chi2			4.99		.45		4.39		1.27		5.70		4.81
kendall's tau-c			.02		-.00		.03		-.04		0.00		0.03
gamma			.02		-.00		-.04		-.05		0.01		0.03

Table 9

Scores for comitative-instrumental test sentences

Score	Measure	Com- instr	Com- instr	Instr- com	Com- instr	Instr- com	Instr- com	Com- instr	Instr- com	Instr- com	Com- instr	Instr- com	Com- instr
1	%(count)	47.8 (22)	10.1 (7)	21.7 (5)	47.8 (22)	30.4 (14)	21.7 (5)	10.1 (7)	30.4 (14)	21.7 (5)	10.1 (7)	30.4 (14)	47.8 (22)
2	%(count)	28.3 (13)	14.5 (10)	30.4 (7)	28.3 (13)	19.6 (9)	30.4 (7)	14.5 (10)	19.6 (9)	30.4 (7)	14.5 (10)	19.6 (9)	28.3 (13)
3	%(count)	13 (6)	13 (9)	13 (3)	13 (6)	19.6 (9)	13 (3)	13 (9)	19.6 (9)	13 (3)	13 (9)	19.6 (9)	13 (6)
4	%(count)	4.3 (2)	30.4 (21)	21.7 (5)	4.3 (2)	15.2 (7)	21.7 (5)	30.4 (21)	15.2 (7)	21.7 (5)	30.4 (21)	15.2 (7)	4.3 (2)
5	%(count)	6.5 (3)	31.9 (22)	13 (3)	6.5 (3)	15.2 (7)	13 (3)	31.9 (22)	15.2 (7)	13 (3)	31.9 (22)	15.2 (7)	6.5 (3)
Mean		1.93	3.59	2.74	1.93	2.65	2.74	3.59	2.65	2.74	5.69	2.65	1.93
SD		1.17	1.33	1.36	1.17	1.43	1.39	1.36	1.43	1.36	1.33	1.43	1.17
chi2		35.71*** ^a		8.01		2.00		13.07		6.87		7.48	
kendall's tau-c		0.58***		-0.31*		0.04		-.35***		.26**		-.28**	
gamma		0.71***		-0.45*		0.06		-.44***		.42**		-.38**	

Note. * $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$, ^a)minimum expected count is less than 5

Table 10

Scores for comitative-matter test sentences

Score	Measure	Com-mat	Com-mat	Mat-com	Com-mat	Mat-com	Mat-com	Com-mat	Mat-com	Mat-com	Com-mat	Mat-com	Com-mat
1	% (count)	10.9 (5)	47.8 (11)	15.2 (7)	10.9 (5)	36.2 (25)	15.2 (7)	47.8 (11)	36.2 (25)	15.2 (7)	47.8 (11)	36.2 (25)	10.9 (5)
2	% (count)	15.2 (7)	34.8 (8)	21.7 (10)	15.2 (7)	20.3 (14)	21.7 (10)	34.8 (8)	20.3 (14)	21.7 (10)	34.8 (8)	20.3 (14)	15.2 (7)
3	% (count)	13 (6)	8.7 (2)	13 (6)	13 (6)	18.8 (13)	13 (6)	8.7 (2)	18.8 (13)	13 (6)	8.7 (2)	18.8 (13)	13 (6)
4	% (count)	34.8 (16)	0 (0)	21.7 (10)	34.8 (16)	13 (9)	21.7 (10)	0 (0)	13 (9)	21.7 (10)	0 (0)	13 (9)	34.8 (16)
5	% (count)	26.1 (12)	8.7 (2)	28.3 (13)	26.1 (12)	11.6 (8)	28.3 (13)	8.7 (2)	11.6 (8)	28.3 (13)	8.7 (2)	11.6 (8)	26.1 (12)
Mean		3.5	1.87	3.26	3.5	2.43	3.26	1.87	2.43	3.26	1.87	2.43	3.5
SD		1.33	1.18	1.47	1.33	1.4	1.47	1.18	1.40	1.47	1.18	1.40	1.33
chi2			22.27*** ^a		2.29		10.43*		6.33		15.2*** ^a		17.09**
kendall's tau-c			-.54***		0.08		.31**		0.17		-.46***		.40***
gamma			-.71***		0.10		.39**		0.31		-.64***		.50***

