Variation in long-distance dependencies

Ankelien Schippers & Jack Hoeksema, Rijksuniversiteit Groningen[1]

1. *Introduction*

This article concerns variation and change in Dutch long-distance (LD) movement constructions. Both historical and contemporary corpus data concerning these constructions are discussed. LD-movement has played a central role within the generative framework, where it is assumed that it involves a productive rule that can be applied in various constructions. Recently, however, it has been argued that LD-movement constructions do not involve a productive rule, but are formed based on a fixed formula (cf. Dąbrowska 2004, 2008; Verhagen 2005, 2006). This hypothesis is based on the observation that naturally occurring examples of LD wh-questions show very limited variation in the domain of the matrix clause. However, as we show, LD-movement constructions other than questions show much more variation, which weakens this claim. Furthermore, while the diachronic development of LD-movement constructions in Dutch indeed suggests that these constructions are becoming less productive, we argue that this is most likely due to the replacement by alternative constructions.

The outline of this article is as follows. First, the four types of LD-movement constructions that are central to this paper are treated. Next, the data discussed in Dąbrowska (2004, 2008) and Verhagen (2005, 2006) are presented as well as some of the main claims these authors put forward. Subsequently, we present our own data, which we argue forms evidence against the analogy analysis of LD-movement constructions. The paper is rounded off with a conclusion.

2. *LD-movement*

LD-movement has been at the heart of generative grammar over the past few decades. Traditionally, four types of constructions are considered to involve this kind of A'-movement: wh-questions, relatives, topicalization constructions and comparatives (cf. Chomsky, 1977). These constructions are illustrated in (1) – (4).

(1) *Wh-questions*
[$_{CP}$ Who do you think [$_{CP}$ John will kiss t$_{who}$]]

(2) *Relativization*
[$_{CP}$ That is the girl who I think [$_{CP}$ John will kiss t$_{who}$]]

[1] Corresponding author: Ankelien Schippers (a.schippers@rug.nl)

(3) *Topicalization*
[$_{CP}$ The girl I think [$_{CP}$ John will kiss t$_{\text{the girl}}$]]

(4) *Comparatives*
[$_{CP}$ John has kissed more girls [$_{CP}$ than OP I think Peter did t$_{OP}$]]

Especially within generative frameworks, LD-movement is considered to be a productive rule in which an element is moved from a subordinate clause into a higher clause. For example, in (1), the wh-phrase *who*, which is the object of the subordinate verb, has moved to the left periphery of the matrix clause. The reason for treating the constructions in (1) to (4) as one and the same is that they behave alike in many respects. In all cases, movement leaves behind a gap, and all four constructions are sensitive to the same kind of intervention effects.

3. *The analogy account*

It has recently been argued that LD-movement (specifically LD wh-movement) does not involve a productive rule, but that these constructions are formed based on a general template (cf. Dąbrowska, 2004, 2008; Verhagen, 2005, 2006). This analysis will be referred to as the analogy account. The idea is that any LD-construction departing from the general template is created by analogy to this template. This hypothesis springs from the observation that naturally occurring examples of LD wh-questions show little variation regarding their type of matrix predicate and subject. Dąbrowska and Verhagen report that in English, the construction is almost exclusively attested with the matrix verb *think* or *say*, the auxiliary *do* and a 2nd person pronoun as the matrix subject. Dąbrowska (2004) investigated the Manchester corpus and found that 96% of the LD wh-questions had the matrix verb ‘think’ or ‘say’. Furthermore, 91% of the occurrences had ‘you’ as the subject and 99 % had some form of ‘do’ in the auxiliary position. Dąbrowska (2004) further looked at the CHILDES-data and found that 47 out of 49 occurrences of LD wh-questions were of the form “WH do you think S?”.[2] In Dąbrowska (2008), additional data from the British National Corpus (BNC) is discussed. She reports that 70 % of the LD wh-questions in the spoken part of the BNC have the form “WH do you think S?”. Similar findings are reported in Verhagen (2005) and (2006) for the Brown corpus: out of 11 occurrences, 10 had the matrix verb ‘think’ and 1 ‘say’; 9 had the matrix subject ‘you’, and 10 constructions occurred with a form of the auxiliary ‘do’. In Verhagen (2005) and (2006), it is furthermore pointed out that Dutch shows a similar pattern. Verhagen searched the digital version of the newspaper De Volkskrant and the Eindhoven corpus for LD wh-questions. In the Eindhoven corpus, 6 out of 6 occurrences showed up with

