

Grammar Competition and Grammatical Cycles: The Case of Old English Relative Clauses

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ConSOLE XX

January 5, 2012

Introduction

syntactic change involves:

Introduction

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(i) a syntactic rule α

α

Introduction

syntactic change involves:

- (i) a syntactic rule α
- (ii) the introduction of a (near-)synonymous rule β

$$\alpha \rightarrow \alpha, \beta$$

Introduction

syntactic change involves:

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- (ii) the introduction of a (near-)synonymous rule β
- (iii) competition between α and β

$$\alpha \rightarrow \{\alpha, \beta\}$$

↑
competition

Introduction

syntactic change involves:

- (i) a syntactic rule α
- (ii) the introduction of a (near-)synonymous rule β
- (iii) competition between α and β
- (iv) eventual dominance of β

$$\alpha \rightarrow \{\alpha, \beta\} \rightarrow \beta$$

↑
competition

Introduction

Example:

$$\alpha \rightarrow \{\alpha, \beta\} \rightarrow \beta$$

↑
competition

Introduction

Example: The loss of V-to-I movement in English

$$\alpha \rightarrow \{\alpha, \beta\} \rightarrow \beta$$

↑
competition

Introduction

Example: The loss of V-to-I movement in English

V-to-I \rightarrow {V-to-I, β } \rightarrow β

competition

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Example: The loss of V-to-I movement in English

V-to-I → {V-to-I, V-in-VP} → V-in-VP

competition

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competition

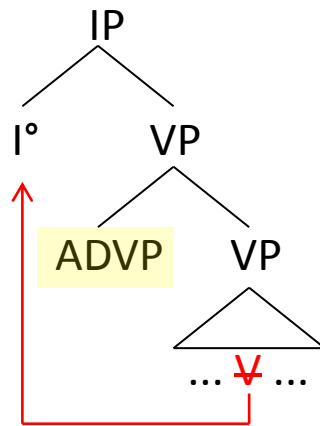
- (1) a. god **bisencte** þa t_i þe pharaon
God afflicted then the pharaoh
(CMLAMBX1,87.712) (c.1200 A.D.)
- b. I **knewe** never t_i such two knyghtes
I knew never such two knights
(CMMALORY,70.2395) (c. 1375 A.D.)
- c. I ever **encheved** them
I always chafed them
(CMMALORY,654.4445) (c. 1375 A.D.)
- d. he often **prayed**
(CMFITZJA,A6R.88) (c. 1400 A.D.)

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Example: The loss of V-to-I movement in English

V-to-I → {V-to-I, V-in-VP} → V-in-VP

competition



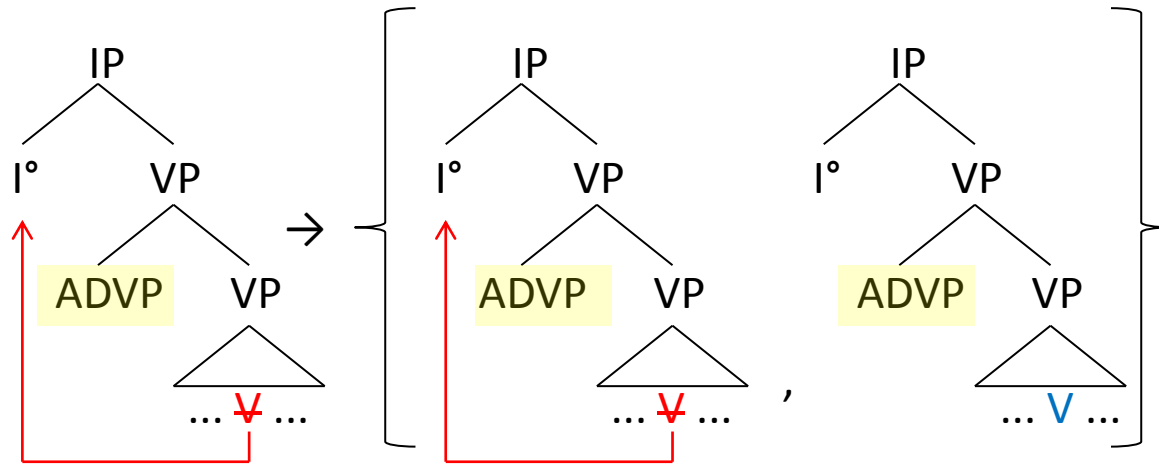
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I **knewe** never such two knyghtes
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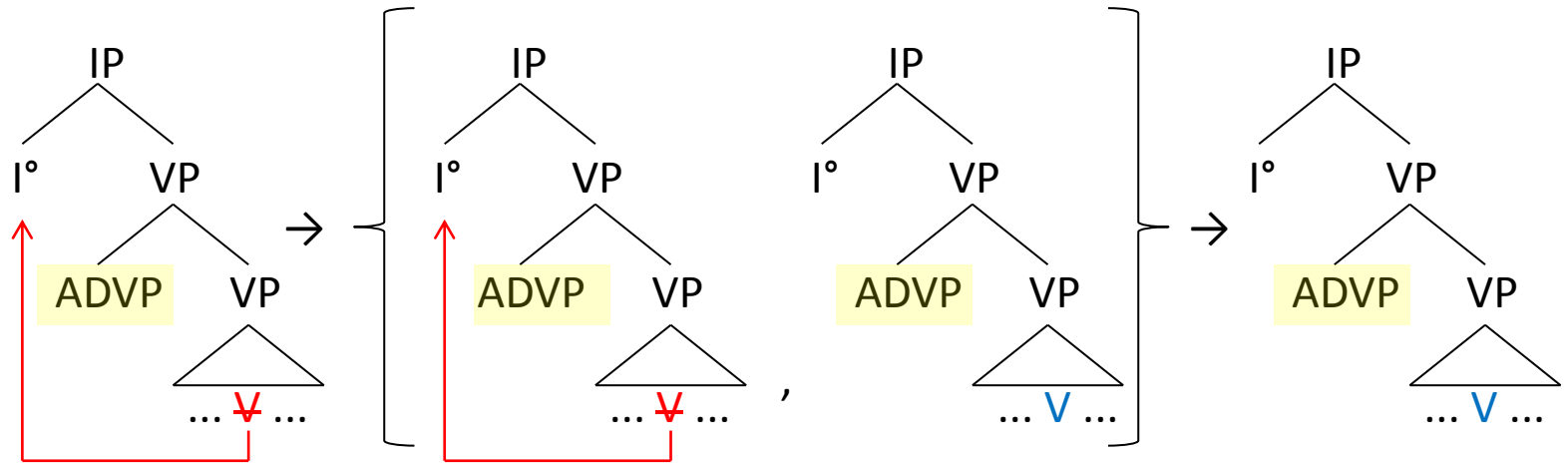
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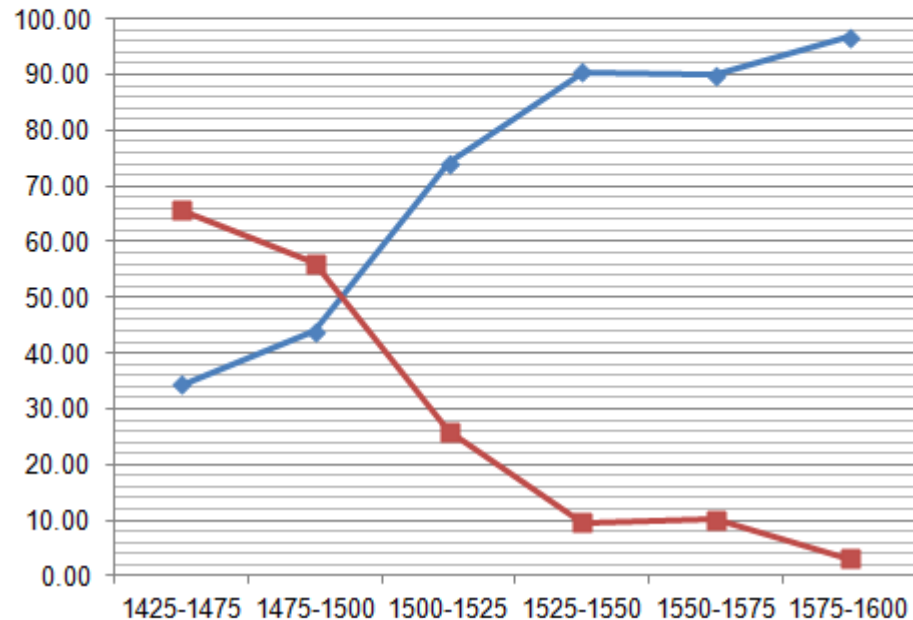
Example: The loss of V-to-I movement in English

V-to-I → {V-to-I, V-in-VP} → V-in-VP

competition

	never V	V never
1425-1475	52	99
1475-1500	80	102
1500-1525	80	28
1525-1550	276	29
1550-1575	71	8
1575-1600	152	5

◆ % never V
■ & V never



from: Ellegård 1953: 184

Kroch 1989

Warner 1997

Introduction

Different type of syntactic change:

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(i) syntactic rules α , β are not mutually exclusive

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$$\alpha \rightarrow \{\alpha, \beta, \alpha \cap \beta\} \rightarrow \beta$$

↑
competition

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- (i) syntactic rules α , β are not mutually exclusive
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↑
competition

“Grammatical cycle”

Introduction

Example of a grammatical cycle:

$$\alpha \rightarrow \{\alpha, \beta, \alpha \cap \beta\} \rightarrow \beta$$

↑
competition

Introduction

Example of a grammatical cycle: The development of Negation in English

$$\alpha \rightarrow \{\alpha, \beta, \alpha \cap \beta\} \rightarrow \beta$$

↑
competition

Introduction

Example of a grammatical cycle: The development of Negation in English

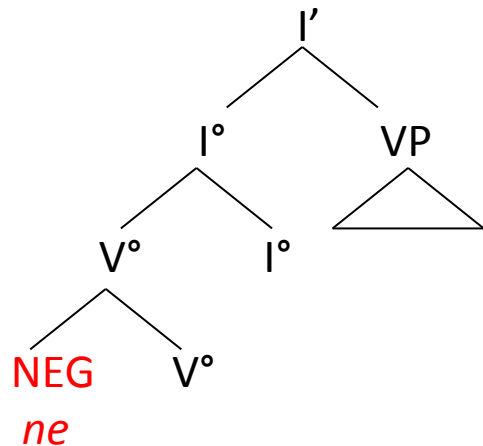
$$V^{\circ}\text{-Adjunct} \rightarrow \{V^{\circ}\text{-Adjunct}, \beta, V^{\circ}\text{-Adjunct} \cap \beta\} \rightarrow \beta$$

↑
competition

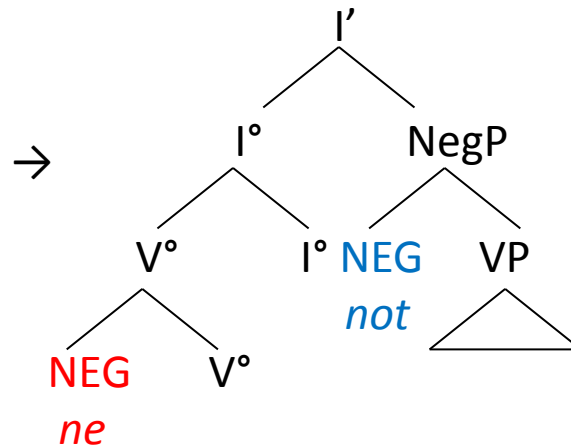
Introduction

Example of a grammatical cycle: The development of Negation in English

$V^\circ\text{-Adjunct} \rightarrow \{V^\circ\text{-Adjunct}, \text{NegP}, V^\circ\text{-Adjunct} \cap \text{NegP}\} \rightarrow \text{NegP}$
 ↑
 competition



oc Crist it *ne* uoalde.
 (CMPETERB,54.374)

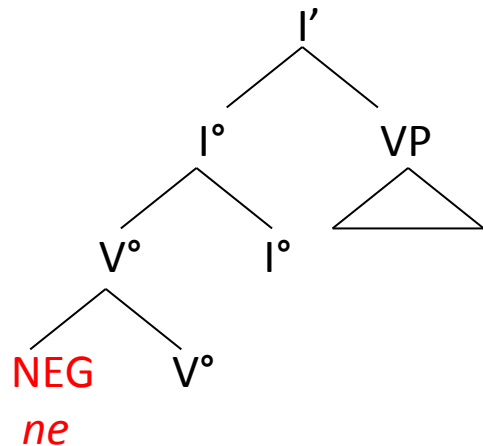


bise *ne* uorbereþ *naȝt* oure lheuedi.
 (CMAYENBI,64.1205)

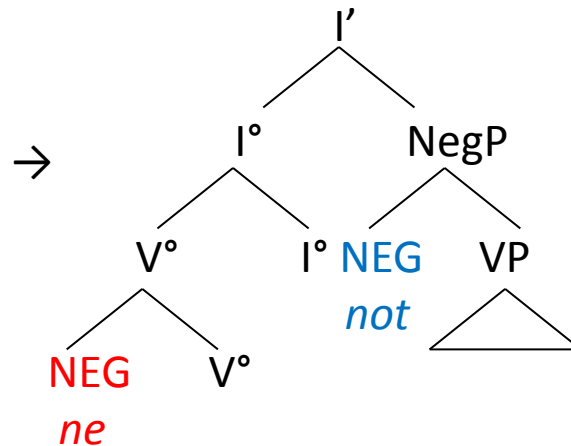
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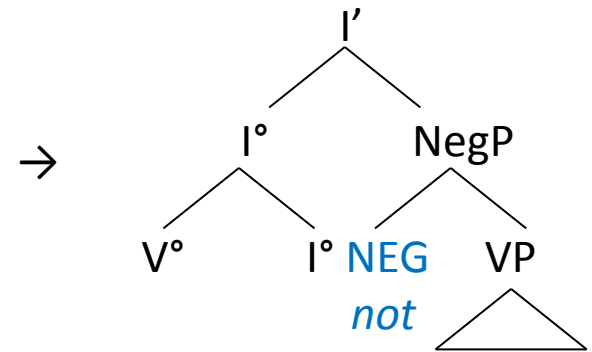
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bise **ne** uorbereþ **nast** oure Iheuedi.
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Tou schalt **not** tempte God.
 (CMMIRK,83.2232)