Note. * $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$, ^a) minimum expected count is less than 5

Table 11

Scores for benefactive-instrumental test sentences

Score	Measure	Ben- instr	Ben- instr	Instr- ben	Ben- instr	Instr- ben	Instr- ben	Ben- instr	Instr- ben	Instr- ben	Ben- instr	Instr- ben	Ben- instr
1	%(count)	21.7 (5)	4.3 (1)	0 (0)	21.7 (5)	13 (3)	0 (0)	4.3 (1)	13 (3)	0 (0)	4.3 (1)	13 (3)	21.7 (5)
2	%(count)	21.7 (5)	13 (3)	4.3 (1)	21.7 (5)	8.7 (2)	4.3 (1)	13 (3)	8.7 (2)	4.3 (1)	13 (3)	8.7 (2)	21.7 (5)
3	%(count)	13 (3)	4.3 (1)	4.3 (1)	13 (3)	21.7 (5)	4.3 (1)	4.3 (1)	21.7 (5)	4.3 (1)	4.3 (1)	21.7 (5)	13 (3)
4	%(count)	17.4 (4)	26.1 (6)	56.5 (13)	17.4 (4)	30.4 (7)	56.5 (13)	26.1 (6)	30.4 (7)	56.5 (13)	26.1 (6)	30.4 (7)	17.4 (4)
5	%(count)	26.1 (6)	52.2 (12)	34.8 (8)	26.1 (6)	26.1 (6)	34.8 (8)	52.2 (12)	26.1 (6)	34.8 (8)	52.2 (12)	26.1 (6)	26.1 (6)
Mean		3.04	4.09	4.22	3.04	3.48	4.22	4.09	3.48	4.22	4.09	3.48	3.04
SD		1.52	1.21	0.72	1.52	1.31	0.72	1.21	1.31	0.72	1.21	1.31	1.52
chi2			6.57		13.72 ^{***ab}		8.09		5.94		5.38		3.10
kendall's tau-c			.37 ^{**}		-.42 ^{**}		.31 [*]		-.29		.07		-.15
gamma			.50 ^{**}		-.52 ^{**}		.43 [*]		-.39		.10		-.19

Note. * $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$, ^a) minimum expected count is less than 5, ^b) more than 20% of cells have expected count of less than five

Table 12

Scores for benefactive-instrumental test sentences

Score	Measure	Ben-mat	Ben-mat	Mat-ben	Ben-mat	Mat-ben	Mat-ben	Ben-mat	Mat-ben	Mat-ben	Ben-mat	Mat-ben	Ben-mat
1	%(count)	13.9 (16)	17.4 (20)	23.5 (27)	13.9 (16)	27.8 (32)	23.5 (27)	17.4 (20)	27.8 (32)	23.5 (27)	17.4 (20)	27.8 (32)	13.9 (16)
2	%(count)	18.3 (21)	20.9 (24)	27 (31)	18.3 (21)	34.8 (40)	27 (31)	20.9 (24)	34.8 (40)	27 (31)	20.9 (24)	34.8 (40)	18.3 (21)
3	%(count)	11.3 (13)	15.7 (18)	20 (23)	11.3 (13)	16.5 (19)	20 (23)	15.7 (18)	16.5 (19)	20 (23)	15.7 (18)	16.5 (19)	11.3 (13)
4	%(count)	30.4 (35)	20.9 (24)	18.3 (21)	30.4 (35)	13.9 (16)	18.3 (21)	20.9 (24)	13.9 (16)	18.3 (21)	20.9 (24)	13.9 (16)	30.4 (35)
5	%(count)	26.1 (30)	25.2 (29)	11.3 (13)	26.1 (30)	7 (8)	11.3 (13)	25.2 (29)	7 (8)	11.3 (13)	25.2 (29)	7 (8)	26.1 (30)
Mean		3.37	3.16	2.67	3.37	2.50	2.67	3.16	2.50	2.67	3.16	2.50	3.37
SD		1.40	1.45	1.32	1.40	1.25	1.32	1.45	1.25	1.32	1.45	1.25	1.40
chi2			3.52		17.74***		3.81		20.32***		8.84		32.19***
kendall's tau-c			-.08		.28***		.13		-.31***		.19**		.39***
gamma			-.10		.35***		.16		-.38***		.24**		.48***

