

University of Groningen

## Processing subject-object ambiguities in Dutch

Kaan, Edith

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

1997

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Kaan, E. (1997). *Processing subject-object ambiguities in Dutch*. s.n.

**Copyright**

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

**Take-down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

*Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.*

**Processing Subject-Object Ambiguities  
in Dutch**

**Edith Kaan**

Groningen Dissertations in Linguistics 20

ISSN 0928-0030

Rijksuniversiteit Groningen

# **Processing Subject-Object Ambiguities in Dutch**

Proefschrift

ter verkrijging van het doctoraat in de  
Letteren  
aan de Rijksuniversiteit Groningen  
op gezag van de  
Rector Magnificus, dr. F. van der Woude,  
in het openbaar te verdedigen op  
donderdag 1 mei 1997  
des namiddags te 4.15 uur

door

**Edith Kaan**

geboren op 31 juli 1969  
te Emmen

Promotor: Prof. dr. J. Koster  
Referent: Dr. L.A. Stowe

*'Stel je voor,' zei Eiso, 'dat we de woorden niet in een bepaalde volgorde konden krijgen.'*

*'Stel je voor,' zei Ramselaar, 'dat we dat niet konden omdat het niet hoefde. Stel je voor dat je twee woorden tegelijk kon uitspreken.'*

*'Dan zou de tijd zijn opgeheven,' zei Eiso.*

-- Gerrit Krol, **Een ongenode gast.**

## Acknowledgments

---

In retrospect, the day I became a research assistant to Laurie Stowe was a major turning point in my short academic career. Although I still decided to write my MA thesis on Minimalist Syntax, I soon became so much intrigued by sentence processing and the technical aspects of running experiments that I decided to apply for an *aito* position in psycholinguistics. This book presents part of the work done during the past four years. I could not have completed this thesis so quickly but for the help of a number of people.

First of all, Laurie Stowe deserves my greatest thanks. It was she who got me into the field and helped me get acquainted with a lot of its intricacies. It was she who was always there with academic advice, moral support, and gastronomic comfort when things went wrong, or at least, when I thought they did. And it was she who, in spite of other worries, found the time to read and comment upon numerous versions of this book. Without her effort, I probably would not have been able to finish within such a short time.

Next, I would like to thank my promotor, Jan Koster, who has always had confidence in me ever since I came to Groningen. He, too, was a major driving force in getting everything arranged before starting my new job at MIT.

I would like to thank Anne Cutler, Bert Mulder and Frans Zwarts for being members of my thesis committee and their quick replies; and Barbara Hemforth, who unfortunately could not take part in the committee, but nevertheless agreed to read and comment on the book.

A number of other people deserve my thanks for reading one or more chapters: Roel Jonkers, Marion Kellenbach, Henny Klein, Evelien Krikhaar, Paulien Rijkhoek, Astrid Sleiderink, Anko Wiegel, and especially Monique Lamers. Their detailed comments helped me to improve the text considerably, and erase at least some of the typos. Thanks also to Hotze Rullmann for persuading me not to change the title, and to Sjoukje van der Wal and Anastasia Giannakidou for helping me get started and also get finished with the lay-out.

The research reported in this thesis would not have been possible without the hundreds of subjects that participated in the pretests or actual experiments, and whose surprising, enthusiastic, funny, bored, or other positive or negative reactions meant a lot to me. Furthermore, the availability of electronically accessible corpora was indispensable. I would like to thank CELEX in Nijmegen for providing access to their data base; and the Instituut voor Nederlandse Lexicologie in Leiden for enabling the corpus study reported in Chapter 5.

I owe a lot to Remko van Veenendaal for his help with the corpus data; to Astrid Sleiderink for her contributions to the materials in Experiment 7; to Marijtje Van Duijn for carrying out the error analyses in Experiments 1 and 4;

and to Ronald Zwaagstra for teaching me how to do a multilevel logistic regression on the data in Experiment 3.