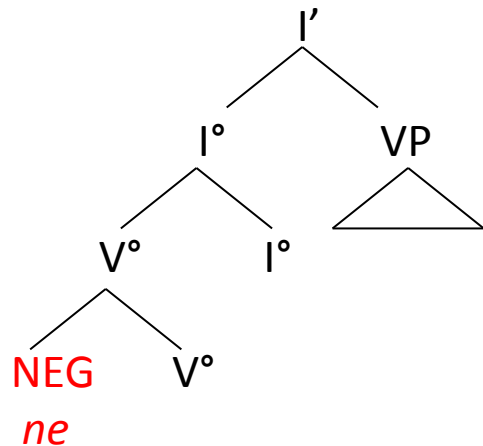
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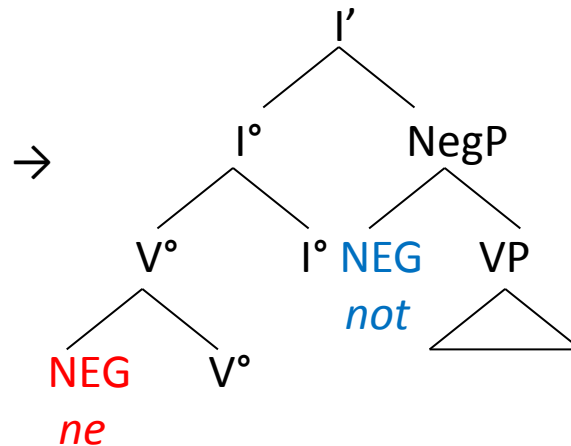
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 competition

“Jespersen’s Cycle”

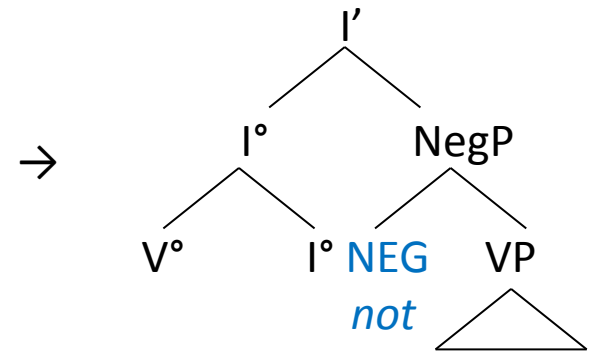
Jespersen 1917



oc Crist it **ne** uoalde.
 (CMPETERB,54.374)



bise **ne** uorbereþ **na3t** oure Iheuedi.
 (CMAYENBI,64.1205)



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Introduction

Binary grammatical change	Cyclic grammatical change
Two competing rules	Three competing rules
Output= $\{\alpha, \beta\}$	Output= $\{\alpha, \beta, \alpha \cap \beta\}$
E.g.: V-to-I movement in the history of English	E.g.: Negation in the history of English
- S-shaped curve	???
- Constant rate of change in different contexts	???
- (near-)synonymous forms	???

Introduction

Binary grammatical change	Cyclic grammatical change
Two competing rules	Three competing rules
Output={ α , β }	Output={ α , β , γ }
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- S-shaped curve	???
- Constant rate of change in different contexts	???
- (near-)synonymous forms	???

What are the mathematical properties of the overlapping option?

Introduction

Binary grammatical change	Cyclic grammatical change
Two competing rules	Three competing rules
Output={ α , β }	Output={ α , β , $\alpha \cap \beta$ }
E.g.: V-to-I movement in the history of English	E.g.: Negation in the history of English
- S-shaped curve	???
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Can we find constant rate effects in grammatical cycles?

Introduction

Binary grammatical change	Cyclic grammatical change
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Output={ α , β }	Output={ α , β , $\alpha \cap \beta$ }
E.g.: V-to-I movement in the history of English	E.g.: Negation in the history of English
- S-shaped curve	???
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What consequences of the fact that non-synonymous rules / with different rule conditions may compete?

Introduction

Binary grammatical change	Cyclic grammatical change
Two competing options	Three competing options
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Case study: The development of **Relative Clauses** in early English

OE Relative Clauses - Overview

Introduction

Study 1

VarbRule

Study 2

CRE

Study 3

Study 4 - ME

Conclusion

OE Relative Clauses - Overview

- two main ways to form a relative clause:

OE Relative Clauses - Overview

- two main ways to form a relative clause:
- (a) *Se*-relatives

OE Relative Clauses - Overview

- two main ways to form a relative clause:
 - (a) *Se*-relatives
 - *Se, seo, þæt* are demonstratives that can be used as relative pronouns
 - cf. German: *der, die, das*
- (3) Gehyge nu, hu mycel **seo syn** sy, **seo** þone man asyndrað fram Godes rice.
consider now, how much the sin be, SE the man tear-apart from God's kingdom
'Consider now the strength of **the sin that** separates man from God's kingdom.'
(cogregdC,GDPref_and_3_[C]:15.207.29.2741)

OE Relative Clauses - Overview

- two main ways to form a relative clause:
- (a) *Se*-relatives
 - *Se* agrees in φ -features with the antecedent and surfaces with case-marking appropriate to the relativized argument of the relative clause

(4) *se bera* ham ne com , *pone* he gewunode for bilwitesse _ broðor cigan.
the bear home not came, SE he was-used for innocence brother call
‘The bear did not come home who he was used to call brother out of innocence’
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OE Relative Clauses - Overview

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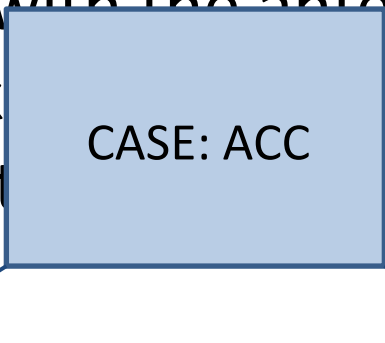
GEND: MASC
NUM: SG

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CASE: ACC



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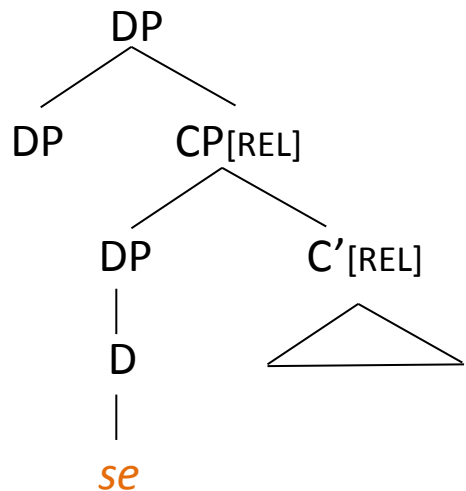
OE Relative Clauses - Overview

- two main ways to form a relative clause:
 - (a) *Se*-relatives
 - pied piping mandatory; P-stranding ungrammatical (Bresnan 1976)
- (5) *se hælend* [...] *ðurh þone* þu scealt underfon ðinra wunda hæle.
the Saviour [...] through SE you shall receive your wounds healing
'the Saviour [...] through whom you shall receive the healing of your wounds'
(coelive,ÆLS[Agnes]:272.1903)
- **se hælend* [...] *þone* þu scealt underfon *ðurh* ðinra wunda hæle.

OE Relative Clauses - Overview

- two main ways to form a relative clause:
- (a) *Se*-relatives
 - analysed as relative operators, in Spec,CP

CP --> DP C'



OE Relative Clauses - Overview

- two main ways to form a relative clause:

OE Relative Clauses - Overview

- two main ways to form a relative clause:
- (b) *þe*-relatives
 - *þe* is an undeclinable particle used as a relativizer

(6) Ac *seo spræc* sy gefylled *þe* on hyra æ awriten ys .

but the speech be fulfilled þe in their law written is

‘But the prophecy will be fulfilled that is written in their testament’

(cowsgosp,Jn_[WSCp]:15.25.7061)

OE Relative Clauses - Overview

- two main ways to form a relative clause:
 - (b) *þe*-relatives
 - *þe* occurs in other contexts as a complementizer with complex prepositions in adverbial clauses:
- (7) a. for ði *þe* b. mid ðam *þe*
for this þE with this þE
'therefore... ' 'when ...'

rarely, in nominal complement clauses

- (8) þurh ða gife *þe* se mennisca Crist wearð Godes bearn.
through the gift þE the human Christ was God's child
'through [the gift [that the human Christ was God's child]]'
(cocathom2,+ACHom_II,_40:301.68.6865)

OE Relative Clauses - Overview

- two main ways to form a relative clause:
- (b) *þe*-relatives
 - pied piping ungrammatical; P-stranding mandatory

(9) *þa upahfednysse þe he ðurh* ahreas.
the arrogance PE he through fell
'the arrogance through wic he fell'
(cocathom1,+ACHom_I,_13:281.14.2359)

* *þa upahfednysse ðurh þe* he ahreas.

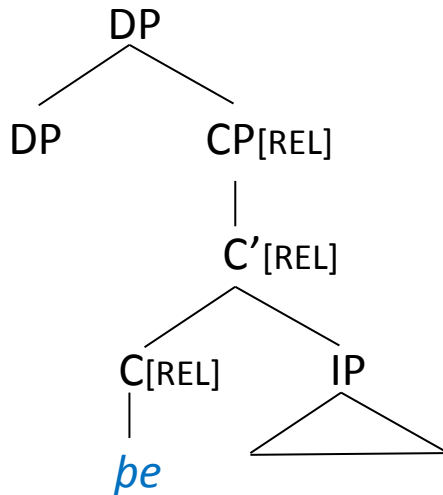
OE Relative Clauses - Overview

- two main ways to form a relative clause:
- (b) *þe*-relatives
 - Punctuation and metrical facts suggest that *þe* is a phonologically reduced, enclitic element (e.g. van der Laan 1929)

OE Relative Clauses - Overview

- two main ways to form a relative clause:
- (b) *pe*-relatives
 - analysed as heads of relative clauses, C°

$C' \rightarrow C^\circ \text{ IP}$



OE Relative Clauses - Overview

- the two rules that introduce *se* and *þe* relatives are not mutually exclusive

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- in theory, they do not impose a binary choice, but allow an overlap rule

OE Relative Clauses - Overview

- the two rules that introduce *se* and *þe* relatives are not mutually exclusive
- in theory, they do not impose a binary choice, but allow an overlap rule
- such *se+þe*-relatives are in fact frequently attested

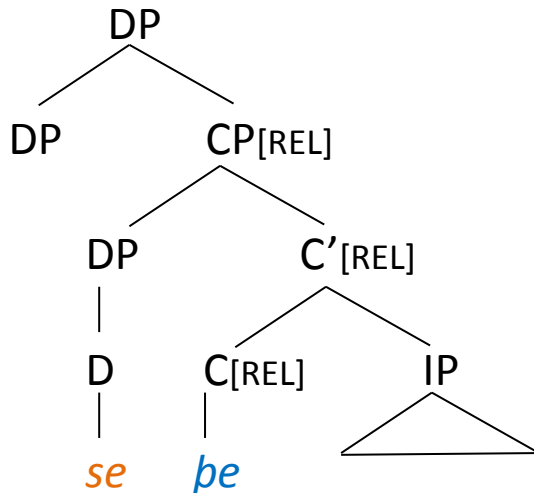
(10) þa wæs seo tunge alysed to spræce, seo þe lange ær wæs dumb.
then was the tongue released to speech SE þE long earlier was dumb
'The tongue could speak again that had been dumb for a long time'
(cogregdC,GDPref_and_3_[C]:3.184.9.2279)

OE Relative Clauses - Overview

- overlap rule:
- *se þe*-relatives
 - analysed as doubly filled COMP clauses:

CP --> DP C' (se)

C' --> C° IP (þe)



OE Relative Clauses - Overview

- Assume that *se* and *þe* relatives are in competition
- Then, they would be a good case study to investigate the properties of the overlap rule (doubly filled COMP *se þe* clauses)

$$\{ \text{CP} \rightarrow \text{DP C}' , \text{C}' \rightarrow \text{C}^\circ \text{IP} , \text{CP} \rightarrow \text{DP C}' \cap \text{C}' \rightarrow \text{C}^\circ \text{IP} \}$$

↑
competition

Quantitative Analysis I

Introduction

Study 1

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Quantitative Analysis I

measure as dependent variable occurrence of relativization strategy (α , β , $\alpha \cap \beta$) as a function of time/period as the independent variable

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measure as dependent variable occurrence of relativization strategy (α , β , $\alpha \cap \beta$) as a function of time/period as the independent variable

3 genres: prose, documents, poetry

Quantitative Analysis I

1) Prose Texts

- collection of data with electronic, syntactically parsed corpora:
- **YCOE2** (Taylor et al. 2003) (Old English)
- and **PPCME2** (Kroch and Taylor 2000) (Middle English)

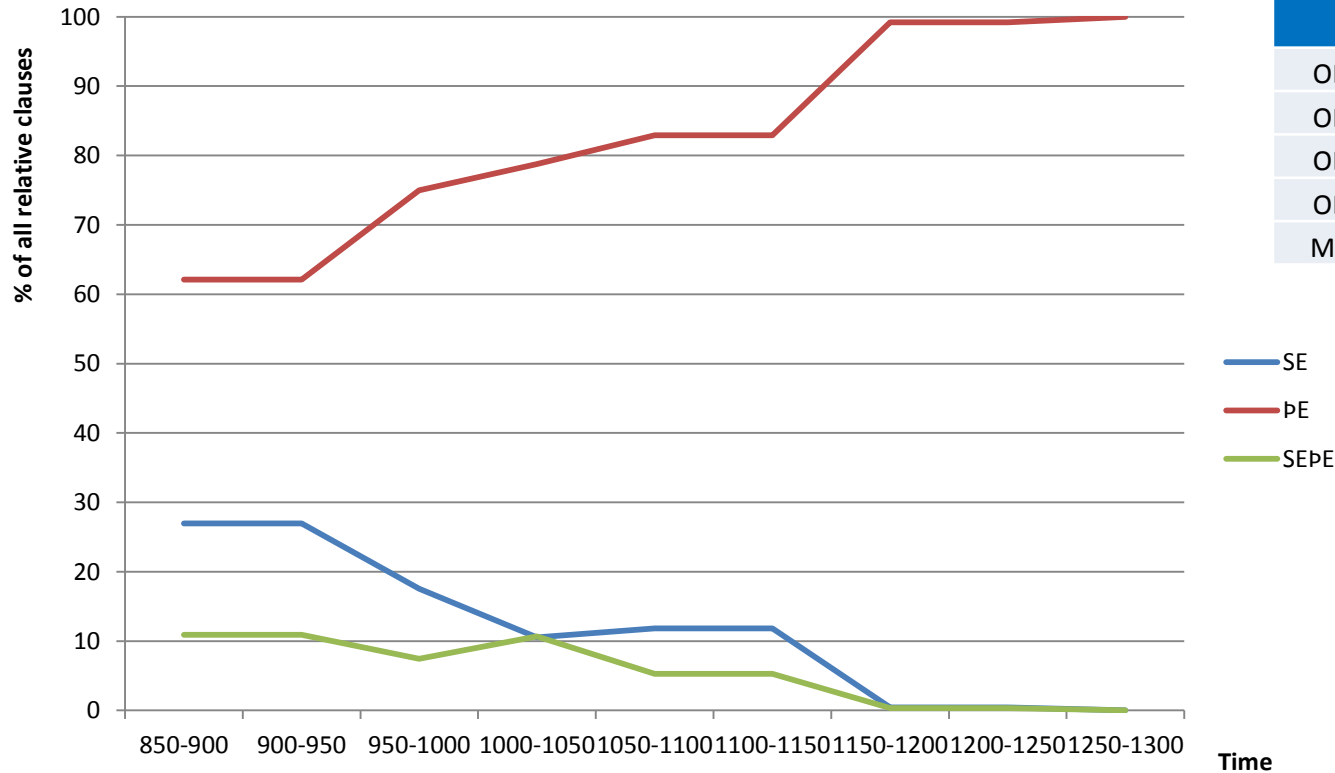
Quantitative Analysis I

1) Prose Texts

Period	Time	# tokens
OE1	850-950	29,936
OE2	950-1000	18,702
OE3	1000-1050	42,064
OE4	1050-1150	11,894
ME1	1150-1250	10,386