[2] ‘S’ = subordinate clause.

the matrix verb *denken* 'think' and a 2nd person personal pronoun. Data from the Volkskrant showed that 34 out of 43 occurrences had the matrix verb *denken* 'think', 5 *willen* 'want' and 4 *zeggen* 'say' or *vinden* 'find'. Furthermore, 36 occurrences had a 2nd person personal pronoun as the matrix subject.

Based on these observations, Dąbrowska (2004, 2008) and Verhagen (2005, 2006) argue that LD wh-movement constructions are stored as fixed formulas as in (5a) below for English and (5b) for Dutch, and are created by analogy to this formula.

(5a) [WH do you think/say [S …]]

(5b) [WH *denk* *je* [*dat* …]]
WH think you that

The limited variation in LD wh-questions indeed suggests that the construction is not as productive as a purely formal account would predict. However, on the analogy account, one would expect other types of LD-movement constructions to show the same kind of limited variation. As we point out in what follows, this does not seem to be the case.

4. *Dutch diachronic corpus data*

The data presented in the studies by Dąbrowska (2004, 2008) and Verhagen (2005, 2006) are very limited in that they capitalize on one type of LD-movement, namely in wh-questions. However, our data contain occurrences of four types of LD-movement constructions. In total, the data consist of 1734 occurrences, of which the oldest example is from the beginning of the 14th century. The data were collected by the second author by manually inspecting texts for LD-movement constructions.[3] Table (1) shows the number of occurrences for each type of movement.

@@ Insert Table 1 here

We first discuss the type of matrix predicates, and then the type of matrix subjects that are attested in the data.

4.1 *Matrix predicates*

Table (2) shows the frequencies and relative frequencies for the 20 most frequent verbs. The data show a wide variety of 143 different matrix predicates in total. In accordance with Verhagen's findings, our data show that the matrix verbs *denken* and *willen* are most frequent. However, it turns

[3] For more details, see Hoeksema & Schippers (2009) and Schippers (2009).

out that they are specifically frequent in wh-questions, and not so much in the other constructions. For example, in LD-relatives, *weten* instead of *denken* is most frequent. This latter verb virtually does not show up in LD wh-questions. The reason for this is that *weten* preferably takes an interrogative complement, whereas LD wh-questions may only have a non-interrogative complement. This suggests the choice of matrix verb is partially influenced by independent (e.g. semantic/pragmatic) factors, something that is also acknowledged by Dąbrowska and Verhagen.

@@ Insert Table 2 here

Furthermore, the data demonstrate that while wh-questions and comparatives indeed show limited lexical variation, relatives and topicalization constructions surface with a wider variety of matrix verbs. Importantly, it appears that the fact that LD wh-questions demonstrate such limited variation is not a feature of LD-movement in general. Rather, it seems particular to specific types of LD-movement (e.g. wh-questions). This speaks against the analogy approach of Dąbrowska and Verhagen. That is, even though the template for other types of LD-movement construction is different from that of LD wh-questions, they nevertheless should be equally unproductive. The fact that they are not considerably weakens the claim that LD-movement constructions involve specified templates. Thus, we agree with Verhagen and Dąbrowska that LD wh-questions are relatively unproductive because they are constrained by pragmatic factors. However, we do not take this to mean that there is no productive rule underlying LD-movement constructions.

Further evidence against the analogy account is presented in Ambridge and Goldberg (2008). One of the predictions the analogy account makes is that the more an LD-movement construction departs form the general template, the less acceptable it will be. Ambridge and Goldberg tested this by collecting acceptability judgments on LD wh-questions. They showed that the acceptability of the constructions correlated with the degree of backgroundedness of the complement clause, and not with whether the constructions were similar to a general template. Hence, their results also speak against the analogy account.