I am also indebted to Edwin Kiers, Jan Sikkens and Tjalling de Vries for technical support; Gina Dijkstra, Carmen Djaoedi and Ken Forster for assistance with the software; and Gosse Bouma, Joop Houtman, Roel Jonkers, Jan Koster and Monique Lamers for helping me move my computer into a soundproof booth at the psychology building each time I started a new response time experiment, and back again onto my desk at Letters after I had collected the data.

I am grateful to the Dutch Organization for Scientific Research (NWO) and the Faculty of Arts / CLCG of the University of Groningen for proving me yearly grants which allowed me to present my data at several conferences and visit other labs: The 6th CUNY Conference on Human Sentence Processing in Amherst, and a visit to MIT in 1993 (SIR 11-865); the 7th CUNY conference in New York, and a visit to MIT in 1994 (SIR 11-1093); the 8th CUNY conference in Tucson, a visit to UCSD, and the 2nd Cognitive Neuroscience Society meeting in San Francisco in 1995 (SIR 11-1282); the 9th CUNY conference in New York, and visits to UPenn, the University of Rochester, and MIT in 1996 (SIR 11-1474). An additional grant from the Faculty of Arts allowed me to visit the 5th Finnish Conference on Neurolinguistics in Helsinki (1994).

At this point I would also like express my thanks to the people who made my life as an *aio* a pleasant one. I would like to thank Thom Gunter, Marion Kellenbach, Monique Lamers, Liesbeth Laport, Astrid Sleiderink, Laurie Stowe, Jorn Veenstra and Sandra Vos for sharing the experimental ups and downs, and for being such fine colleagues; and Laurie's research assistants over the years: Roel Jonkers, Paulien Rijkhoek, Jonneke Brouw, Rienk Withaar, Lenka Kerstens, Inne Bruinsma and Lidewei Houtman for creating such a great atmosphere. I would also like to thank the students in our Experimental Design classes, whose enthusiastic reactions made me realize more than once how much fun psycholinguistics actually is.

During those hectic weeks when I was finishing up, preparing my leave, and arranging other things, some people were of special importance to me. I would especially like to thank Linda Escobar, Evelien Krikhaar, Marion Kellenbach, Monique Lamers and Paulien Rijkhoek, who perhaps unknowingly provided moral support at exactly the right moments; Roel Jonkers for letting me use his computer when I needed to be close to the laser printer; Víctor Sánchez Valencia for being my acting representative; and Paulien Rijkhoek and Anko Wiegel, my primus and secundus, for their help and organizing talents. At the home front, I would like to thank Eelko Hooijmaaijers and other (former) residents of Damsport for their sympathy, gossip and culinary delights.

Finally, I am grateful to my parents for their support over the years, and for understanding immediately why I did not dedicate this book to them.

E.K., December 13, 1996



# Contents

---

Acknowledgments .....	v
Contents .....	vii
Abbreviations .....	xv
<b>1 Introduction .....</b>	<b>1</b>
1 Sentence comprehension .....	1
2 The tasks of the sentence processor .....	2
2.1 Combining words to phrases .....	2
2.2 Assigning thematic roles to NPs .....	3
2.3 Establishing NP referents .....	4
2.4 Summary .....	5
3 Ambiguity resolution .....	5
3.1 Syntax-first approaches .....	6
3.2 Interactive approaches .....	7
3.3 Empirical evidence is not conclusive .....	8
3.4 Summarizing remarks .....	9
4 The present study .....	9
5 Overview of this book .....	11
<b>2 Subject-object ambiguities .....</b>	<b>13</b>
1 Introduction .....	13
2 Subject-object ambiguities .....	13
3 A subject-object preference .....	15
3.1 Main clauses .....	15
3.1.1 Dutch data: declaratives .....	15
3.1.2 German data: declaratives .....	17
3.1.3 Dutch data: wh-questions .....	19
3.1.4 German data: wh-questions .....	20
3.1.5 Order preferences in main clauses: summary .....	22
3.2 Embedded clauses .....	22