Quantitative Analysis I

1) Prose Texts



	SE	PE	SEPE
OE1	1884	4342	763
OE2	596	2544	253
OE3	864	6442	875
OE4	288	2021	129
ME1	22	4750	17

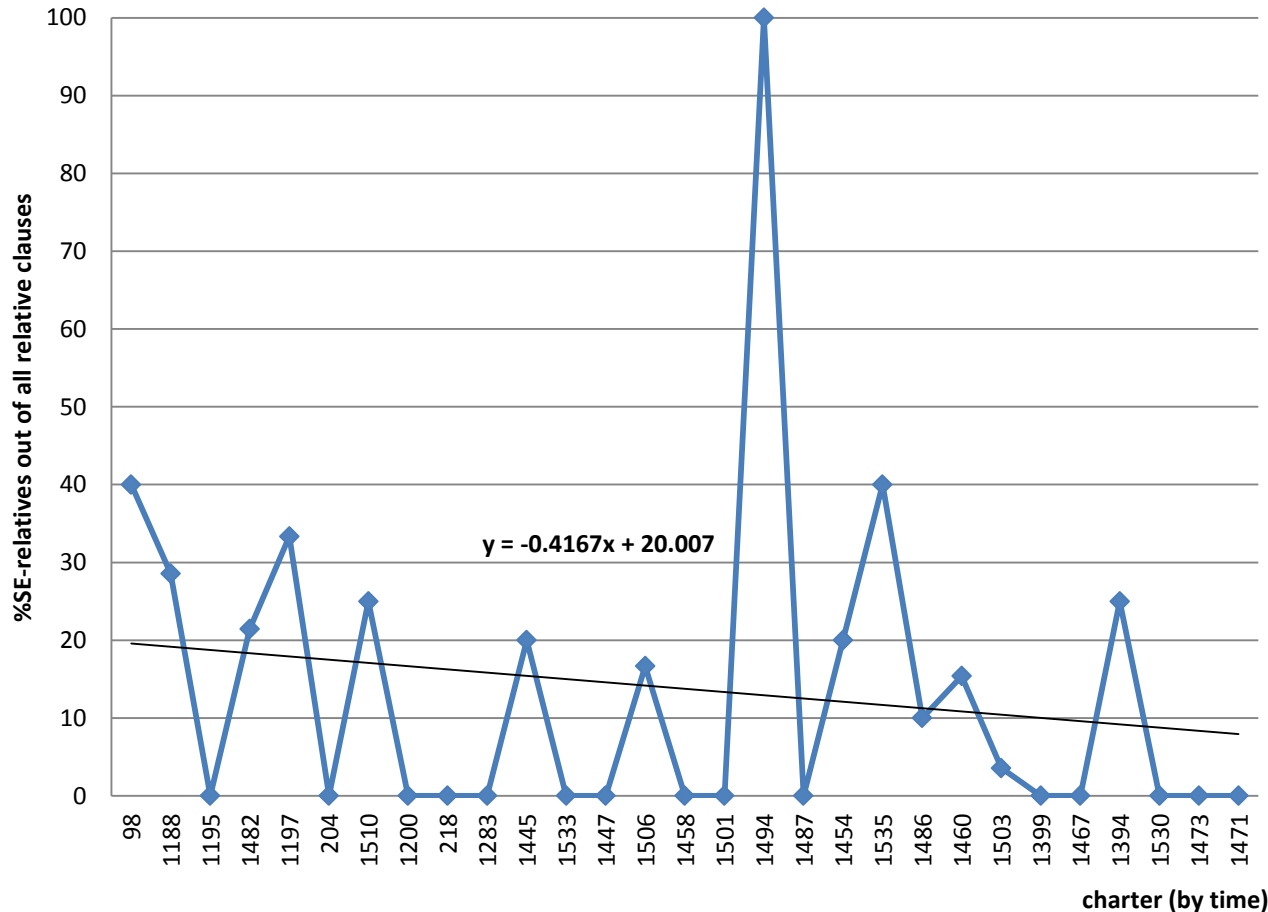
Quantitative Analysis I

2) Documents

charter #	year	tokens
98	0743-45	12
1188	0805-10	18
1195	831	7
1482	0833-839	48
1197	0843-63	12
204	0844-5	6
1510	0845-53	11
1200	0867-70	12
218	883	23
1283	0899-904	14
1445	0899-924	67
1533	0931-39	18
1447	0950-68	49
1506	958	12
1458	0960-88	38
1501	0961-95	10
1494	0962-91	29
1487	0975-1016	33
1454	0990-2	23
1535	1000	20
1486	1000-2	41
1460	1010-23	22
1503	1015	39
1399	1033-8	5
1467	1037-40	39
1394	1042	8
1530	1042-3	11
1473	1044-48	8
1471	1044-5	13
		648

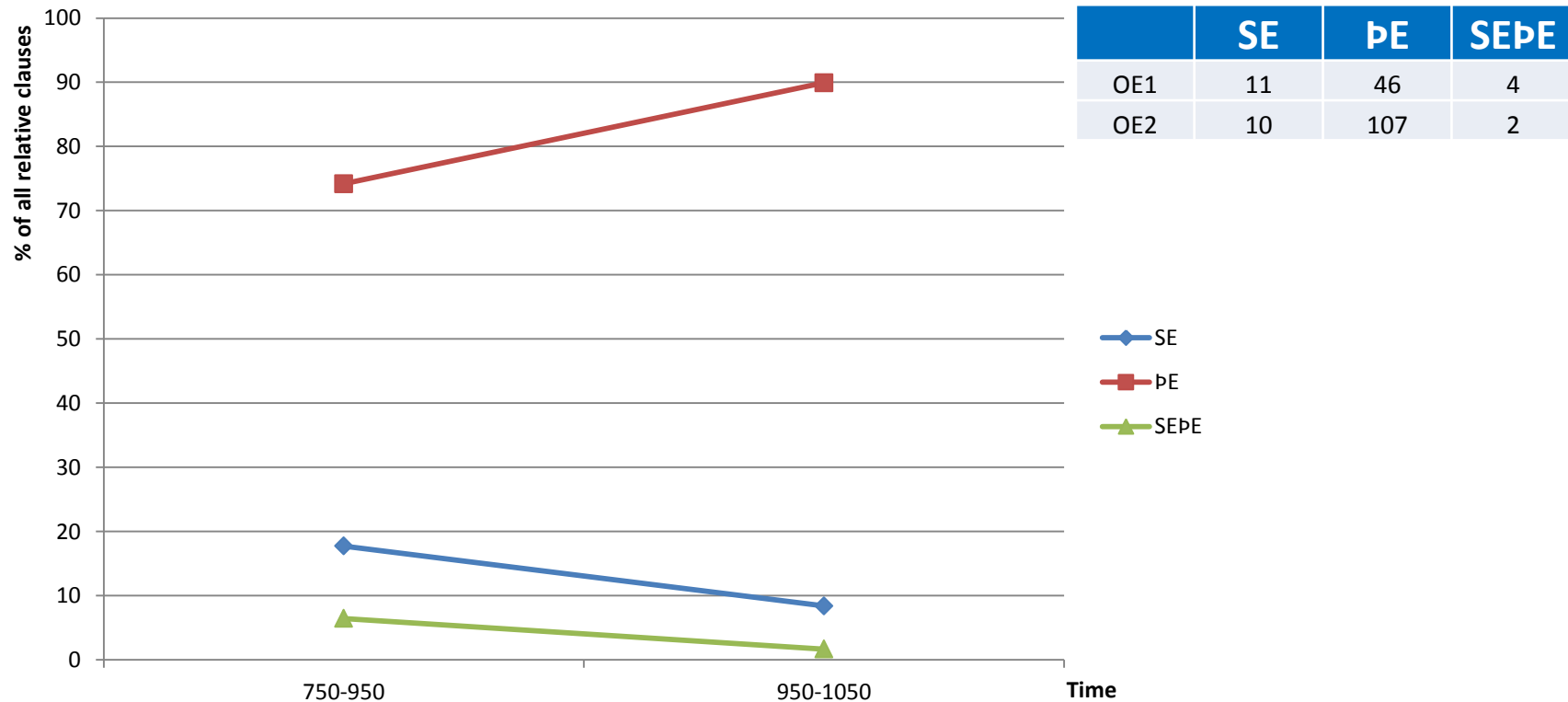
Quantitative Analysis I

2) Documents



Quantitative Analysis I

2) Documents



Quantitative Analysis I

3) Poetry

10 Old English poems: *Andreas, Beowulf, Christ, Apostles, Exodus, Genesis, Metres of Boethius, The Wanderer, The Phoenix, Riddles*

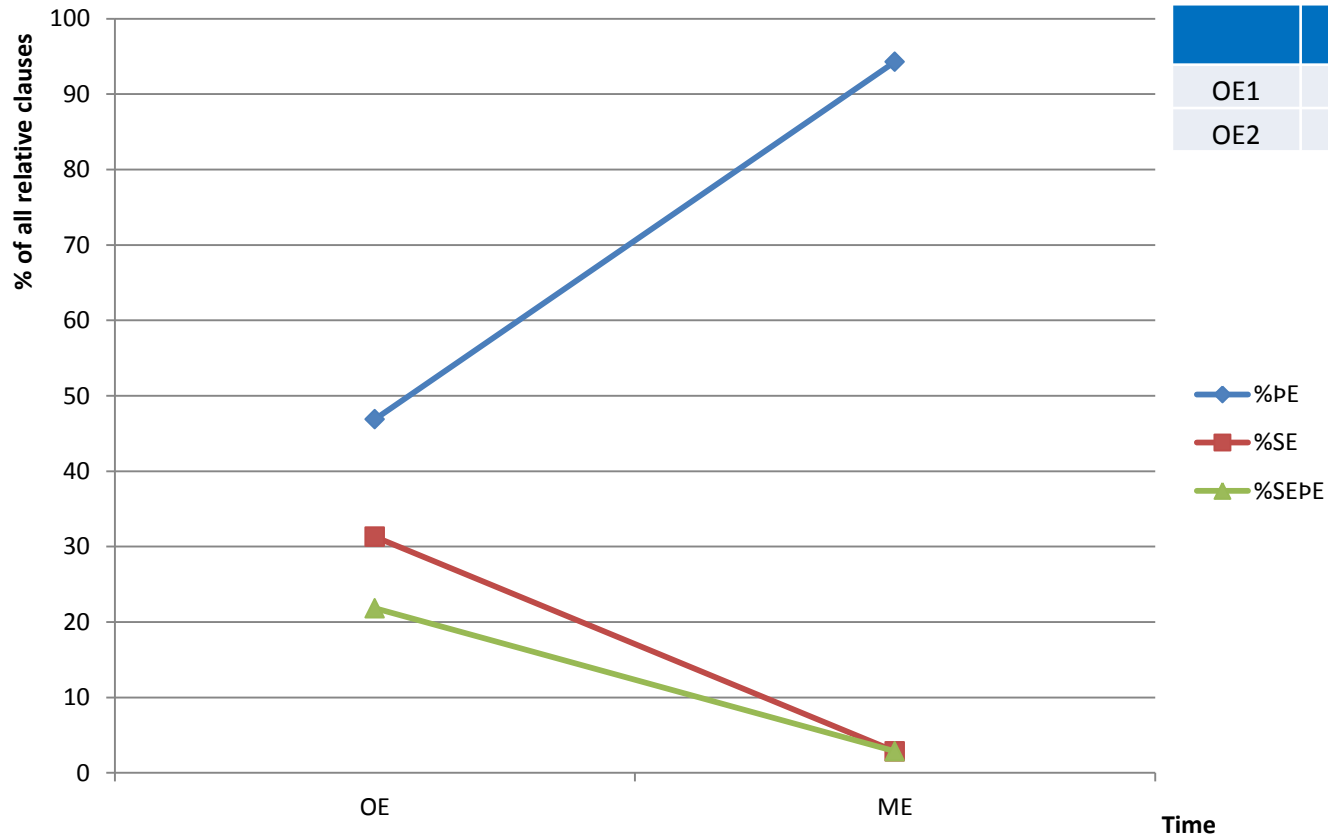
- **YCOEP2** (part of YCOE2, Taylor et al. 2003)
- c. 9000 tokens
- composition dates vary, before 1000 A.D.

2 Middle English poems: *Poema Morale, Orison of our Lady*

- c. 500 tokens
- c. 1200 A.D.

Quantitative Analysis I

3) Poetry



	SE	PE	SEPE
OE1	221	331	154
OE2	3	99	3

Hypothesis I

Rule Independence

The two relativization rules are *independent* of each other. Doubly filled COMP relative clauses are “accidental”. They occur when both relativization rules are applied.