4.2 *Type of matrix subject*

Additional evidence against the analogy account comes from the fact that the four types of LD-movement constructions also occur with a variety of different matrix subjects. Table (3) shows for each construction the type of matrix subject.

@@ Insert Table 3 here

As can be seen from Table (3), 2nd person personal pronouns are indeed most frequent. However, this is only due to the fact that they are so frequent for wh-questions. The other three constructions are much more frequent with 1st and 3rd person personal pronouns.

The reason why wh-movement constructions mainly show up with 2nd person personal pronouns seems to be pragmatic in nature. Firstly, personal pronouns are far more frequent than full noun phrases (cf. Howe, 1996). Second, most matrix predicates in wh-questions are mental verbs (e.g. ‘think’ and ‘hope’). From a pragmatic view, it is much more natural to ask a question about someone’s thoughts/hopes to an addressee, than to oneself or a third party. Furthermore, the reason why pronouns instead of full NPs are used is likely due to the fact that it is more natural to refer to the addressee by means of a personal pronoun than by means of a full noun phrase (e.g. a proper name) in these cases. Hence, the predominance of 2nd person personal pronouns appears to be due to pragmatic reasons only.[4]

5. *Diachronic development of LD-movement in Dutch*

Although we showed previously that the limited variation in the matrix clause of LD-movement constructions is something not typical of these constructions in general, the question that remains is why LD wh-questions and comparatives only occur with such a limited variety of matrix predicates, contrary to relatives and topicalization constructions.

Interestingly, relatives (particularly headed relatives) and topicalization constructions appear to differ in another respect from wh-questions and comparatives as well. The diachronic data shows that these constructions show a relative decrease in frequency compared to wh-questions, free relatives and comparatives, starting around the middle of the 19th century. This is shown in Table (4) and Graph (1).[5] Graph (1) shows the relative frequencies for each type of movement per period. These were computed by determining for each period the percentage of LD-movement occurrences relative to the total number of occurrences in that period. It is clear that especially LD wh-questions show a strong relative increase over the past

[4] Interestingly, 2nd person personal pronouns are less frequent with *zeggen*, as one might expect from a pragmatic perspective (since it is a reporting verb). For *denken* and *willen*, approximately 85% of the matrix subjects were 2nd person pronouns, against approximately 50% for *zeggen*. We thank an anonymous reviewer for drawing our attention to this point.

[5] Free relatives are treated separately from headed relatives for reasons that will become apparent in a moment.

two centuries, while topicalization constructions and headed relatives decrease.[6]

@@ Insert Table 4 here

@@ Insert Graph 1 here

It appears that the decrease in headed relatives and topicalization constructions is due to the replacement by an alternative construction, called resumptive prolepsis, here exemplified in (6).

(6) [$_{CP}$ *De man*^{i} *van wie*^{i} *ik denk* [$_{CP}$ *dat hij*^{i} *de fiets gestolen heeft*]]
the man of whom I think that he the bike stolen has
'The man whom I think stole the bike'

This construction is discussed extensively in Salzmann (2006), and does not seem to involve LD-movement proper: it occurs with all sorts of islands, and the gap site is filled by a resumptive pronoun, something otherwise not allowed in Dutch. As pointed out in Salzmann (2006), the construction can be used as an alternative for LD-relativization, topicalization and wh-movement, but cannot be used as an alternative for LD-comparatives and free relatives. The reason for this is that resumptive prolepsis is only possible when the noun phrase is referential/d-linked. Furthermore, resumptive prolepsis is most natural with topicalization and relativization, and much less with wh-questions. Hence, resumptive prolepsis is not normally used as an alternative for LD wh-movement, for reasons that are not entirely clear to us.

