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Synchronic theory and semantic change
Maximization and Middle English *which*-relatives

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Introduction

- ▶ We are interested in the emergence of headed *wh*-relative clauses.
- ▶ There appears to be a robust pathway from correlative to free relative, to nonrestrictive headed relative, to restrictive relative.
- ▶ Diagnosing restrictiveness is fraught with problems in purely textual data.
- ▶ In this paper, we draw on insights from formal semantics to establish a distributional diagnostic for nonrestrictive relative clauses in Middle English.
- ▶ This allows us to correlate the pathway with distributional evidence.
- ▶ Our case study today is *which*.

Roadmap

1. Distributional evidence for semantic change
2. Relative clause types
3. English: 3500BC–1500AD
4. Synchronic semantics to the rescue
5. Conclusions

Section 1

Distributional evidence for semantic change

Collocations and meaning

- ▶ The grammaticalization literature (e.g. Traugott & Dasher 2002) is exercised with data like (1).

- (1)
- a. I am going to London (to marry Bill).
 - b. I am going to marry Bill.
 - c. If interest rates are going to climb, we'll have to change our plans.
 - d. *If interest rates will climb, we'll have to change our plans. (Hopper & Traugott 2003)

- ▶ *marry Bill* is not a place you can go to.
- ▶ *interest rates* are not the kind of things that can go.
- ▶ So we know that the meaning of *go* has changed.

What collocations are good for

- ▶ Collocational evidence is often able to diagnose **primary grammaticalization**.
 - ▶ Spatial motion → (abstract) temporal motion
- ▶ Wider set of collocates → loss of semantic selectional restrictions → bleaching.
- ▶ Not all semantic change works like this.
- ▶ **Secondary grammaticalization** may have little direct collocational evidence.
 - ▶ Demonstrative → definite article
- ▶ And yet, distributional evidence is all we have in diachronic semantics.
 - ▶ Obligatoriness of article
- ▶ The challenge is to relate distributional changes to denotational changes.

Section 2

Relative clause types

Free vs. headed relatives

- ▶ A **free relative** is a clause with the external distribution of an NP.
- ▶ A **headed relative** is a clause that modifies a noun.
- ▶ Both are syntactically subordinate.
- ▶ A headed relative can be introduced by an inflecting phrase (a **relative specifier**), an uninflecting particle (a **relative complementizer**), both or neither.

- (2) a. The food $\frac{\emptyset}{\text{that}} \mid \frac{\text{which}}{\text{which that}}$ she ate
b. What she ate

- ▶ Indo-European relative specifiers tend to be formed from **demonstratives** or **interrogatives**.

Restrictive vs. nonrestrictive headed relatives

- ▶ A **restrictive** relative denotes a property which modifies a nominal property.

(3) The person who left: $\iota x.[person'(x) \wedge left'(x)]$

- ▶ A **nonrestrictive** relative denotes a proposition containing a discourse anaphor.

(4) The person, who left: $\iota x.[person'(x)] \bullet left'(y)$

- ▶ A discourse anaphor needs an accessible antecedent (Evans 1980, Sells 1985) → nonrestrictive relatives cannot modify **opacity-inducing** quantifiers.

(5) *No person, who left

Maximization and free relatives

- ▶ English free relatives are definite descriptions (Jacobson 1995), and therefore maximizers.

(6) I ate [what he cooked].

- ▶ Two factors can obscure this, but not invalidate it:
 1. Generic contexts favour universal-like interpretations (Dayal 1996).

(7) I eat [what he cooks].

2. *-ever* can indicate ignorance or indifference (von Stechow 2000) regarding the referent of the free relative.

(8) I will eat [whatever he cooks].

Standard analyses of both treat the free relative as a definite description within the scope of a quantifier over situations or worlds.

Maximization and nonrestrictive relatives

- ▶ The *wh*-phrase in English nonrestrictive relatives is a discourse anaphor (Sells 1985).
- ▶ Discourse anaphors are maximizing (Evans 1980).
- ▶ This yields contrasts like (9) (Sells 1985: 19).

- (9)
- a. Each farmer owns some sheep, which the State buys in the Spring. (→ state buys all the sheep)
 - b. Each farmer owns some sheep that the State buys in the Spring. (→ state may not buy all the sheep)

- ▶ So free relatives and nonrestrictive relatives both involve maximization, but in different ways.
 - ▶ Free relative: maximal individual.
 - ▶ Nonrestrictive relative: proposition about maximal individual.
- ▶ We are looking at a free > nonrestrictive pathway.

Section 3

English: 3500BC–1500AD

Context

- ▶ The emergence of headed *which*-relatives is part of a wider set of changes in English:
 - ▶ Old English demonstrative relative constructions abruptly disappear.
 - ▶ *Wh*-forms are gradually co-opted in their place.
- ▶ Free relatives provided the source for headed *wh*-relatives (Truswell & Gisborne 2015).
- ▶ It is tempting to attribute the emergence of headed *wh*-relatives to the loss of demonstrative relatives.
- ▶ However, *wh*-relatives have emerged in other Germanic languages without anterior loss of demonstrative relatives.
- ▶ The *wh*-relative strategy emerges repeatedly across the Indo-European family.
- ▶ We can understand this better by tracking the history of *wh*-forms, rather than the history of relative clauses (Gisborne & Truswell 2016).