Note. * $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$

Table 13

Scores for *instrmental-matter* test sentences

Score	Measure	Instr- mat	Instr- mat	Mat- instr	Instr- mat	Mat- instr	Mat- instr	Instr- mat	Mat- instr	Mat- instr	instr- mat	Mat- instr	Instr- mat
1	%(count)	0 (0)	0 (0)	21.7 (5)	0 (0)	8.7 (2)	21.7 (5)	0 (0)	8.7 (2)	21.7 (5)	0 (0)	8.7 (2)	0 (0)
2	%(count)	4.3 (1)	4.3 (1)	30.4 (7)	4.3 (1)	8.7 (2)	30.4 (7)	4.3 (1)	8.7 (2)	30.4 (7)	4.3 (1)	8.7 (2)	4.3 (1)
3	%(count)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)	8.7 (2)
4	%(count)	30.4 (7)	21.7 (5)	8.7 (2)	30.4 (7)	34.8 (8)	8.7 (2)	21.7 (5)	34.8 (8)	8.7 (2)	21.7 (5)	34.8 (8)	30.4 (7)
5	%(count)	56.5 (13)	65.2 (15)	30.4 (7)	56.5 (13)	39.1 (9)	30.4 (7)	65.2 (15)	39.1 (9)	30.4 (7)	65.2 (15)	39.1 (9)	56.5 (13)
Mean		4.39	4.48	2.96	4.39	3.87	2.96	4.48	3.87	2.96	4.48	3.87	4.39
SD		0.82	0.83	1.57	0.82	1.26	1.57	0.83	1.26	1.57	0.83	1.26	0.82
chi2			.48		14.08** ^{ab}		7.91		4.53		13.70** ^{ab}		3.13
kendall's tau-c			.77		.49***		-.30		-.29		.52***		.22
gamma			.14		.62***		-.37		-.44		.68***		.34

Note. * $p < 0.001$, ** $p < 0.01$, *** $p < 0.05$, ^a) minimum expected count is less than 5, ^b) more than 20% of cells have expected count of less than five

7.3 Appendix 3: test sentences for Preference Task

7.3.1: VP-topicalisation

Manner-Matter

Over de paardensport gesproken heeft Jan met veel elan
Met veel elan gesproken heeft Jan over de paardensport

Met veel elan over de paardensport gesproken heeft Jan
Over de paardensport met veel elan gesproken heeft Jan

Manner-Benefactive

Voor zijn ouders geklust heeft Jan met pijn en moeite
Met pijn en moeite geklust heeft Jan voor zijn ouders

Met pijn en moeite voor zijn ouders geklust heeft Jan
Voor zijn ouders met pijn en moeite geklust heeft Jan

Manner-Instrumental

Op zijn manier geklust heeft Jan met een schroevendraaier
Met een schroevendraaier geklust heeft Jan op zijn manier

Met een schroevendraaier op zijn manier geklust heeft Jan
Op zijn manier met een schroevendraaier geklust heeft Jan

Manner-Comitative

Met de buurman hout gehakt heeft Jan op zijn manier
Op zijn manier hout gehakt heeft Jan met de buurman

Op zijn manier met de buurman hout gehakt heeft Jan
Met de buurman op zijn manier hout gehakt heeft Jan

Matter-Benefactive

Over de biodiversiteit gesproken heeft Jan voor de natuurschng
Voor de natuurschng gesproken heeft Jan over de biodiversiteit