While we do not have any conclusive evidence to prove that the resumptive prolepsis construction has replaced LD-movement constructions, there are several observations suggesting this is indeed the case. First, it appears that a similar process took place in German. It has been reported

[6] One reviewer asked whether the increase of wh-questions in our material could be due to differences in the selection of texts for the various periods. This point is relevant since questions (including wh-questions) are far more common in dialogues than in other text types. Most of the long-distance wh-questions in dialogues come from novels, but for periods such as the 17th century, in which novels were not a popular genre yet, we used dialogues from plays, in particular popular comedies. We made an effort to select texts for each period as broadly as possible, from novels, diaries, letters, plays, history and nonfiction, and do not believe that the long-term trends can be attributed to differences in text selection.

that LD-movement in German started to decrease around the same time as in Dutch, namely around the middle of the 19th century (cf. Blatz, 1896; Paul, 1920; Behaghel, 1928; Ebert, 1973; Andersson & Kvam, 1984; Lühr, 1998). These authors also point out that in German, LD- dependencies are instead formed by using alternatives, one of them being resumptive prolepsis.

Further evidence that LD-movement constructions decrease due to the availability of alternatives is provided by the decline of LD wh-movement in German. German, contrary to Dutch, has alternatives to form LD wh-questions, such as partial wh-movement.[7] Consequently, LD wh-questions also started to decline in German, whereas in Dutch, they can still be frequently attested. The idea that LD-movement constructions are replaced by alternative constructions is also corroborated by the fact that free relatives, contrary to headed relatives, do not show a decrease in frequency. This strongly suggests the decline of headed LD-relatives is not something inherent to LD-relativization, but rather related to the possibility of using an alternative.

In sum, the constructions that do not have a proper alternative (LD wh-questions, free relatives and comparatives), do not decrease in frequency. On the contrary, these constructions show a relative increase. This is particularly true for LD wh-questions, which show a strong relative increase over the past few centuries. Interestingly, this is also precisely the construction that shows very limited variation in the domain of the matrix clause. Hence, while the relatively high frequency of LD wh-questions in Dutch suggests it is quite a productive construction, the limited variation in the domain of its matrix clause suggests otherwise.

There is some evidence that the limited variation in matrix predicates has a diachronic dimension as well. This becomes obvious by looking at the type/token ratios of the matrix predicates in wh-questions, headed relatives and topicalization constructions.[8] These can be found in Table (5) and Graph (3). To adjust for the fact that the samples are not the same for each period and type of movement, Guiraud’s index was used. This is the type/token ratio where the types are divided by the square root of the tokens. While type/token ratios are not a very reliable measure of variation, they do give a general idea of the degree of variation. Table (5) and Graph (2) show that the type/token ratios for the matrix predicates declines, again around the middle of the 19th century. This is the same period at which headed relatives and topicalization constructions also generally start to decline in frequency.

@@ Insert Table 5 here

[7] Partial wh-movement is attested in Dutch, too, but is rather marginal and normally not used as an alternative to LD wh-movement in the standard language (cf. Schippers, 2009).

[8] Comparative constructions and free relatives were not taken into consideration, since there is too little data per period to deduce anything meaningful from them.

@@ Insert Graph 2 here

Taken together, the picture that emerges is that LD-movement in Dutch is generally becoming a less productive phenomenon. Relative and topicalization constructions show a decline that is most likely due to replacement by the resumptive prolepsis construction. Furthermore, this decline is mirrored by the decreasing variation in type of matrix predicates. Hence, notwithstanding the fact that LD wh-questions are increasing in frequency, the productivity of this construction actually appears to decrease. This is something that is also noted by Verhagen, and which can also be witnessed in our data: especially in more recent periods, the variety of matrix predicates in this construction is limited. However, this is not something particular to LD-movement itself, but rather to specific LD-movement constructions, such as wh-questions, and likely subject to diachronic change.

An open question is whether the limited variation in LD wh-question is solely due to pragmatic factors, or caused by the declining productivity of LD-movement in general. In this respect, it would be interesting to look at the development of LD-movement in English, which also has limited lexical variation in LD wh-questions. If LD-movement in English is not decreasing the same way as in Dutch, it suggests that the limited variation in LD wh-question is mostly caused by pragmatic factors. We leave this open for further research.