## Contents

3.2.1	<i>Dutch data: relative clauses</i>	23
3.2.2	<i>German data: relative clauses</i>	25
3.2.3	<i>German data: embedded wh-questions</i>	28
3.2.4	<i>Order preferences in embedded clauses: summary</i>	29
3.3	A syntactic preference	30
4	Syntactic accounts	30
4.1	Gap-filling approaches	31
4.1.1	<i>Word order ambiguities in English</i>	31
4.1.2	<i>Dutch syntax: some underlying assumptions</i>	32
4.1.3	<i>Deriving the subject-object preference</i>	35
4.1.4	<i>A problem for the AFS</i>	36
4.1.4.1	<i>Gap-filling is driven by lexical information</i>	36
4.1.4.2	<i>Gap-filling is not driven by lexical information</i>	38
4.1.5	<i>Summary</i>	38
4.2	A phrase structure approach	39
4.3	A frequency-based approach	40
4.4	Summary	41
5	Other factors influencing word order preferences	41
5.1	Discourse inferences in isolated sentences	42
5.2	The nature of the first NP	44
5.2.1	<i>Restrictions on object-initial declaratives</i>	44
5.2.2	<i>Wh-questions</i>	46
5.2.3	<i>Syntactic differences</i>	46
5.2.4	<i>Predictions</i>	48
5.3	The nature of the second NP	48
5.3.1	<i>NPs differ in their discourse properties</i>	49
5.3.2	<i>Givenness and subjecthood</i>	51
5.3.3	<i>Predictions</i>	54
5.3.4	<i>Evidence</i>	55
5.4	Summary	56
6	Hypotheses and predictions	57
6.1	The Syntactic Hypothesis	57
6.2	The Discourse Hypothesis	58
6.3	Remarks	59
7	Summary	59

<b>3 The effect of the first NP: Processing Dutch main clauses</b> . . . . .	<b>61</b>
1 Introduction . . . . .	61
1.1 Overview . . . . .	61
1.2 Dutch main clauses . . . . .	61
1.3 The two hypotheses . . . . .	63
1.4 Self-paced reading . . . . .	63
2 Experiment 1: Dutch main clauses . . . . .	64
2.1 Methods . . . . .	64
2.1.1 <i>Materials</i> . . . . .	64
2.1.1.1 <i>The structure of the experimental items</i> . . . . .	64
2.1.1.2 <i>Comprehension questions</i> . . . . .	65
2.1.1.3 <i>Plausibility and reversibility</i> . . . . .	65
2.1.1.4 <i>Assignment to groups and lists</i> . . . . .	67
2.1.1.5 <i>Fillers</i> . . . . .	68
2.1.1.6 <i>Order of presentation</i> . . . . .	68
2.1.2 <i>Subjects</i> . . . . .	68
2.1.3 <i>Procedure</i> . . . . .	68
2.2 Analysis and results . . . . .	69
2.2.1 <i>Reading times</i> . . . . .	69
2.2.1.1 <i>Analysis</i> . . . . .	69
2.2.1.2 <i>Results</i> . . . . .	70
2.2.2 <i>Comprehension questions</i> . . . . .	75
2.2.2.1 <i>Reaction times</i> . . . . .	76
2.2.2.2 <i>Error rates</i> . . . . .	77
3 Discussion . . . . .	78
3.1 Summary of the results . . . . .	78
3.2 The two hypotheses . . . . .	79
3.3 The effect of negation . . . . .	81
3.4 The effect of verb number . . . . .	82
4 Summary . . . . .	83
<b>4 The effect of the second NP: Processing embedded <i>wh</i>-clauses</b> . . . . .	<b>85</b>
1 Introduction . . . . .	85
1.1 Embedded <i>wh</i> -clauses in Dutch . . . . .	85
1.2 The nature of the second NP . . . . .	86
1.3 Predictions . . . . .	87