Hypothesis I

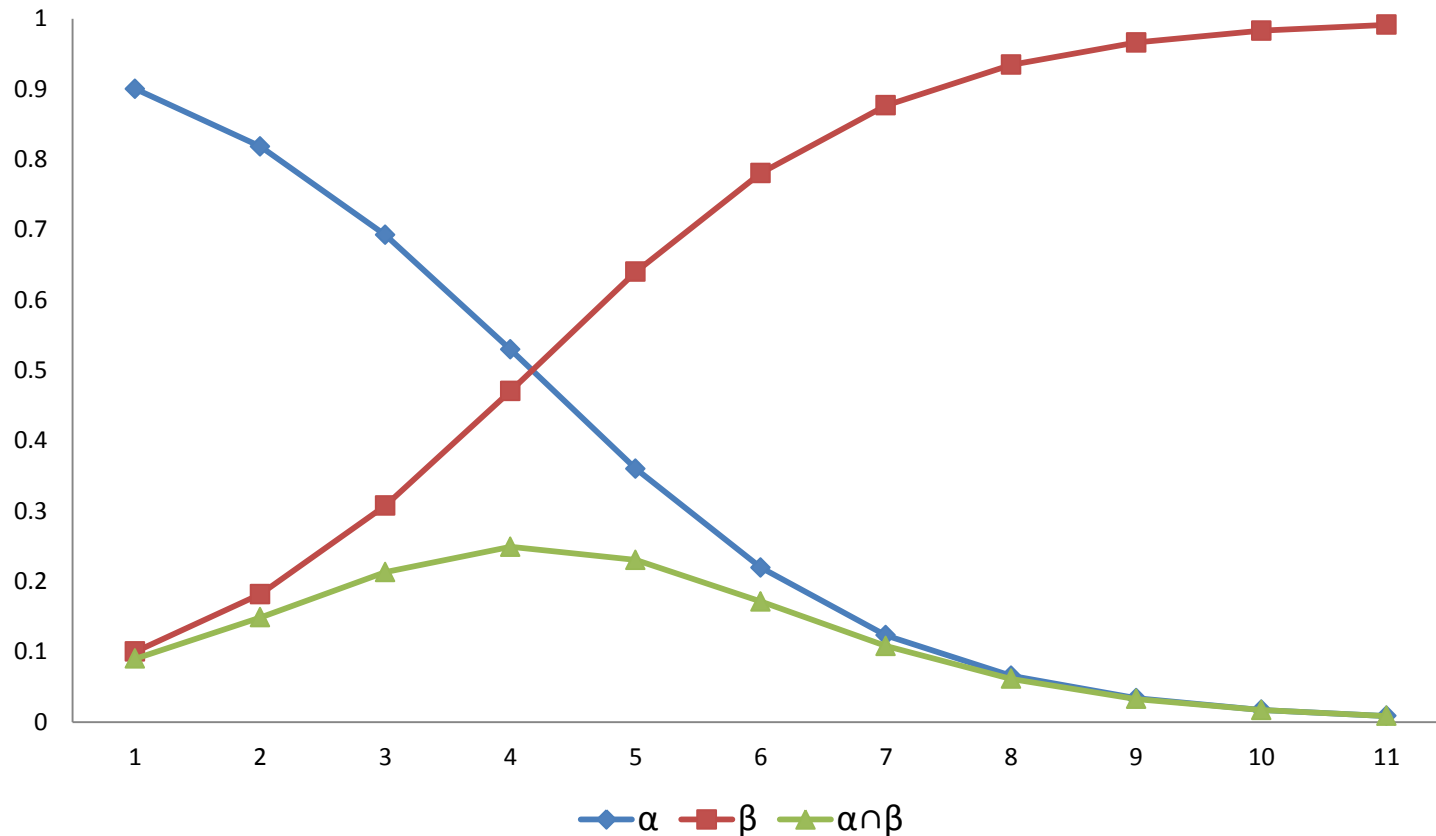
Rule Independence

The two relativization rules are *independent* of each other. Doubly filled COMP relative clauses are “accidental”. They occur when both relativization rules are applied.

$$P(\alpha \cap \beta) = P(\alpha) \times P(\beta)$$

Hypothesis I

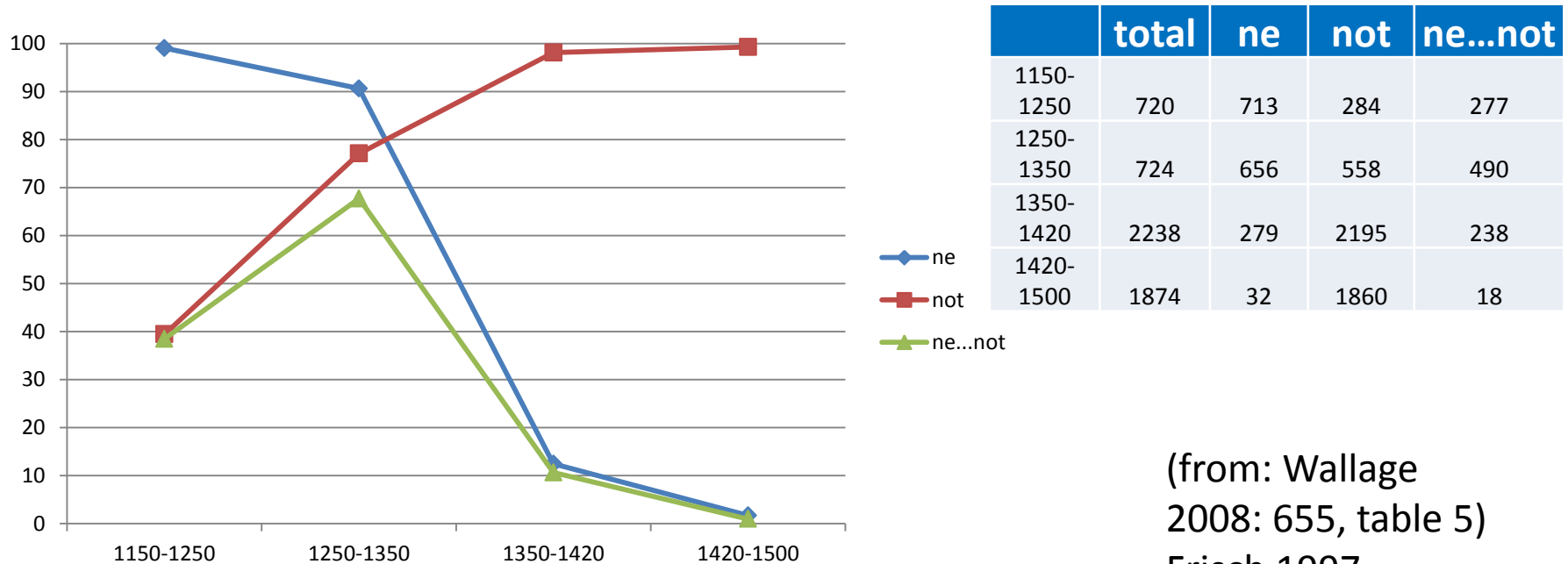
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Hypothesis I

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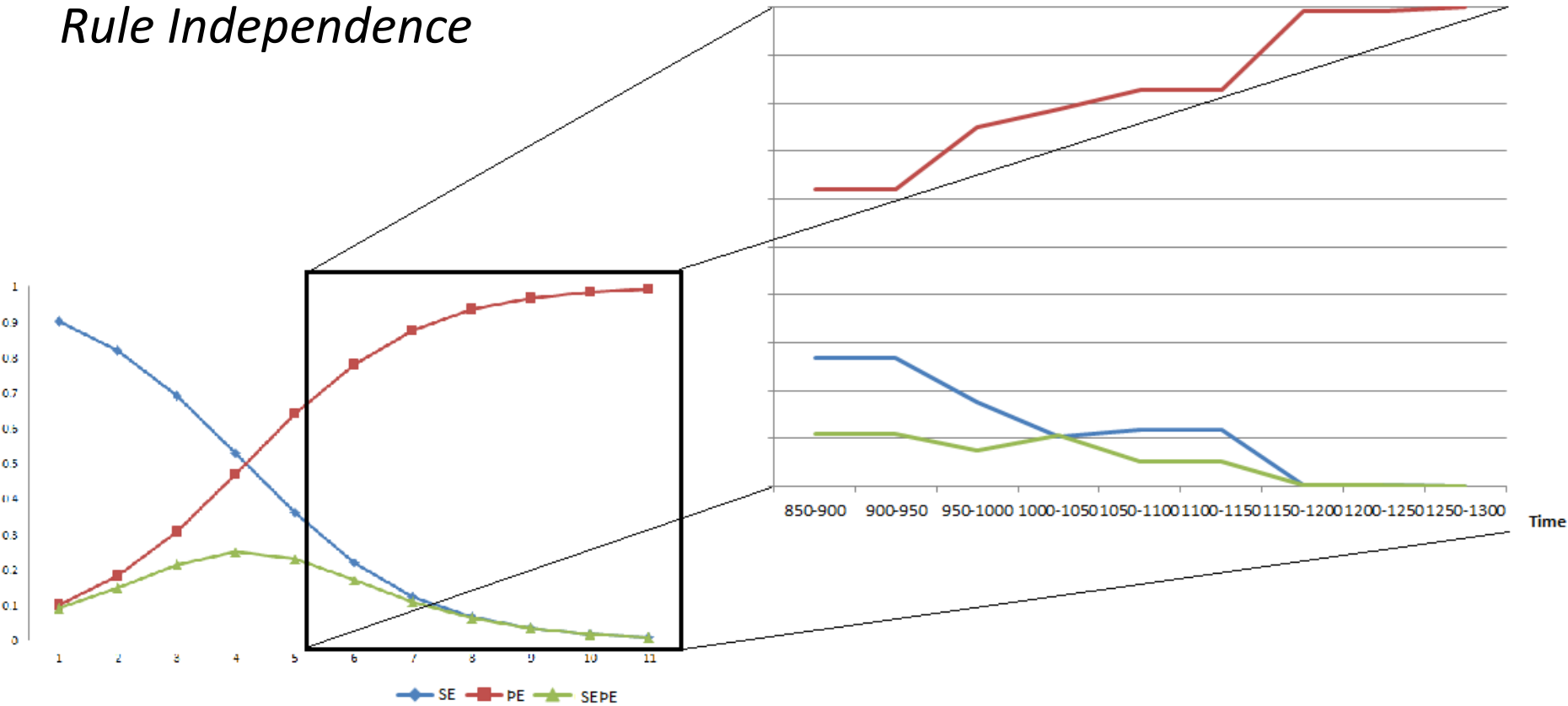
Overlap rule in Jespersen's cycle



(from: Wallage
2008: 655, table 5)
Frisch 1997

Hypothesis I

Rule Independence



Multivariate Analysis

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Conclusion

Multivariate Analysis

Problem: the two relativization strategies may not be synonymous / have different distributions.

Multivariate Analysis

Problem: the two relativization strategies may not be synonymous / have different distributions.

Then *Rule Independence* may not hold uniformly for all contexts.

Multivariate Analysis

Problem: the two relativization strategies may not be synonymous / have different distributions.

Then *Rule Independence* may not hold uniformly for all contexts.

→ Multivariate Analysis (Variable Rule) to identify linguistic factors that determine the occurrence of *se* vs. *pe* relatives

Multivariate Analysis

Factor Groups:

- (a) Antecedent type
- (b) Matrix clause Type
- (c) Position of relative clause
- (d) Extraction site
- (e) Period

Multivariate Analysis

Factor Groups:

(a) Antecedent type

- Bare nouns
- Proper names and /or appositions
- Bare pronouns / bare possessives
- Demonstrative / possessive / superlative + (adjective +) noun
- Existentially quantified noun
- Universally quantified noun
- Other

Multivariate Analysis

Factor Groups:

(c) Matrix clause Type

(11) a. **Main Clauses**

þone ylcan sige God behet eallum þam ðe hine lufian wyllað.
the same victory God promised all those þE him believe will
(cobede,Bede_1:7.40.4.330)

b. **Conjoined Main Clauses**

and geceas ða hæðenan leoda þe geond ealne middaneard on deofolgyldum gelyfdon
and chose the heathen people þE about all earth in devil-idol believed
(cocathom2,+ACHom_II,_8:69.75.1401)

c. **Subordinate Clauses**

... gif we geðenceað ða twegen witgan ðe God wolde sendan.
... if we think-of the two prophets þE god would send
(cocura,CP:7.49.1.270)

Multivariate Analysis

Factor Groups:

(d) Position of relative clause

(12) a. **In Situ**

and gewende him to [**sumum halgan were** [se hatte Hilarianus]] mid his mannum
and went himself to some holy man SE was.called Hilarianus with his men
'and [he] went to a holy man wo was called Hilarianus wiht his men'
(coaelive,ÆLS[Agnes]:381.1985)

b. **Extraposd**

and [**pa gestrinde** ti] he bearn on hys cnihtade [se hatte Seth];
and the lineage he bore in his boyhood SE was.called Seth
'And his boyhood he bore the lineage that was called Seth'
(cosolsat1,Sol_1:13.2.44)

Multivariate Analysis

Factor Groups:

(e) Extraction site (local, long-distance)

(13) ta beboda [þe Moyses bebead on þære halgan Godes æ hym [to gehealdenne]]
the order þe Moses ordered in the holy God's law him to hold
'The order which Moses ordered him to keep in the holy Book.'
(coaelhom,+AHom_16:102.2302)

(f) Period (OE1, OE2, OE3, OE4, ME1)

Multivariate Analysis

Procedure:

- Input: 25,790 relative clauses
- 7 Antecedent types x 3 Matrix clause Type x 2 Positions of relative clause x 2 Extraction site x 5 Periods = 420 cells
- Statistical Analysis with *GoldVarb* (Robinson et al. 2001)

Multivariate Analysis

Results:

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Multivariate Analysis

Results:

- Strong overall preference for PE (corrected mean: 0.803)

Multivariate Analysis

Results:

(a) Antecedent type

~~(b) Matrix clause Type~~

(c) Position of relative clause

~~(d) Extraction site~~

(e) Period

Multivariate Analysis

Results:

(a) Antecedent type

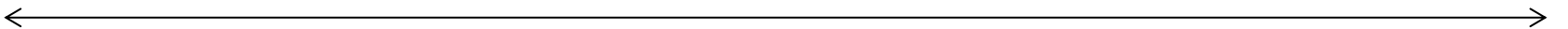
Multivariate Analysis

Results:

(a) Antecedent type

“SE/PE Hierarchy”

existential quantification > names > bare nouns > other > pronouns > demonstrative > universal quantification



SE PE

0.248 0.320 0.348 0.706 0.708 0.921 0.968

Factor weight

Multivariate Analysis

Results:

(a) Antecedent type

“SE/PE Hierarchy”

Reason: restrictiveness (e.g. Troup 2010)

Multivariate Analysis

Results:

(a) Antecedent type

“SE/PE Hierarchy”

Reason: restrictiveness

(14) þider cwom **sum cuma**, **se** wæs from unclænum gaste hefiglice swenced.
thither came some stranger SE was from unclean spirit intensely afflicted
‘A certain stranger came there, who suffered intensely from an unclean spirit’
(cobede, Bede_3:9.184.20.1840)

Multivariate Analysis

Results:

(a) Antecedent type

“SE/PE Hierarchy”

Reason: restrictiveness

(15) & of hyre ic ðe forgyfe **sunu**, ðone ic wylle bletsian

and of her I you give son, SE I will bless

‘and I will give you a son who I will bless’

(cootest, Gen:17.16.657)

Multivariate Analysis

Results:

(a) Antecedent type

“SE/þE Hierarchy”

Reason: restrictiveness

(16) Ge sceolon eac gelyfan þæt **seo bletsung** ðe God behet Abrahame gæð ofer us.
you shall also believe that the blessing þE god ordered A. goes over us
‘You shall also believe that the blessing that god commanded is with us’
(cocathom2,ÆCHom_II,_4:35.173.791)

Multivariate Analysis

Results:

(a) Antecedent type

“SE/PE Hierarchy”

Reason: restrictiveness

(17) Ac **ælc mon þe** allunga underþeoded bið unþeawum forlæt his sceppend
but each man PE entirely subdued is vices.dat lets his creator
‘But each man who is entirely subdued by vices loses his creator’
(coboeth,Bo:30.69.30.1296)

Multivariate Analysis

Results:

(a) Antecedent type

Reason: restrictiveness

Multivariate Analysis

Results:

(a) Antecedent type

Reason: restrictiveness \sim negation (Mitchell 1985: §2134)

- (18) a. I have a car. It is red.
b. I have a car, which is red.
c. *I don't have a car. It is red.
d. *I don't have a car, which is red.