6. *Conclusion*

We argued that the limited variation in LD wh-questions is not simply due to the fact that these constructions are based on a general template, since LD-movement constructions other than wh-questions show much more variation. We claimed there to be evidence that LD-movement is less productive as the result of a diachronic process. We also pointed out some pragmatic and semantic issues that influence the type of matrix predicate and subject. We conclude that LD wh-questions in contemporary corpora show such limited variation is due to a number of independent factors, and not directly caused by the fact that LD wh-questions are formed by analogy to a template.

References

Ambridge, Ben & Adele Goldberg 2008. “The island status of clausal complements: evidence in favor of an information structure explanation.” *Cognitive Linguistics* 19.349-381.

Andersson, Sven-Gunnar & Sigmund Kvam 1984. *Satzverschränkung im heutigen Deutsch.* Tübingen: Narr.

Behaghel, Otto 1928. *Deutsche Syntax. Eine geschichtliche Darstellung. Vol III: Die Satzgebilde*. Heidelberg: Winter.

Blatz, Friedrich 1896. *Neuhochdeutsche Grammatik*. Karlsruhe: Lang.

Chomsky, Noam 1977. “On Wh-Movement”. *Formal Syntax* ed. by Peter Culicover, Thomas Wasow & Adrian Akamajian. Academic Press: New York.

Dąbrowska, Ewa 2004. *Language, Mind and Brain*. Georgetown: Georgetown University Press.

Dąbrowska, Ewa 2008. “Questions with long-distance dependencies: A usage-based perspective”. *Cognitive Linguistics* 19.391-425.

Ebert, Robert P. 1973. “On the Notion ‘Subordinate Clause’ in Standard German”. *You take the High Node and I’ll take the Low Node: Papers from the Comparative Syntax Festival*, 164-177. Chicago: Chicago Linguistic Society.

Hoeksema, Jack & Ankelien Schippers 2009. “Diachronic changes in long-distance dependencies: the case of Dutch.” *Submitted*.

Howe, Stephen 1996. *The personal pronouns in the Germanic languages*. Berlijn: De Gruyter.

Kvam, Sigmund 1983. *Linksverschachtelung im Deutschen und Norwegischen. Eine Kontrastive Untersuchung zur Satzverschränkung und Infinitivverschränkung in der deutschen und norwegischen Gegenwartssprache*. Tübingen, Max Niemeyer Verlag.

Lühr, Rosemarie 1988. “Zur Satzverschränkung im heutigen Deutsch.” *GAGL* 28.74-87.

Paul, Hermannn 1920. *Deutsche Grammatik IV*. Halle: Max Niemeyer Verlag.

Salzmann, Martin 2006. Resumptive Prolepsis. A Study in Indirect A’ dependencies. PhD diss., University of Utrecht.

Schippers, Ankelien 2009. “On the (un)availability of long-distance movement.” To appear in: Movement and Clitics ed. by Vincent Torrens, Linda Escobar, Anna Gavarró & Junkal Gutierrez-Mangado. Newcastle: Cambridge Scholars Publishing.

Verhagen, Arie 2005. *Constructions of Intersubjectivity*. Oxford: Oxford University Press.

Verhagen, Arie 2006. “On subjectivity and ‘long distance Wh-movement’.” *Subjectification: Various Paths to Subjectivity* ed. by Angeliki Athanasiadou, Costas Canakis & Bert Cornillie, 323 - 346. Berlin/New York: Mouton de Gruyter.

Tables

Table 1: Total occurrences LD-movement constructions

Type of construction	Frequency
Wh-questions	562
Relatives	872
Topicalization	196
Comparatives	104
Total	**1734**

Table 2: Matrix predicates[*]