Voor de natuurschng over de biodiversiteit gesproken heeft Jan
Over de biodiversiteit voor de natuurschng gesproken heeft Jan

Matter-Instrumental

Over de biodiversiteit geschreven heeft Jan met een pen
Met een pen geschreven heeft Jan over de biodiversiteit

Met een pen over de biodiversiteit geschreven heeft Jan
Over de biodiversiteit met een pen geschreven heeft Jan

Matter-Comitative

Over de biodiversiteit gesproken heeft Jan met Bas Haring
Met Bas Haring gesproken heeft Jan over de biodiversiteit

Met Bas Haring over de biodiversiteit gesproken heeft Jan
Over de biodiversiteit met Bas Haring gesproken heeft Jan

Benefactive-Instrumental

Met dat penseel geschilderd heeft Jan voor een klant
Voor een klant geschilderd heeft Jan met dat penseel

Voor een klant met dat penseel geschilderd heeft Jan
Met dat penseelvoor een klant geschilderd heeft Jan

Benefactive-Comitative

Voor de kinderen gekookt heeft Jan met zijn vrouw
Met zijn vrouw gekookt heeft Jan voor de kinderen

Met zijn vrouw voor de kinderen gekookt heeft Jan
Voor de kinderen met zijn vrouw gekookt heeft Jan

Instrumental-Comitative

Met een hapjespan gekookt heeft Jan met zijn broer
Met zijn broer gekookt heeft Jan met een hapjespan

Met zijn broer met een hapjespan gekookt heeft Jan
Met een hapjespan met zijn broer gekookt heeft Jan

7.3.2: Test sentences for extraction

Locative-Benefactive

- 21 De oceaan waar Greenpeace in voor de walvissen had gedobberd
De oceaan waar Greenpeace voor de walvissen in had gedobberd
- 22 De walvissen waar Greenpeace voor in de oceaan had gedobberd
De walvissen waar Greenpeace in de oceaan voor had gedobberd

Locative-Instrumental

- 23 De tuin waar Peter in met een schop had staan spitten
De tuin waar Peter met een schop in had staan spitten
- 24 De schop waar Peter mee in de tuin had staan spitten
De schop waar Peter in de tuin mee had staan spitten

Locative-Comitative

- 25 De tuin waar Marie in met zijn moeder had gepicknickt
De tuin waar Marie met zijn moeder in had gepicknickt
- 26 De ouder waar Marie mee in de tuin had gepicknickt
De ouder waar Marie in de tuin mee had gepicknickt

Benefactive-Instrumental

- 27 De klant waar Van Gogh met een penseel voor heeft geschilderd
De klant waar Van Gogh voor met een penseel heeft geschilderd
- 28 Het penseel waar Van Gogh voor een klant mee heeft geschilderd
Het penseel waar Van Gogh mee voor een klant heeft geschilderd

Benefactive-Comitative

- 29 De broer waar Hans voor met zijn zus boodschappen heeft gedaan
De broer waar Hans met zijn zus voor boodschappen heeft gedaan
- 30 De zus waar Hans mee voor zijn broer boodschappen heeft gedaan
De zus waar Hans voor zijn broer mee boodschappen heeft gedaan

Instrumental-Comitative

- 31 De vulpen waar Kees mee met zijn moeder de brief heeft geschreven
De vulpen waar Kees met zijn moeder mee de brief heeft geschreven
- 32 De ouder waar Kees mee met een pen de brief heeft geschreven
De ouder waar Kees met een pen mee de brief heeft geschreven