Multivariate Analysis

Results:

(a) Antecedent type

Reason: restrictiveness ~ negation (Mitchell 1985: §2134)

(19) rare:

and **ne** ondræd þe no þone deað **se** þe gelædeþ to life.

and NEG fear you not-at-all the death SE you leads to life

‘and don’t fear the death that leads you to life’

(comart3,Mart_5_[Kotzor]:Au22,A.11.1514)

	SE	þE
POS	1930	6671
NEG	22	438

Chi-square=80.54, df=1, p<0.0001

Multivariate Analysis

Results:

(a) Antecedent type

Reason: restrictiveness ~ negation (Mitchell 1985: §2134)

(20) rare:

ne forlæt þu nan þincg þæt þu me ne gecyðe

NEG leave you no thing SE you me not make.known

‘Don’t abandon anything that you have not made known to me’

(comary,LS_23_[MaryofEgypt]:528.349)

	SE	PE
NO	5	81

Multivariate Analysis

Results:

(c) Position of relative clause

Extraposed relative clauses are more likely than relative clauses In Situ to be introduced by SE

	SE	PE
IN SITU	4182	16384
EXTRAPOSED	1840	3384

Chi-square=515.88, df=1, p<0.0001

Multivariate Analysis

Results:

(e) Period

Quantitative Analysis II

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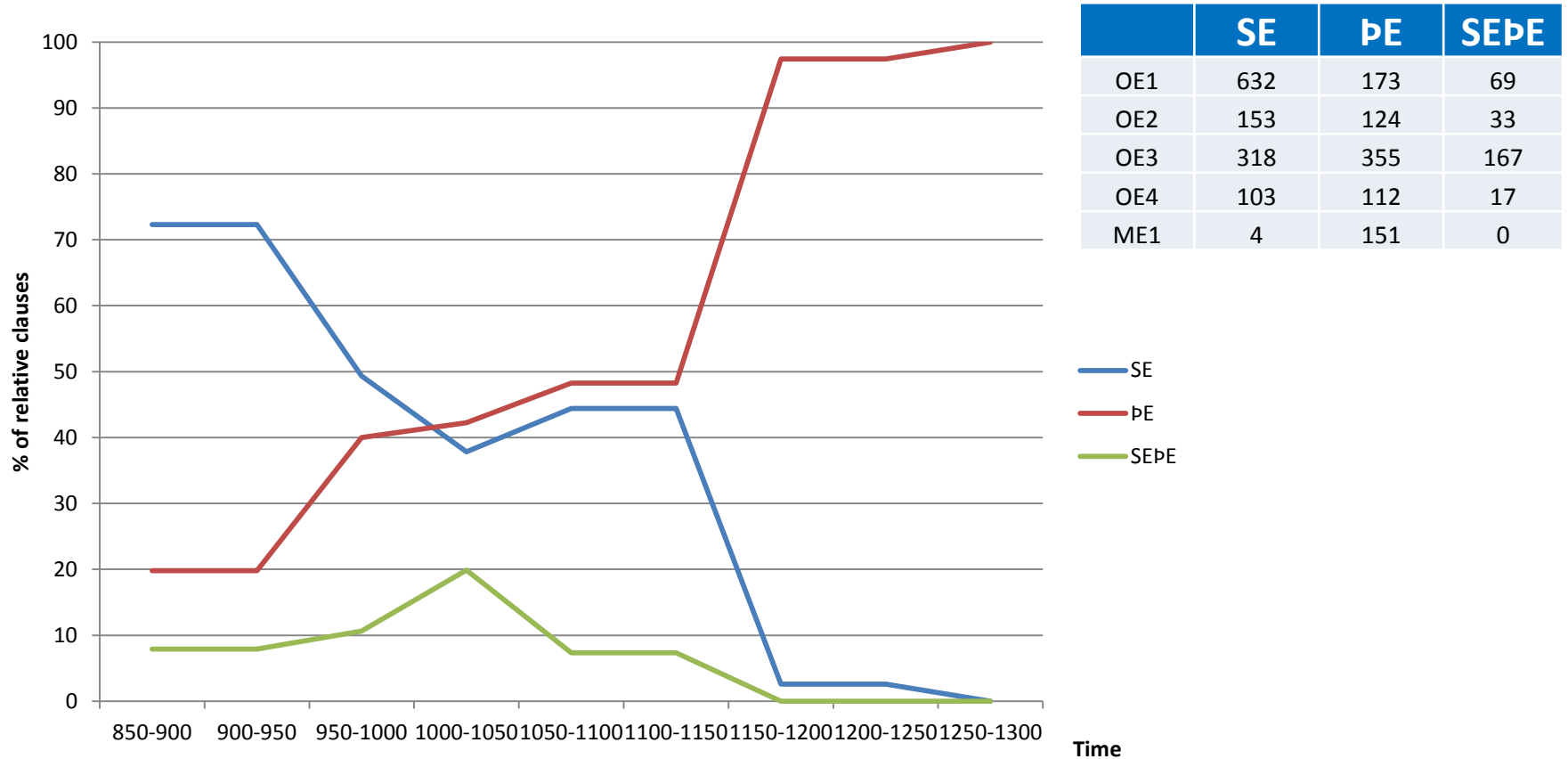
Quantitative Analysis II

measure as dependent variable occurrence of relativization strategy (α , β , $\alpha \cap \beta$) as a function of time/period as the independent variable

in the most conservative contexts:

- quantifier “some”, bare nouns, names, appositives

Quantitative Analysis II



Quantitative Analysis II

Conclusion:

- OE relative clauses can be regarded as a grammatical cycle
- But: More work required (more contexts)
- But: statistical evaluation of similarity between expected and observed frequency of SEPE forms pending

Constant Rate Effects

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Constant Rate Effects

Constant Rate Hypothesis, Kroch 1989

“...when one grammatical option replaces another with which it is in competition across a set of linguistic contexts, the rate of replacement, properly measured, is the same in all of them. The contexts generally differ from one another at each period in the degree to which they favor the spreading form, but they do not differ in the rate at which the form spreads.” (Kroch 1989:200)

Constant Rate Effects

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Constant Rate Effects

How to test the Constant Rate Hypothesis

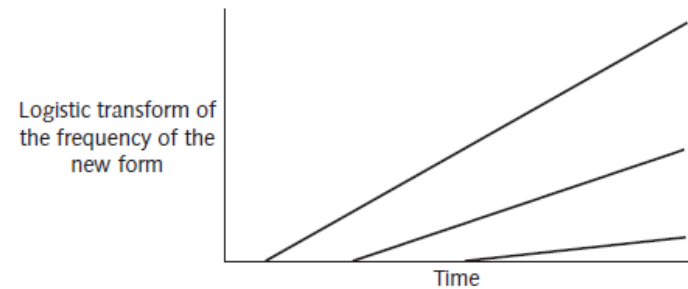
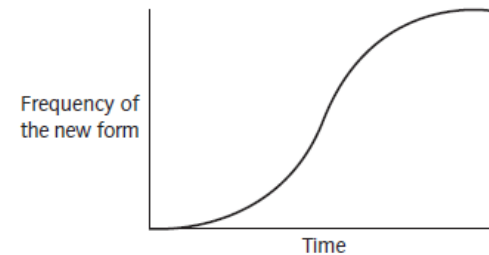
- fit data to logistic functions (“S-curve function”) (e.g. CADMOD)

$$p = \frac{e^{k+st}}{1+e^{k+st}}$$

- logistic transforms of the frequency (“logit”)

$$\ln \frac{p}{1-p} = k + st$$

- determine rates of increase
 - compare rates of increase
- (Pintzuk 2003)



Constant Rate Effects

How to test the Constant Rate Hypothesis

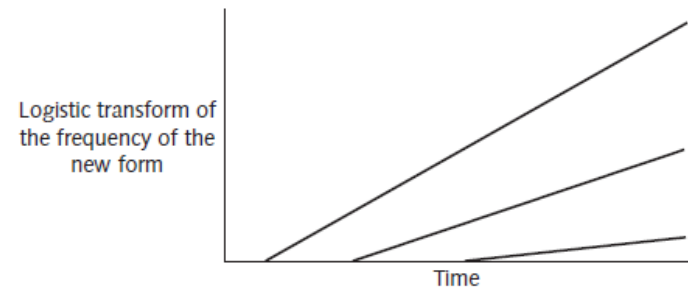
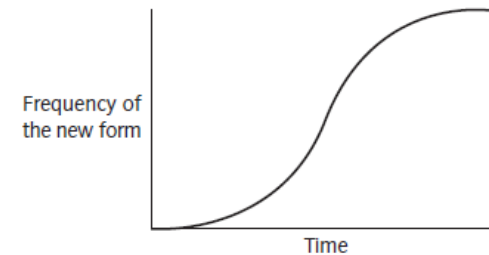
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- determine rates of increase
- compare rates of increase (Pintzuk 2003)
- But: overlap form?



Constant Rate Effects

How to test the Constant Rate Hypothesis

“alternative”: compare factor weight of a given context separately for each period

“. . . if a study reports a series of multivariate analyses for different time periods, and the contextual effects are constant across these analyses, the rate of change of each context measured separately would necessarily be the same. This equivalence holds because, in statistical terms, the constant rate hypothesis is the claim that the overall rate of use of a form is independent of the contextual effects on its use.” (Kroch, 1989:206)

Constant Rate Effects

Constant Rate Effects in overlap form

Context 1: Different clause types

Period	Main Clauses	Conjoined Main Clause	Subordinate Clause
OE1	0.187	0.278	0.277
OE2	0.220	0.151	0.256
OE3	0.244	0.291	0.250
OE4	0.175	0.280	0.242

**Factor weights for overlap SEPE forms, independent variable=clause type
(0= SEPE, 1= SE+PE)**

Constant Rate Effects

Constant Rate Effects in overlap form

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**Factor weights for overlap SEPE forms, independent variable=clause type
(0= SEPE, 1= SE+PE)**

→ Factor weights are relatively close by each other
(Range= 14)

Constant Rate Effects

Constant Rate Effects in overlap form

Context 2: Position of the relative clause

Period	In situ	Extraposd
OE1	0.117	0.391
OE2	0.119	0.340
OE3	0.218	0.380
OE4	0.109	0.363

**Factor weights for overlap SEPE forms, independent variable=position
(0= SEPE, 1= SE+PE)**

Constant Rate Effects

Constant Rate Effects in overlap form

Context 2: Position of the relative clause

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OE4	0.109	0.363

**Factor weights for overlap SEPE forms, independent variable=position
(0= SEPE, 1= SE+PE)**

→ Factor weights are relatively close by each other
(In situ: Range= 11; Extrapolated: Range=5)

Constant Rate Effects

Conclusion

- Type of the higher clause and position of the relative clause have the same effect on the distribution of SEPE in the periods OE1-4
- Just like binary changes, grammatical cycles may be subject to the constant rate hypothesis

Quantitative Analysis III

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Quantitative Analysis III

Observation: Ælfric texts seem to have a slightly different distribution of relative clauses from the other texts – SEPE relatives occur frequently after pronominal subjects

(21) a. and **hi** forðgað. þa ðe god worhton
and they forth.went **SE PE** good worked
'and those who did good went away'
(cocathom2,ÆCHom_II,_44:331.128.7441)

b. hi lif hæfdon on **him**, se þe ure lif is
they life had in him **SE PE** our life is
'and they had life in him who is our life'
(coaelhom,+AHom_18:67.2538)

Quantitative Analysis III

measure frequency of SEPE-relatives with
pronominal antecedents

Quantitative Analysis III

Frequency of SEPE relatives with pronominal antecedents

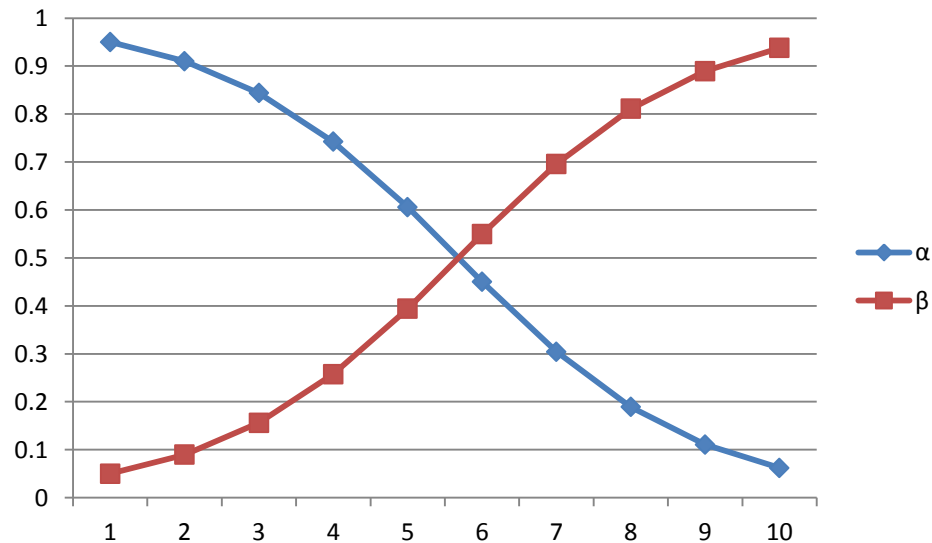
Period	SEPE	With PRO	% PRO
OE1	763	48	6.3
OE2	253	19	7.5
OE3	28	2	7.1
OE4	129	8	6.2
Ælfric	847	101	11.9

Chi-square=12.2, df=4, p=0.0159

Hypothesis II

Rule Conditioning

Grammar competition depends on the “synonymy” of the competing options. (rule independence)



Hypothesis II

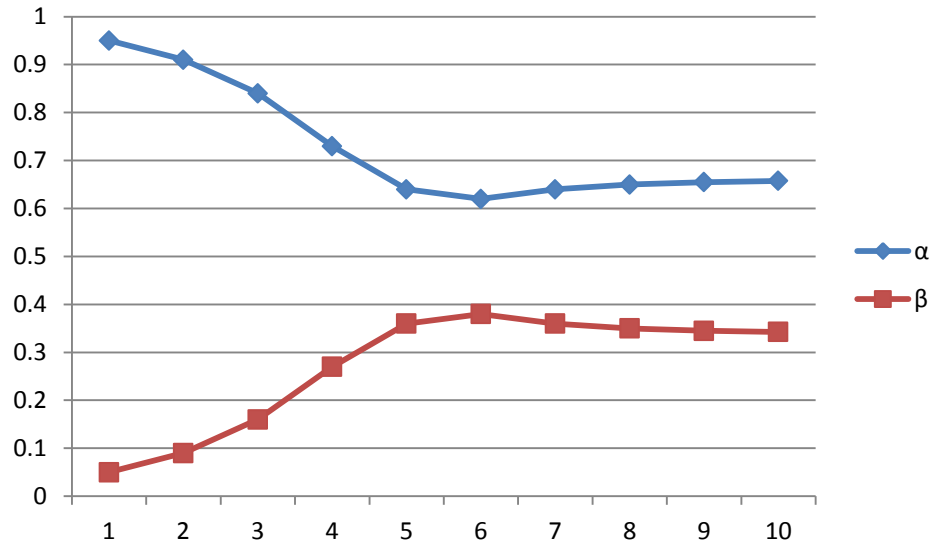
Rule Conditioning

Grammar competition depends on the “synonymy” of the competing options. “Synonymy” is the absence of determining factors that condition the application of the grammatical rule. Synonymous forms result in constant rate effects.