Predicate	Wh	% of Wh	Rel	% of Rel	Top	% of Top	Com	%of Com	Total	% of Total
denken think	325	57,8	102	11,7	21	10,7	26	25,0	474	27,3
willen want	119	21,2	41	4,7	9	4,6	10	9,6	179	10,3
zeggen say	35	6,2	89	10,2	22	11,2	6	5,8	152	8,8
weten know	3	0,5	106	12,2	15	7,7	3	2,9	127	7,3
menen think	21	3,7	77	8,8	13	6,6	5	4,8	116	6,7
hopen hope	7	1,2	52	6,0	6	3,1	7	6,7	72	4,2
zien see	1	0,2	35	4,0	7	3,6	2	1,9	45	2,6
geloven believe	0	0,0	25	2,9	12	6,1	4	3,8	41	2,4
vinden consider	18	3,2	19	2,2	5	2,6	5	4,8	47	2,7
wensen wish	3	0,5	23	2,6	8	4,1	1	1,0	35	2,0
vrezen fear	0	0,0	15	1,7	10	5,1	2	1,9	27	1,6
oordelen judge	1	0,2	15	1,7	3	1,5	1	1,0	20	1,2
begrijpen comprehend	0	0,0	12	1,4	6	3,1	2	1,9	20	1,2
vermoeden suspect	1	0,2	14	1,6	3	1,5	1	1,0	19	1,1
horen hear	0	0,0	10	1,1	2	1,0	2	1,9	14	0,8
verzoeken request	0	0,0	13	1,5	1	0,5	0	0,0	14	0,8
verwachten expect	9	1,6	8	0,9	1	0,5	1	1,0	19	1,1
vertrouwen trust	0	0,0	8	0,9	5	2,6	1	1,0	14	0,8
verzekeren ensure	0	0,0	5	0,6	6	3,1	2	1,9	13	0,7
beweren claim	0	0,0	7	0,8	0	0,0	3	2,9	10	0,6

[*] Abbreviations: Wh = Wh-questions, Rel = Relative, Top = Topicalization, Com = Comparative.

other types of predicates (118)	19	3,4	196	22,5	41	20,9	20	19,2	276	15,9
Total	562	100	872	100	196	100	104	100	1734	100

Table 3: Type of matrix subject

	Type of construction				
Matrix subject	**Wh-questions**	**Relatives**	**Topicalization**	**Comparatives**	**Total**
1SG pronoun	23	299	111	38	471
1PL pronoun	4	48	15	3	70
2SG pronoun	445	52	4	8	509
2PL pronoun	13	3	0	0	16
3SG pronoun	36	165	15	17	233
3PL pronoun	7	60	6	5	78
INDEF pronoun	1	13	1	0	15
No overt subject	30	100	18	24	172
Full NP	3	132	26	9	170
Total	**562**	**872**	**196**	**104**	**1734**

Table 4: Frequency LD-movement constructions 1610 - present

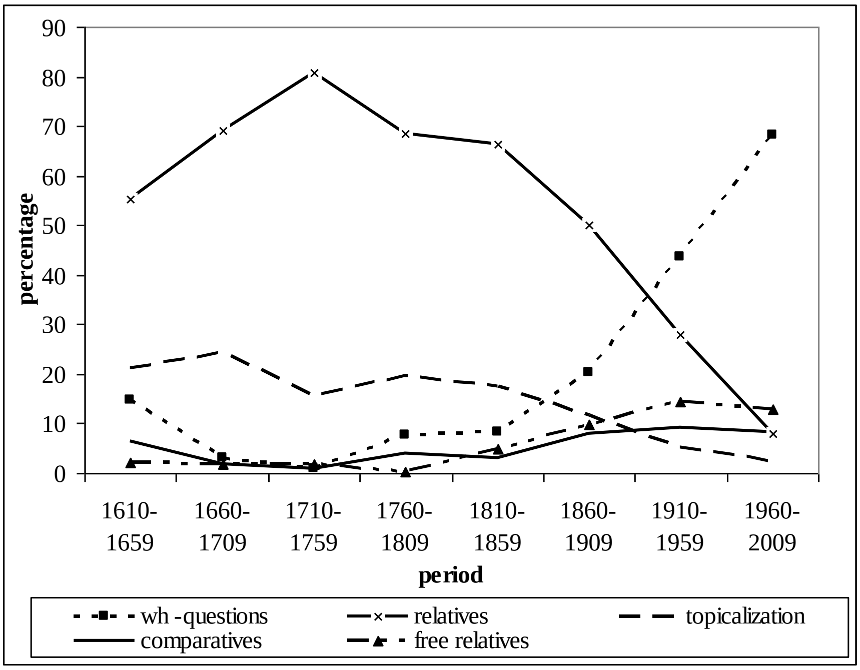
	Type of construction					
Period	**Wh-questions**	**Headed relatives**	**Topicalization**	**Comparatives**	**Free relatives**	**Total**
1610 - 1659	7	26	10	3	1	47
1660 - 1709	5	114	40	3	3	165
1710 - 1759	1	88	17	1	2	109
1760 - 1809	17	154	44	9	1	225
1810 - 1859	14	111	29	5	8	167
1860 - 1909	45	111	26	18	22	222
1910 - 1959	403	47	14	49	77	590
1960 - present	559	694	188	102	136	1679