## Contents

1.4	An overview of the experiments	88
2	A subject preference for embedded <i>wh</i> -phrases	88
2.1	Introduction	88
2.2	Experiment 2	89
2.2.1	<i>Subjects and materials</i>	89
2.2.2	<i>Analysis and results</i>	89
2.3	Discussion	90
3	Order preferences with case-marked pronouns	91
3.1	Introduction	91
3.2	Experiment 3	92
3.2.1	<i>Introduction</i>	92
3.2.2	<i>Methods</i>	93
3.2.2.1	<i>Materials</i>	93
3.2.2.2	<i>Subjects</i>	94
3.2.2.3	<i>Procedure</i>	95
3.2.2.4	<i>Analysis</i>	95
3.2.3	<i>Results</i>	95
3.2.4	<i>Discussion</i>	96
3.3	Experiment 4	97
3.3.1	<i>Introduction</i>	97
3.3.2	<i>Methods</i>	98
3.3.2.1	<i>Materials</i>	98
3.3.2.2	<i>Subjects</i>	102
3.3.2.3	<i>Procedure</i>	102
3.3.3	<i>Analysis and results</i>	103
3.3.3.1	<i>Decision times</i>	103
3.3.3.2	<i>Error data</i>	106
3.3.4	<i>Summary of the findings</i>	109
3.3.5	<i>Discussion</i>	109
3.4	Experiment 5	110
3.4.1	<i>Introduction</i>	110
3.4.2	<i>Methods</i>	110
3.4.2.1	<i>Materials</i>	110
3.4.2.2	<i>Subjects</i>	112
3.4.2.3	<i>Procedure</i>	112
3.4.2.4	<i>Analysis</i>	113
3.4.3	<i>Results</i>	113
3.4.3.1	<i>Comprehension questions</i>	113
3.4.3.2	<i>Reading times</i>	114

Contents

3.4.4	<i>Summary and discussion</i>	117
3.5	Discussion: order preferences with case-marked pronouns	118
4	Order preferences using number disambiguation	120
4.1	Experiment 6	120
4.2	Methods	121
4.2.1	<i>Materials</i>	121
4.2.1.1	<i>The experimental conditions</i>	121
4.2.1.2	<i>Plausibility rating</i>	122
4.2.1.3	<i>Items groups and subject lists</i>	123
4.2.1.4	<i>Fillers</i>	123
4.2.1.5	<i>Comprehension questions</i>	123
4.2.1.6	<i>Order of presentation</i>	124
4.2.2	<i>Subjects</i>	124
4.2.3	<i>Procedure</i>	124
4.2.4	<i>Analysis</i>	124
4.3	Results	125
4.3.1	<i>Comprehension questions</i>	125
4.3.2	<i>Reading times</i>	125
4.4	Discussion	128
4.4.1	<i>Summary of the results</i>	128
4.4.2	<i>The two hypotheses</i>	128
4.4.3	<i>The categorial ambiguity of jullie</i>	129
4.4.4	<i>Summarizing remarks</i>	130
5	Pronouns and definite NPs compared	130
5.1	Experiment 7	130
5.2	Methods	131
5.2.1	<i>Materials</i>	131
5.2.1.1	<i>The structure of the experimental items</i>	131
5.2.1.2	<i>Materials pretest</i>	132
5.2.1.3	<i>Item groups and subject lists</i>	133
5.2.1.4	<i>Fillers</i>	133
5.2.1.5	<i>Comprehension questions</i>	133
5.2.1.6	<i>The order of presentation</i>	134
5.2.2	<i>Subjects</i>	134
5.2.3	<i>Procedure</i>	134
5.2.4	<i>Analysis</i>	134
5.3	Results	134
5.3.1	<i>Comprehension questions</i>	134
5.3.2	<i>Reading times</i>	135

## Contents

5.4 Discussion	137
5.4.1 Summary	137
5.4.2 No preference in the pronoun conditions	138
5.4.3 The weak effect in the definite NP conditions	139
5.4.4 Scrambling	140
5.4.4.1 The effect of an adverbial expression	140
5.4.4.2 Implications for order preferences	141
5.4.4.3 Predictions	143
6 Discussion: The effect of the second NP	144
6.1 Summary of the results	144
6.2 The two hypotheses	144
<b>5 A corpus study</b>	<b>147</b>
1 Introduction	147
2 Order frequencies in <i>welke</i> -questions	148
2.1 Introduction	148
2.2 Methods	149
2.2.1 The corpus	149
2.2.2 Restricting the corpus	149
2.2.3 Coding	150
2.2.3.1 Subject / object-initiality	151
2.2.3.2 Main and embedded clauses	151
2.2.3.3 The number of argument NPs	151
2.2.3.4 The type of second NP	152
2.2.3.5 Animacy	152
2.3 Results	152
2.3.1 Frequency of <i>S(O)</i> versus <i>OS</i> structures	152
2.3.2 Order as a function of the second NP	154
2.3.3 Controlling for animacy differences	155
2.4 Summary of the findings	158
3 Discussion	158
3.1 Main clauses and the effects of transitivity	160
3.2 The influence of the second NP: an apparent paradox	161
3.3 Resolving the paradox	161
3.3.1 A coarser grain-size	162
3.3.2 A finer grain-size	162
3.3.3 A mixed-grain approach	163