Hypothesis II

Rule Conditioning

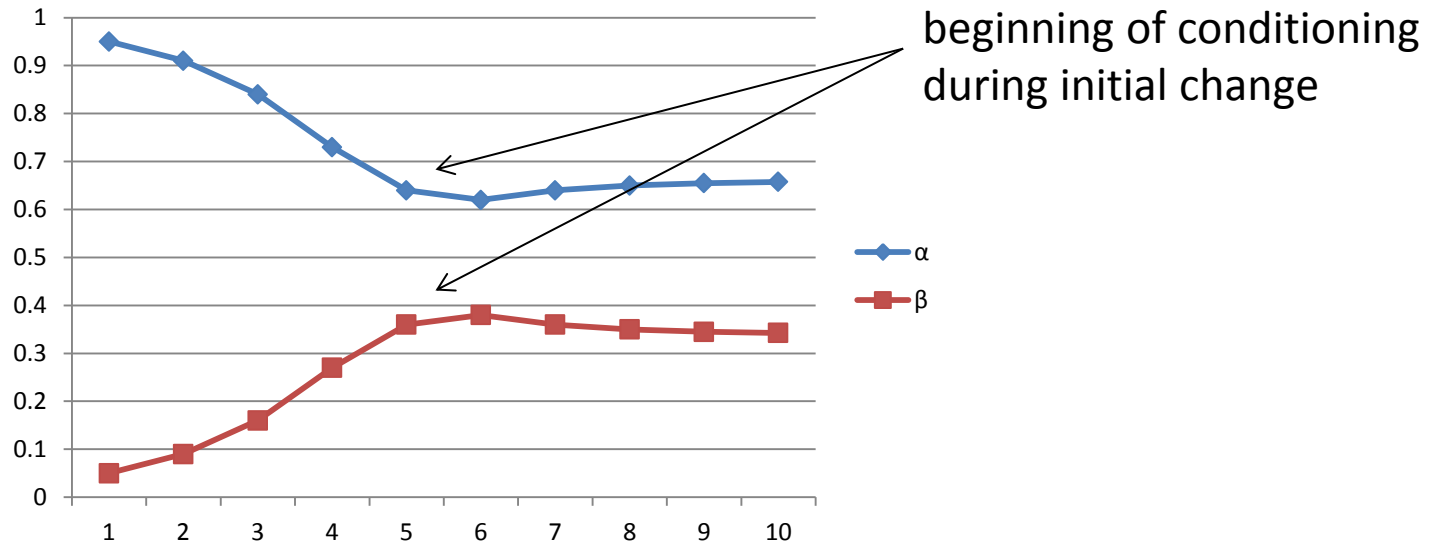
Alternatively, the two rules may become conditioned on the presence of a particular feature.



Hypothesis II

Rule Conditioning

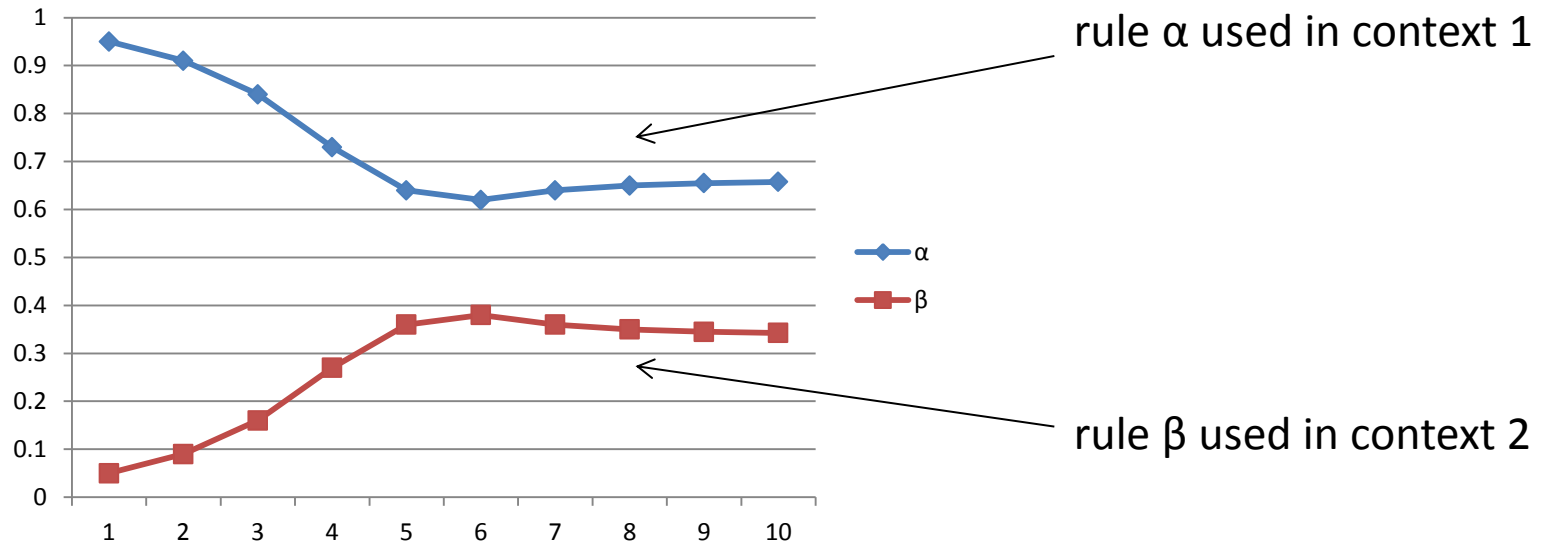
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Hypothesis II

Rule Conditioning

Alternatively, the two rules may become conditioned on the presence of a particular feature.



Hypothesis II

Rule Conditioning

Alternatively, the two rules may become conditioned on the presence of a particular feature.

Children tend to impose rules on variable data (Hudson Kam & Newport (2005)).

Once the two grammar rules are conditioned, the overlap form may become impossible.

Hypothesis II

Rule Conditioning

→ In this case, Ælfric may have capitalized on the inherent variability of the overlap form and begun conditioning it on pronominal antecedents.

Hypothesis II

Rule Conditioning

- In this case, Ælfric may have capitalized on the inherent variability of the overlap form and begun conditioning it on pronominal antecedents.
- In Bavarian, doubly filled COMP relatives exist; the two grammatical options occur in relatively free variation

(22) *Bavarian*

i schenk's dem Kind /des / wo / des wo mid da Katz spuid
I give it the child (DAT) who (NOM) that who (NOM) that with the cat plays
'I give it to the child that plays with the cat' (Bayer 1984: 216)

Hypothesis II

Rule Conditioning

- In this case, Ælfric may have capitalized on the inherent variability of the overlap form and begun conditioning it on pronominal antecedents.
- In Bavarian, doubly filled COMP relatives exist; the two grammatical options occur in relatively free variation
- In the history of German, V2 became conditioned on clause type

(23) Old High German

[Fona hreue] [aer lucifere] [ih] [dhih] chibar

from womb before Lucifer I you bore

'I bore you out of the womb before Lucifer'

Latin: Ex utero ante luciferum genui te (Isidor V,3)

Quantitative Analysis IV

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Quantitative Analysis IV

Investigation of relative clauses in Middle English (1150-1500)

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Quantitative Analysis IV

Investigation of relative clauses in Middle English (1150-1500)

4 periods, data collected from *PPCME2*:

Period	Time	# tokens
ME1	1100-1250	10,386
ME2	1250-1400	12,913
ME3	1400-1450	31,212
ME4	1450-1500	23,076

Quantitative Analysis IV

Investigation of relative clauses in Middle English (1150-1500)

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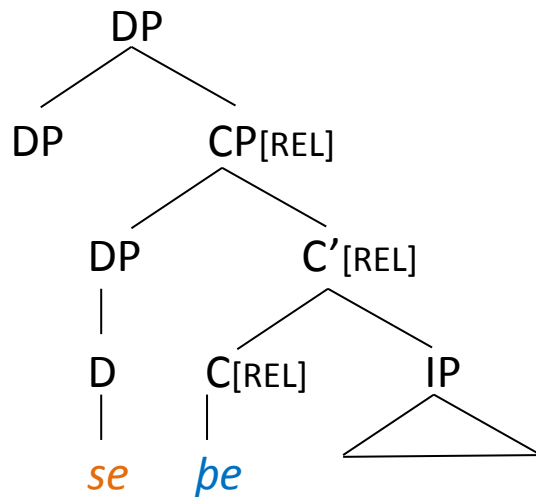
Consider overlap forms in relation to *restrictiveness*

Quantitative Analysis IV

(i) changes internal to the relativization system

CP --> DP C' (se)

C' --> C° IP (pe)

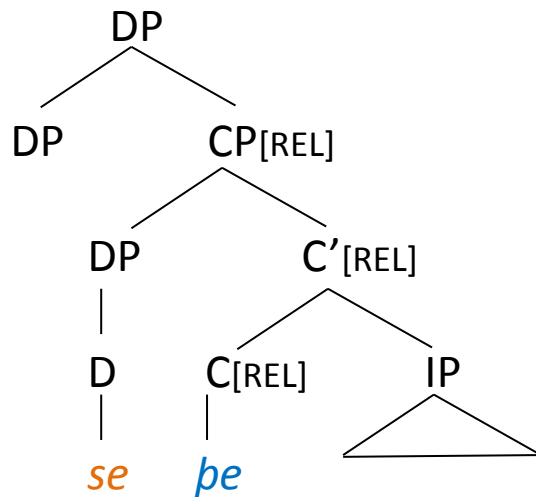


Quantitative Analysis IV

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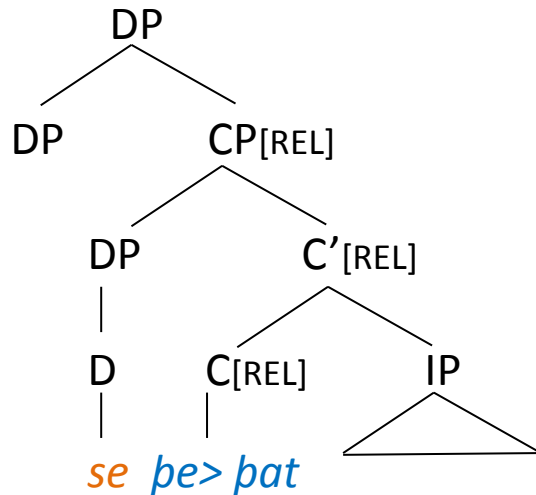
1. *pe* > *pat*

Quantitative Analysis IV

(i) *1. pe > pat*

CP --> DP C' (se)

C' --> C° IP (pe)



Quantitative Analysis IV

(i) 1. *pe* > *pat*

		MASC	FEM	NEUT	PL
CP --> DP	NOM	<i>se</i>	<i>seo</i>	<i>þæt</i>	<i>þa</i>
C' --> C°	ACC	<i>þone</i>	<i>þa</i>	<i>þæt</i>	<i>þa</i>
	GEN	<i>þæs</i>	<i>þære</i>	<i>þæs</i>	<i>þara</i>
	DAT	<i>þæm</i>	<i>þære</i>	<i>þæm</i>	<i>þæm</i>
	INSTR	<i>þy</i>	<i>(þære)</i>	<i>þon</i>	

DP

DP CP[REL]

DP C'[REL]

D C[REL] IP

se *þe*

Quantitative Analysis IV

(i) 1. *pe* > *pat*

	MASC	FEM	NEUT	PL
NOM	<i>se</i>	<i>seo</i>	<i>þæt</i>	<i>þa</i>
ACC	<i>þone</i>	<i>þa</i>	<i>þæt</i>	<i>þa</i>
GEN	<i>þæs</i>	<i>þære</i>	<i>þæs</i>	<i>þara</i>
DAT	<i>þæm</i>	<i>þære</i>	<i>þæm</i>	<i>þæm</i>
INSTR	<i>þy</i>	<i>(þære)</i>	<i>þon</i>	

CP --> DP
C' --> C°

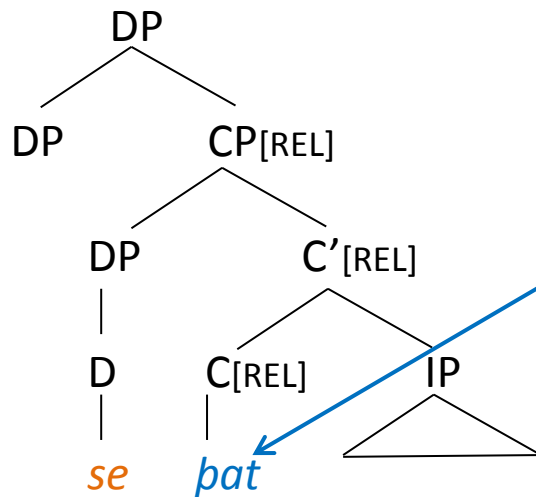
DP
DP CP[REL]
DP C'[REL]
D C[REL] IP
se *þæt*

Quantitative Analysis IV

(i) *1. pe > pat*

CP --> DP C' (se)

C' --> C° IP (pe)



Or from standard complementizer:

C[std] *pæt*

Quantitative Analysis IV

(i) 1. *pe* > *pat*

A (partial) sound change [s] > [θ]:

(24) þe dom þal ben sone idon
the doom shall be soon don
'Doomesday shall soon be finished'

(Poema Morale, 169)

(c. 1175 A.D.)