7.3.3: Test sentences for length/dependency

MiD

Subordinate

- 33 Jan zegt dat hij voor zijn zwaar dementerende moeder met een bezem heeft geveegd
Jan zegt dat hij met een bezem voor zijn zwaar dementerende moeder heeft geveegd
- 34 Loes zegt dat ze voor Henk met allerlei interessante ingrediënten heeft gekookt
Loes zegt dat ze met allerlei interessante ingrediënten voor Henk heeft gekookt
- 35 Jan zegt dat hij met een bezem heeft geveegd voor zijn zwaar dementerende moeder
Jan zegt dat hij voor zijn zwaar dementerende moeder heeft geveegd met een bezem
- 36 Loes zegt dat ze met allerlei interessante ingrediënten heeft gekookt voor Henk
Loes zegt dat ze voor Henk heeft gekookt met allerlei interessante ingrediënten
- 37 Jan zegt dat hij heeft geveegd voor zijn zwaar dementerende moeder met een bezem
Jan zegt dat hij heeft geveegd met een bezem voor zijn zwaar dementerende moeder
- 38 Loes zegt dat ze heeft gekookt voor Henk met allerlei interessante ingrediënten
Loes zegt dat ze heeft gekookt met allerlei interessante ingrediënten voor Henk

Auxiliary

- 39 Jan heeft met een bezem voor zijn zwaar dementerende moeder geveegd
Jan heeft voor zijn zwaar dementerende moeder met een bezem geveegd
- 40 Loes heeft voor Henk met allerlei interessante ingrediënten gekookt
Loes heeft met allerlei interessante ingrediënten voor Henk gekookt
- 41 Jan heeft voor zijn zwaar dementerende moeder geveegd met een bezem
Jan heeft met een bezem geveegd voor zijn zwaar dementerende moeder
- 42 Loes heeft met allerlei interessante ingrediënten gekookt voor Henk
Loes heeft voor Henk gekookt met allerlei interessante ingrediënten
- 43 Jan heeft geveegd met een bezem voor zijn zwaar dementerende moeder
Jan heeft geveegd voor zijn zwaar dementerende moeder met een bezem
- 44 Loes heeft gekookt voor Henk met allerlei interessante ingrediënten
Loes heeft gekookt met allerlei interessante ingrediënten voor Henk

Dependency

Subordinate

- 45 Jan zegt dat hij in een lachbui tijdens de film is uitgebarsten
Jan zegt dat hij tijdens de film in een lachbui is uitgebarsten
- 46 Piet zegt dat hij in de tuin over het onderwerp heeft gepraat
Piet zegt dat hij over het onderwerp in de tuin heeft gepraat
- 47 Jan zegt dat hij in een lachbui is uitgebarsten tijdens de film
Jan zegt dat hij tijdens de film is uitgebarsten in een lachbui
- 48 Piet zegt dat hij met een vriend heeft gepraat in de tuin
Piet zegt dat hij in de tuin heeft gepraat met een vriend
- 49 Jan zegt dat hij is uitgebarsten in een lachbui tijdens de film

Jan zegt dat hij is uitgebarsten tijdens de film in een lachbui

- 50 Piet zegt dat hij heeft gepraat met een vriend in de tuin
Piet zegt dat hij heeft gepraat in de tuin met een vriend

Auxiliary

- 51 Jan zal in een lachbui tijdens de film uitbarsten
Jan zal tijdens de film in een lachbui uitbarsten

- 52 Piet zal met een vriend in de tuin praten
Piet zal in de tuin met een vriend praten

- 53 Jan zal in een lachbui uitbarsten tijdens de film
Jan zal tijdens de film uitbarsten in een lachbui

- 54 Piet zal met een vriend praten in de tuin
Piet zal in de tuin praten met een vriend

- 55 Jan zal uitbarsten in een lachbui tijdens de film
Jan zal uitbarsten tijdens de film in een lachbui

- 56 Piet zal praten met een vriend in de tuin
Piet zal praten in de tuin met een vriend

Interference MiD and dependency

- 57 Jan zegt dat hij in een zeer hevige lachbui tijdens de film is uitgebarsten
Jan zegt dat hij tijdens de film in een zeer hevige lachbui is uitgebarsten

- 58 Jan zegt dat hij in een lachbui tijdens de veel te lang durende film is uitgebarsten
Jan zegt dat hij tijdens de veel te lang durende film in een lachbui is uitgebarsten