3.3.4	<i>Other explanations</i> . . . . .	163
4	Summary . . . . .	164
<b>6</b>	<b>General Discussion</b> . . . . .	<b>167</b>
1	Introduction . . . . .	167
2	The influence of the NPs on word order preferences . . . . .	167
2.1	A summary of the findings . . . . .	167
2.2	The two hypotheses . . . . .	169
2.3	Manner of disambiguation . . . . .	171
2.4	Point of disambiguation . . . . .	174
2.4.1	<i>The contents of the ambiguous region may resolve confounding ambiguities</i> . . . . .	174
2.4.2	<i>The contents of the ambiguous region may facilitate a non-preferred reading</i> . . . . .	175
2.4.3	<i>The contents of the ambiguous region may trigger additional processes</i> . . . . .	176
2.4.4	<i>Summary</i> . . . . .	176
2.5	The relative strength of the sources of information . . . . .	176
3	Parsing models . . . . .	178
3.1	Garden-path models . . . . .	179
3.1.1	<i>The general subject-object preference</i> . . . . .	179
3.1.2	<i>Wh-phases versus definite first NPs</i> . . . . .	179
3.1.3	<i>Pronouns versus full definite second NPs</i> . . . . .	180
3.1.4	<i>Remarks</i> . . . . .	182
3.2	Referential theory . . . . .	182
3.2.1	<i>Wh-phrases versus definite first NPs</i> . . . . .	182
3.2.2	<i>Pronouns versus full definite second NPs</i> . . . . .	183
3.2.3	<i>Summarizing remarks</i> . . . . .	184
3.3	Tuning . . . . .	184
3.3.1	<i>Wh-phrases versus definite first NPs</i> . . . . .	185
3.3.2	<i>Pronouns versus full definite second NPs</i> . . . . .	186
3.3.3	<i>Remarks</i> . . . . .	186
3.4	Constraint-based models . . . . .	187
3.4.1	<i>The subject-object preference</i> . . . . .	188
3.4.2	<i>Wh-phrases versus definite first NPs</i> . . . . .	189
3.4.3	<i>Pronouns versus full definite second NPs</i> . . . . .	190
3.4.4	<i>Remarks</i> . . . . .	191
3.5	Summary . . . . .	192

*Contents*

4 Conclusion .....	193
<b>7 Summary .....</b>	<b>195</b>
<b>Appendix 1: Experimental materials in Experiment 1 .....</b>	<b>199</b>
<b>Appendix 2: Experimental materials in Experiment 3 .....</b>	<b>201</b>
<b>Appendix 3: Experimental materials in Experiments 4 and 5 .....</b>	<b>203</b>
<b>Appendix 4: Experimental materials in Experiment 6 .....</b>	<b>205</b>
<b>Appendix 5: Experimental materials in Experiment 7 .....</b>	<b>209</b>
<b>References .....</b>	<b>213</b>
<b>Samenvatting .....</b>	<b>223</b>



## Abbreviations

---

A	adjective
ACC	accusative
AMB	ambiguous
AUX	auxiliary
DET	determiner
FEM	feminine
MASC	masculine
N	noun
NEG	negation
NOM	nominative
NP	noun phrase
<i>[OS]</i>	object-subject order
P	preposition
PART	particle/participle
PL	plural
PP	prepositional phrase
RC	relative clause
SG	singular
<i>[SO]</i>	subject-object order
V	verb
VP	verb phrase
*	ungrammatical
#	pragmatically odd