Quantitative Analysis IV

(i) 1. *pe* > *pat*

A (partial) sound change [s] > [θ]:

(24) *pe dom þal* ben sone idon
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'Doomesday shall soon be finished'

(Poema Morale, 169)

(c. 1175 A.D.)

Quantitative Analysis IV

(i) 1. *pe* > *pat*

Consequence: change of the form of the definite article:

- (25) a. se abbod
(cobenrul, BenR:57.95.3.1021)
(late 10th century)

- b. þe Abbot
(CMROLLTR, 7.218)
(1349)

- c. the abbot
(CMMIRK, 40.1176)
(c. 1415)

Quantitative Analysis IV

(i) 1. *pe* > *pat*

Consequence: change of the form of the definite article:

	<i>se</i>	<i>pe/the</i>	% <i>se</i>
OE1	5372	5	99.91
OE2	8454	66	99.23
ME1	174	2667	6.12
ME2	14	5829	0.24
ME3	0	10082	0
ME4	0	8889	0

Quantitative Analysis IV

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	<i>se</i>	<i>pe/the</i>	% <i>se</i>
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ME3	0	10082	0
ME4	0	8889	0

→ very rapid change, between **OE/ME**

→ from **ME2** no more *se*-form determiners

Quantitative Analysis IV

(i) 1. *pe* > *pat*

“Chain shift”:

se > pe/the > pat/that

(Fischer 1992)

(Suárez-Gómez 2006)

Quantitative Analysis IV

(i) 1. *pe* > *pat*

Adverbial clauses:

- (26) a. *þæt is his agen Wisdom, for ðan pe* word is wisdomes geswutelung
that is his own wisdom, for this that word is wisdom's manifestation
'this is his own wisdom because a word is the manifestation of wisdom'
(coaelhom,ÆHom_1:84.56)
(c. 1000 A.D.)
- b. *and bret hine for þon pet* he scolde swote smelle.
and cooked it for this that it should sweet smell
'and [he] cooked it because it should smell sweet'
(CMLAMBX1,53.685)
(c. 1225 A.D.)

Quantitative Analysis IV

(i) 1. *pe* > *pat*

Adverbial clauses:

	Forpan <i>pe</i>	Forpan <i>pat</i>	% <i>pe</i>
OE1	834	40	95.4
OE2	1985	12	99.4
ME1	33	22	60.0
ME2	0	6	0

Quantitative Analysis IV

(i) 1. *pe* > *pat*

Adverbial clauses:

	Forpan <i>pe</i>	Forpan <i>pat</i>	% <i>pe</i>
OE1	834	40	95.4
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→ very rapid change, between **OE/ME**

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→ from **ME2** no more adverbial *pe*-clauses

(Allen 1977)

Quantitative Analysis IV

(i) *1. pe > pat*

Relative clauses:

Quantitative Analysis IV

(i) 1. *pe* > *pat*


Relative clauses:

- (27) a. in *pære stowe*, *seo* is cweden Streoneshealh
 in that place-*fem.sg.*, *SE.fem.sg.nom* is called Whitby
 ‘in the place that is called Whitby’
 (cobede,Bede_3:18.236.31.2424) (c. 900 A.D.)
- b. *seo stow* *pæt* man on gebidde.
 the place-*fem.sg.* *PE/SE.neut.sg.acc* one in pray
 ‘the place that one should pray in’
 (cowsgosp,Jn_[WSCp]:4.20.5988) (c. 1000 A.D.)

Quantitative Analysis IV

(i) 1. *pe* > *pat*

Relative clauses:

- (27) a. in *pære*  *is cweden Streoneshealh*
in that *.fem.sg.nom* is called Whitby
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the place-*fem.sg.* *PE/SE.neut.sg.acc* one in pray
'the place that one should pray in'
(cowsgosp,Jn_[WSCp]:4.20.5988) (c. 1000 A.D.)

Quantitative Analysis IV

(i) 1. *pe* > *pat*

Relative clauses:

- (27) a. in *pære stowe*, *seo* stranded
preposition *en Streoneshealh*
in that place-*fem.sg.*, *SE.fem.sg.* *d Whitby*
'in the place that is called Whitby'
(cobede, Bede_3:18.236.31.24)
- b. *seo stow* *pæt* *man* *on* *gebidde*.
the place-*fem.sg.* *PE/SE.neut.sg.acc* one in pray
'the place that one should pray in'
(cowsgosp, Jn_[WSCp]:4.20.5988) (c. 1000 A.D.)
-
- ```
graph TD; A[\"stranded preposition\"] --> B[\"pæt\"]; A --> C[\"on\"]; B --- D[\"(27) a. in pære stowe, seo en Streoneshealh d Whitby 'in the place that is called Whitby' (cobede, Bede_3:18.236.31.24)\"]; C --- E[\"(27) b. seo stow pæt man on gebidde. the place-fem.sg. PE/SE.neut.sg.acc one in pray 'the place that one should pray in' (cowsgosp, Jn_[WSCp]:4.20.5988) (c. 1000 A.D.)\"]; style A fill:#d9e1f2,stroke:#333,stroke-width:1px; style B fill:none,stroke:none; style C fill:none,stroke:none;
```

# Quantitative Analysis IV

## (i) 1. *pe* > *pat*

*pe* -relatives vs. *pat* relatives

(with a gender mismatch in OE and ME1):

|     | <i>pe</i> -relatives | <i>pat</i> -relatives | % <i>pe</i> |
|-----|----------------------|-----------------------|-------------|
| OE1 | 1932                 | 15                    | 99.23       |
| OE2 | 3536                 | 26                    | 99.27       |
| ME1 | 174                  | 83                    | 67.70       |
| ME2 | 0                    | 217                   | 0           |
| ME3 | 0                    | 251                   | 0           |
| ME4 | 0                    | 169                   | 0           |

# Quantitative Analysis IV

## (i) 1. *pe* > *pat*

*pe* -relatives vs. *pat* relatives

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| ME1 | 174                  | 83                    | 67.70       |
| ME2 | 0                    | 217                   | 0           |
| ME3 | 0                    | 251                   | 0           |
| ME4 | 0                    | 169                   | 0           |

→ very rapid change, between **OE/ME**

→ the frequencies mirror the change from *pe* to *pat* in adverbial clauses

→ from **ME2** no more relative *pe*-clauses

# Quantitative Analysis IV

## (i) 1. *pe* > *pat*

### Relative clauses:

(28) a. medomlic hus,                      *on þæt*                      nænig wer    næfde    ingang  
simple    house-*neut.sg.* on that-*neut.sg.acc* no    man not-had    entry  
'a simple house in that no man could enter'  
(comart2,Mart\_2.1\_[Herzfeld-Kotzor]:Ju25,A.9.22)    (c. 950 A.D.)

b. seo stow                      *þæt*                      man    *on* gebidde.  
the place-*fem.sg.*    *þE/SE.neut.sg.acc*    one    in    pray  
'the place that one should pray in'  
(cowsgosp,Jn\_[WSCp]:4.20.5988)                      (c. 1000 A.D.)

# Quantitative Analysis IV

(i) 1. *pe* > *pat*

*pat*-relatives with Pied Piping and P-stranding:

|     | <i>Pied piping</i> | <i>P-stranding</i> | <i>% Pied piping</i> |
|-----|--------------------|--------------------|----------------------|
| OE1 | 9                  | 5                  | 64.29                |
| OE2 | 3                  | 3                  | 50.0                 |
| ME1 | 0                  | 62                 | 0                    |
| ME2 | 0                  | 11                 | 0                    |
| ME3 | 0                  | 3                  | 0                    |
| ME4 | 0                  | 42                 | 0                    |

# Quantitative Analysis IV

## (i) 1. *pe* > *pat*

*pat*-relatives with Pied Piping and P-stranding:

|     | <i>Pied piping</i> | <i>P-stranding</i> | % <i>Pied piping</i> |
|-----|--------------------|--------------------|----------------------|
| OE1 | 9                  | 5                  | 64.29                |
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| ME1 | 0                  | 62                 | 0                    |
| ME2 | 0                  | 11                 | 0                    |
| ME3 | 0                  | 3                  | 0                    |
| ME4 | 0                  | 42                 | 0                    |

→ very rapid change, between **OE/ME**

→ from **ME1** *pat*-relatives do not allow pied piping anymore

(this is still the case in standard Modern English, e.g. Sag 1997)

# Quantitative Analysis IV

(i) 1. *pe* > *pat*

## Conclusion:

→ a very rapid change, hence probably lexical in nature, shifts the C-head relativizer form from *pe* > *pat*

→ as a rule of thumb *pat* can be considered as a form of *se* in OE and as a C-head from ME1 on

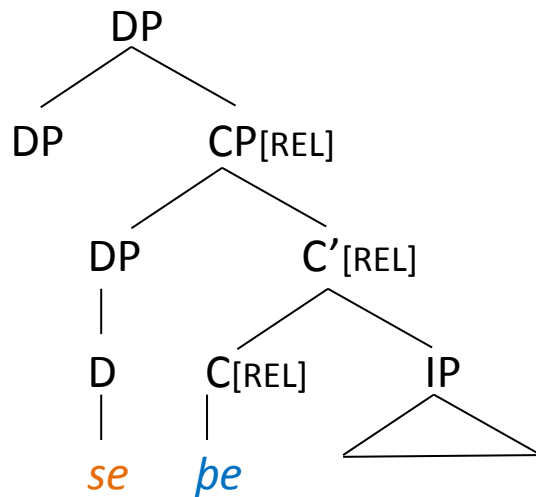
→ considering gender mismatches and the behaviour of prepositions, especially in ME1, can disambiguate the category of *pat*

# Quantitative Analysis IV

(i) changes internal to the relativization system

CP --> DP C' (se)

C' --> C° IP (pe)

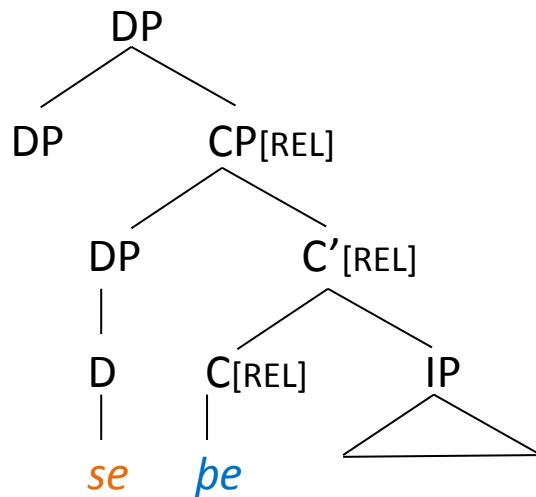


# Quantitative Analysis IV

(i) changes internal to the relativization system

CP --> DP C' (se)

C' --> C° IP (pe)



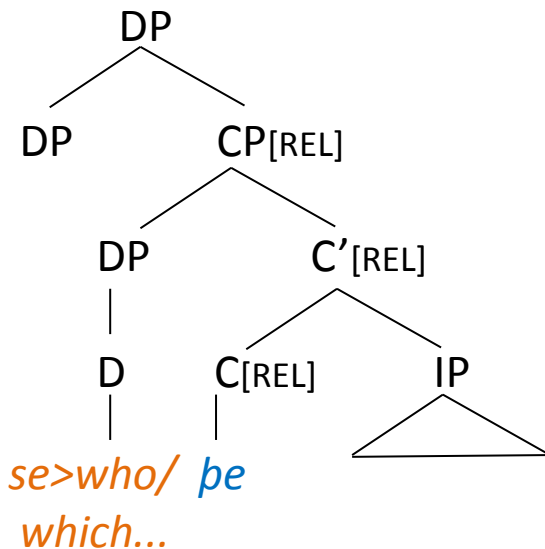
2.  $D > WH$

# Quantitative Analysis IV

(i) changes internal to the relativization system

CP --> DP C' (se)

C' --> C° IP (be)



2. D > WH

# Quantitative Analysis IV

## (i) 2. *se* > *who/whom/which*

### Possible sources:

#### free generalising relatives:

(29) he mid dede gefylde, *swa hwæt* swa he mid worde lærde.  
he with deeds fulfilled *so WH* so he with words taught  
'he fulfilled with actions *whatever* he taught'  
(cobede, Bede\_2:1.94.21.875) (c. 900 A.D.)

#### dubious/extremely rare: after 'all', 'that' (Karlberg 1954)

(30) ne rædde ge þæt, *hwæt* David dyde  
NEG advise you that *WH* David did  
'Don't advise to do that *which* David did'  
(cowsgosp, Lk\_[WSCp]:6.3.3989) (c. 1000 A.D.)

# Quantitative Analysis IV

## (i) 2. *se > who/whom/which*

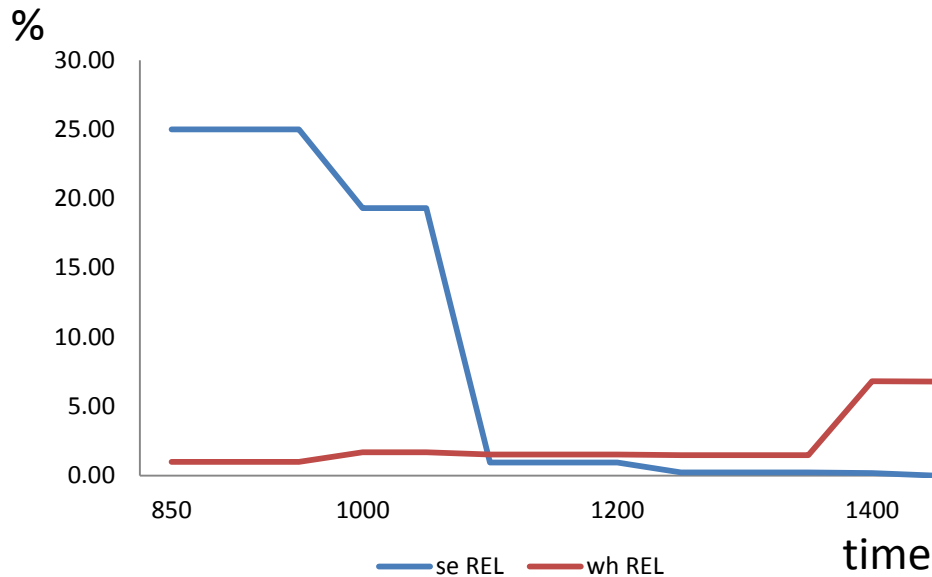
### Investigation of free relatives:

- (31) a. Ac þær wunian mot **se** þa stowe geseceþ  
but there live may **SE** the place seeks  
'but those who seek the place may live there'  
(coblick,HomU\_19\_[BIHom\_8]:105.135.1338)  
(c. 925 A.D.)
- b. **who** is not wiþ hym is azeynes hym  
**WH** is not with him is against him  
'Those who are not with him are against him'  
(CMWYCSE,280.962)  
(c. 1400 A.D.)