- 59 Piet zegt dat hij in de pas aangeharkte tuin over het onderwerp heeft gepraat
Piet zegt dat hij over het onderwerp in de pas aangeharkte tuin heeft gepraat

- 60 Piet zegt dat hij in de tuin over het enigzins uitgekauwde onderwerp heeft gepraat
Piet zegt dat hij over het enigzins uitgekauwde onderwerp in de tuin heeft gepraat

- 61 Jan zegt dat hij in een zeer hevige lachbui is uitgebarsten tijdens de film
Jan zegt dat hij tijdens de film is uitgebarsten in een zeer hevige lachbui

- 62 Jan zegt dat hij in een lachbui is uitgebarsten tijdens de veel te lang durende film
Jan zegt dat hij tijdens de veel te lang durende film is uitgebarsten in een lachbui

- 63 Piet zegt dat hij over het onderwerp heeft gepraat in de pas aangeharkte tuin
Piet zegt dat hij in de pas aangeharkte tuin heeft gepraat over het onderwerp

- 64 Piet zegt dat hij over het enigzins uitgekauwde onderwerp heeft gepraat in de tuin
Piet zegt dat hij in de tuin heeft gepraat over het enigzins uitgekauwde onderwerp

- 65 Jan zegt dat hij is uitgebarsten in een zeer hevige lachbui tijdens de film
Jan zegt dat hij is uitgebarsten tijdens de film in een zeer hevige lachbui

- 66 Jan zegt dat hij is uitgebarsten in een lachbui tijdens de veel te lang durende film
Jan zegt dat hij is uitgebarsten tijdens de veel te lang durende film in een lachbui

- 67 Piet zegt dat hij heeft gepraat over het onderwerp in de pas aangeharkte tuin
Piet zegt dat hij heeft gepraat in de pas aangeharkte tuin over het onderwerp
- 68 Piet zegt dat hij heeft gepraat over het enigzins uitgekauwde onderwerp in de tuin
Piet zegt dat hij heeft gepraat in de tuin over het enigzins uitgekauwde onderwerp

Auxiliary

- 69 Jan zal in een lachbui tijdens de veel te lang durende film uitbarsten
Jan zal tijdens de veel te lang durende film in een lachbui uitbarsten
- 70 Jan zal in een zeer hevige lachbui tijdens de film uitbarsten
Jan zal tijdens de film in een zeer hevige lachbui uitbarsten
- 71 Piet zal over het onderwerp in de pas aangeharkte tuin praten
Piet zal in de pas aangeharkte tuin over het onderwerp praten
- 72 Piet zal over het enigzins uitgekauwde onderwerp in de tuin praten
Piet zal in de tuin over het enigzins uitgekauwde onderwerp praten
- 73 Jan zal in een lachbui uitbarsten tijdens de veel te lang durende film
Jan zal tijdens de veel te lang durende film uitbarsten in een lachbui
- 74 Jan zal in een zeer hevige lachbui uitbarsten tijdens de film
Jan zal tijdens de film uitbarsten in een zeer hevige lachbui
- 75 Piet zal over het onderwerp praten in de pas aangeharkte tuin
Piet zal in de pas aangeharkte tuin praten over het onderwerp
- 76 Piet zal over het enigzins uitgekauwde onderwerp praten in de tuin
Piet zal in de tuin praten over het enigzins uitgekauwde onderwerp
- 77 Jan zal uitbarsten in een lachbui tijdens de veel te lang durende film
Jan zal uitbarsten tijdens de veel te lang durende film in een lachbui
- 78 Jan zal uitbarsten in een zeer hevige lachbui tijdens de film
Jan zal uitbarsten tijdens de film in een zeer hevige lachbui
- 79 Piet zal praten over het onderwerp in de pas aangeharkte tuin
Piet zal praten in de pas aangeharkte tuin over het onderwerp
- 80 Piet zal praten over het enigzins uitgekauwde onderwerp in de tuin
Piet zal praten in de tuin over het enigzins uitgekauwde onderwerp