Table 5: Type/token ratios matrix predicates per period

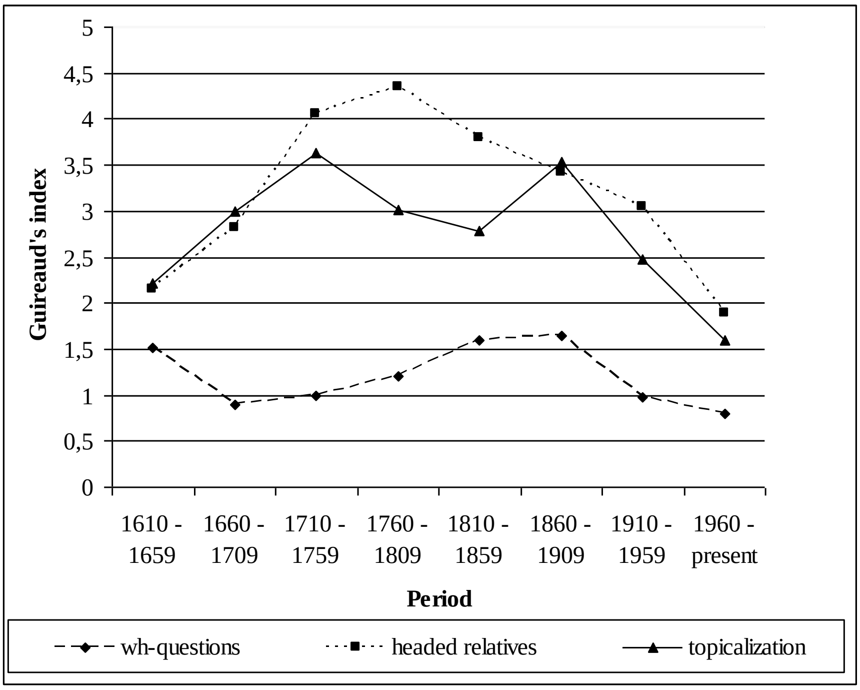
	wh-questions		**headed relatives**		**topicalization**	
Period	**type/token**	$\frac{\textit{type}}{\sqrt{\textit{tokens}}}$	**type/token**	$\frac{\textit{type}}{\sqrt{\textit{tokens}}}$	**type/token**	$\frac{\textit{type}}{\sqrt{\textit{tokens}}}$
1610 - 1659	4/7	1,51	11/26	2,16	7/10	2,21
1660 - 1709	2/5	0,89	30/114	2,81	19/40	3,00
1710 - 1759	1/1	1,00	38/88	4,05	15/17	3,64
1760 - 1809	5/17	1,21	54/154	4,35	20/44	3,02
1810 - 1859	6/14	1,60	40/111	3,80	15/29	2,79
1860 - 1909	11/45	1,64	36/111	3,42	18/26	3,53
1910 - 1959	8/67	0,98	20/43	3,05	7/8	2,47
1960 - present	16/403	0,80	13/47	1,90	6/14	1,60

Graphs

Graph (1): Development of LD-movement constructions in Dutch



Graph (2): Type/token ratios matrix predicates


Guireaud's index
1960 - present
Period
wh-questions
headed relatives
topicalization