# Quantitative Analysis IV

## (i) 2. *se* > *who/whom/which*

Development of *SE* / *WH*-free relatives:

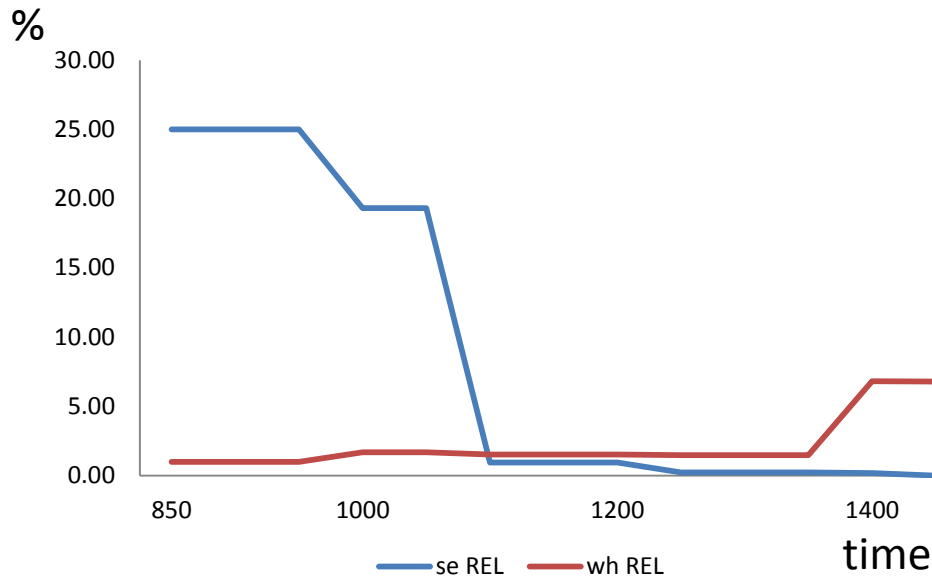


|     | all  | <i>SE</i> | <i>WH</i> |
|-----|------|-----------|-----------|
| OE1 | 1432 | 358       | 14        |
| OE2 | 1729 | 334       | 29        |
| ME1 | 529  | 5         | 8         |
| ME2 | 476  | 1         | 7         |
| ME3 | 1101 | 2         | 75        |
| ME4 | 575  | 0         | 39        |

# Quantitative Analysis IV

## (i) 2. *se* > *who/whom/which*

Development of *SE* / *WH*-free relatives:



|     | all  | <i>SE</i> | <i>WH</i> |
|-----|------|-----------|-----------|
| OE1 | 1432 | 358       | 14        |
| OE2 | 1729 | 334       | 29        |
| ME1 | 529  | 5         | 8         |
| ME2 | 476  | 1         | 7         |
| ME3 | 1101 | 2         | 75        |
| ME4 | 575  | 0         | 39        |

- decline in *SE*-relatives; more gradual increase in *WH*-relatives
- Some variation between the two forms mainly in ME1

# Quantitative Analysis IV

## (i) 2. *se* > *who/whom/which*

### Conclusion:

- rapid change reduces SE relatives; WH relatives increase gradually
- similarities between SE and WH relatives in syntactic behaviour (pied piping), same structural position (Spec, CP)
- between c. 1100-1250 Se and WH relatives are extremely infrequent

“From the north, *þat* spread to the other dialects and in the thirteenth century *þat* was the rule everywhere [...]. All this means that in the thirteenth century *that* stood practically alone as a relativizer” (Fischer et al. 2000: 91)

# Quantitative Analysis IV

Introduction

Study 1

VarbRule

Study 2

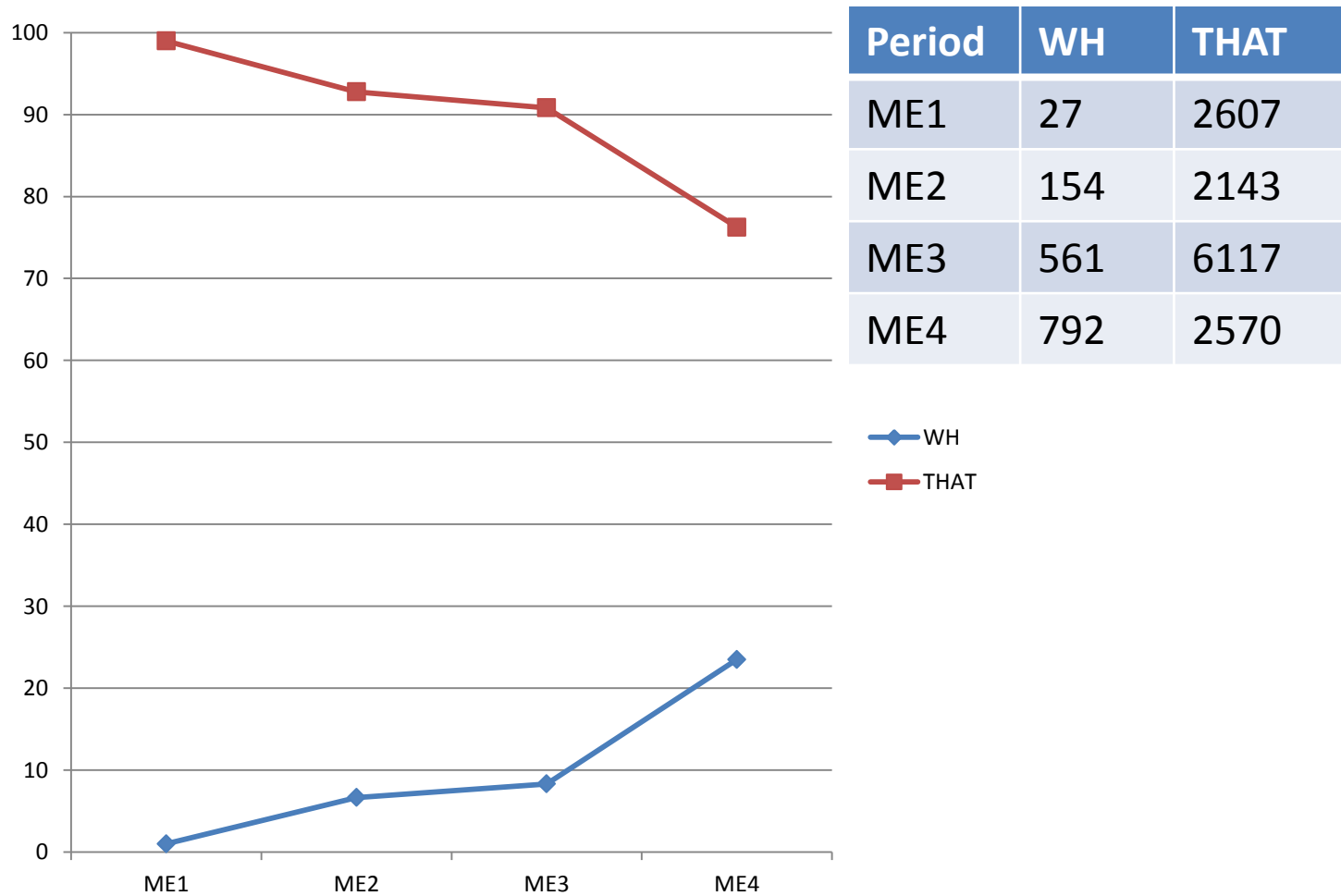
CRE

Study 3

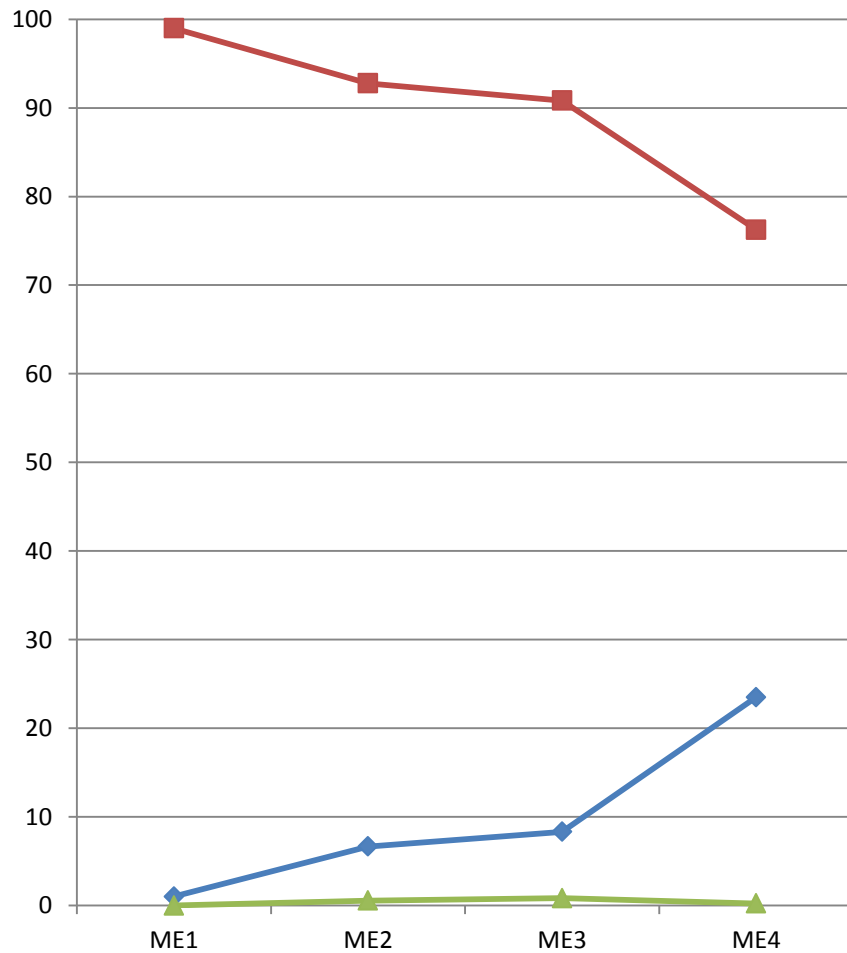
**Study 4 - ME**

Conclusion

# Quantitative Analysis IV



# Quantitative Analysis IV



| Period | WH  | THAT | WH THAT |
|--------|-----|------|---------|
| ME1    | 27  | 2607 | 0       |
| ME2    | 154 | 2143 | 13      |
| ME3    | 561 | 6117 | 57      |
| ME4    | 792 | 2570 | 8       |

—◆— WH  
—■— THAT  
—▲— WH THAT

# Quantitative Analysis IV

## Doubly filled COMP examples:

- (32) a. for Coppa turnede azgeyne to þe host fro **whens** **that** he come.  
for C. turned again to the host from **WH** **THAT** he came  
'Therefore, Coppa returned to the place from where he came'  
(CMBRUT3,63.1888)
- b. the degre of the ecliptik **which** **that** is the degre of his longitude.  
the degre of the ecliptic **WH** **THAT** is the degre of its longitude  
'the degree of the ecliptic that is the degree of its longitude'  
(CMASTRO,670.C2.261)
- c. synnes **whiche** **that** many a man peraventure ne demeth *hem* nat synnes  
sins **WH** **THAT** many a man perhaps not deems *resumptive* not sins  
'sins which many a man does not perhaps consider sins'  
(CMCTPARS,298.C2.437)

# Quantitative Analysis IV

From earliest period on, WH-relatives are predominantly non-restrictive!

# Quantitative Analysis IV

- (33) a. pilke      precious tresour of maydenhood, **which** so profitable is ihad  
the-same precious treasure of maidenhood **WH**    so profitable is had  
'this same precious treasure of maidenhood, which is so profitable to be had'  
(CMAELR3,27.38) (c. 1400)
- b. þu dedist it to myn owyn precyows body **whesch** is in Heuyn,  
You did    it to my own precious    body **WH**    is in Heaven  
'you would do it to my own precious body, which will be in heaven'  
(CMKEMPE,90.2054) (c. 1430)
- c. sory of    the synnes and giltes **which** we han trespassed in the sighte of oure Lord  
sorry for the sins      and guilts **WH**    we have trespassed in the sight of our Lord  
'... sorry for the sins and faults which we have committed in the sight of God'  
(CMCTMELI,239.C2.859) (c. 1470)

# Quantitative Analysis IV

| Period | All WH relatives | % restrictiveness |
|--------|------------------|-------------------|
| OE*    | 200              | c. 40%            |
| ME     | 574              | 83%               |

\*SE-relatives, estimate based on 200 clauses

# Quantitative Analysis IV

## Conclusion:

- WH / THAT relatives never showed a considerable overlap form in the history of English  
(less than 1% in all ME periods)
- WH relatives show a strong preference for non-restrictive contexts from the earliest period on
- These findings are in accordance with the *Rule Conditioning* hypothesis

# Conclusion

Introduction

Study 1

VarbRule

Study 2

CRE

Study 3

Study 4 - ME

**Conclusion**

# Conclusion

- Relative clauses in Old English can be regarded as a grammatical cycle (similar to Jespersen's cycle)
- The “overlapping” form results from independent application of two different relativization strategies
  - Approximation of the development:  $P(\alpha \cap \beta) = P(\alpha) \times P(\beta)$
  - But: different structural distribution and other factors may obscure the expected frequencies
- The overlapping form appears to be subject to the Constant Rate Hypothesis
  - Position of the relative clause and clause type have the same effect on the change throughout the transition
- Rule Conditioning may be a process that restricts constant rate effects (more work is required to substantiate this idea)
  - Rules that are conditioned “sufficiently” will not be independent anymore and thus will not create an overlap form

# Conclusion

- Future work:
  - Find other phenomena that can be analysed as grammatical cycles to substantiate hypotheses; ideally less complex
  - Improve statistical analyses, three dependent variables, test of constant rate effects ...
  - Refine analysis of factors (e.g. gender, number, grammatical function in matrix and relative clause, complexity of SE/WH relativizer; multivariate analysis of ME data; animacy of antecedent )
  - Include free relatives

THANK YOU VERY MUCH FOR YOUR ATTENTION

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