Prehistory: Early IE correlatives

- ▶ English *wh*-forms and cognates are descended from PIE $k^w i-$ / $k^w o-$.
- ▶ Original functions: probably interrogative and (restricted) indefinite (e.g. Belyaev & Haug 2014).
- ▶ Belyaev & Haug: bipartite asyndetic conditional structure + *wh*-indefinite \rightsquigarrow correlative.

(10) [kuiš=an=šan EGIR-pa tarnai] n=an
WH=him=PTCL back lets PTCL=him
šakuwanzi
they.imprison
'If anyone lets him back, they will imprison him.' \rightsquigarrow
'Whoever lets him back, they will imprison him.'
(Garrett 2008, conditional 'back-formation' ours)

- ▶ Early IE did not have embedded relatives (Clackson 2007); later headed *wh*-relatives descend from structures like (10).

Indo-European and diachronic typology

- ▶ Correlatives are rare (< 3% of languages in Dryer 2013) and overrepresented in IE (De Vries 2002).
- ▶ Correlatives with interrogative forms are even rarer.
- ▶ Headed *wh*-relatives are just as rare.

	IE	Other
<i>Wh</i> -RC	19 (47.5%)	3 (2.3%)
Other	21 (52.5%)	129 (97.7%)

Table 1: Headed *wh*-relatives in 172 languages (based on De Vries 2002)

- ▶ We're investigating a secondary grammaticalization pathway which recurs across IE but only very rarely in other languages.

On contact

- ▶ Comrie (1998): *wh*-relatives are a European, not an IE phenomenon.
 - ▶ Also attested in neighbouring unrelated languages.
- ▶ However, fine details of varieties in contact are rarely similar.
 - ▶ Middle English vs. Medieval French (Sakalauskaite 2016).
 - ▶ Early Modern Icelandic vs. ENHG (Youmerski 2016).
- ▶ Plausible contact situations aren't always in evidence.

(11) de fout **wie** hun eigenlijk maken
the mistake who they actually make
'the mistake which they actually make'
(Johan Cruyff, via Boef 2012)

- ▶ So contact can't explain everything.
- ▶ (See also Poplack et al. 2012 on French P-stranding.)

PIE \rightsquigarrow English

- ▶ Universal \rightsquigarrow definite *wh*-correlatives (Belyaev & Haug 2014);
- ▶ Loss of multiple correlatives (unattested in English written record);
- ▶ Generalization from clause-initial \rightsquigarrow clause-peripheral position.
- ▶ By the start of the written history of English, correlatives have morphed into left-dislocated free relatives + resumption.

OE free *wh*-relatives

Clause-initial, generalizing, *swa* obligatory

- (12) [Swa **hwylc** eower swa næfð nane synne on
So which you.GEN.PL so NEG.have no sin in
him], awyrpe se ærest ænne stan on hy
him, cast.out.SBJ he first one stone on her
'He that is without sin among you, let him first cast a
stone at her.' (coaelhom,+AHom_14:214.2117, c.990)
- (13) Soðlice [swa **hwar** swa Israhela bearn wæron], þar
Truly so where so Israel's children were, there
wæs leoht.
was light
'all the children of Israel had light in their dwellings.'
(cootest,Exod:10.23.2788, c.1050)

OE free *wh*-relatives

Clause-final, optionally generalizing, *swa* optional

- (14) Fyres gecynd is þæt hit fornymð [swa hwæt swa
Fire.GEN nature is that it consumes so what so
him gehende bið].
it.DAT near is
'Fire's nature is that it consumes whatever is near it.'
(cocathom1,+ACHom_I,_22:360.152.4446, c.990)
- (15) Gemyne, [hwæt Sanctus Paulus cwæð]
Remember what Saint Paul said
'Remember what Saint Paul said.'
(cogregdC,GDPref_and_3_[C]:15.207.28.2739, c.1075)
- ▶ Presence of *swa*, not position, determines interpretation.
 - ▶ *Swa* ≈ *-ever* (Truswell & Gisborne 2015).
 - ▶ OE free relatives are definite descriptions, as described above.

Latent structural ambiguity

- ▶ Clause-final definite free relatives could in principle be used appositively.

(16) ... NP_i ... FR_i

- ▶ This permits the following reanalysis.

(17) ... [NP ... t_i] ... RC_i

(18) Þa cwæð ic to him, æteowe me [þa byrigeles [hwar ic þe
Then said I to him show me the tomb where I you
leigde]].
laid
'Then I said to him, "Show me the tomb where I laid you".'

Se Hælend me þa beo þære rihthand genam and me ut
The Saviour me then by the right hand took and me out
lædde [hwar ic hine byrede]
led where I him buried
'The Saviour then took me by the right hand and led me out to
where I buried him' (conicodC,Nic_[C]:149.161–2,c.1150)

Early Middle English free relatives

- ▶ Various aspects of the OE free relative system disintegrated in early ME.
- ▶ *Which*-FRs almost never occur with explicit indicators of generality (*se*, *ever*) after 1200.
- ▶ Bare *which*-FRs can be interpreted as generalizing.

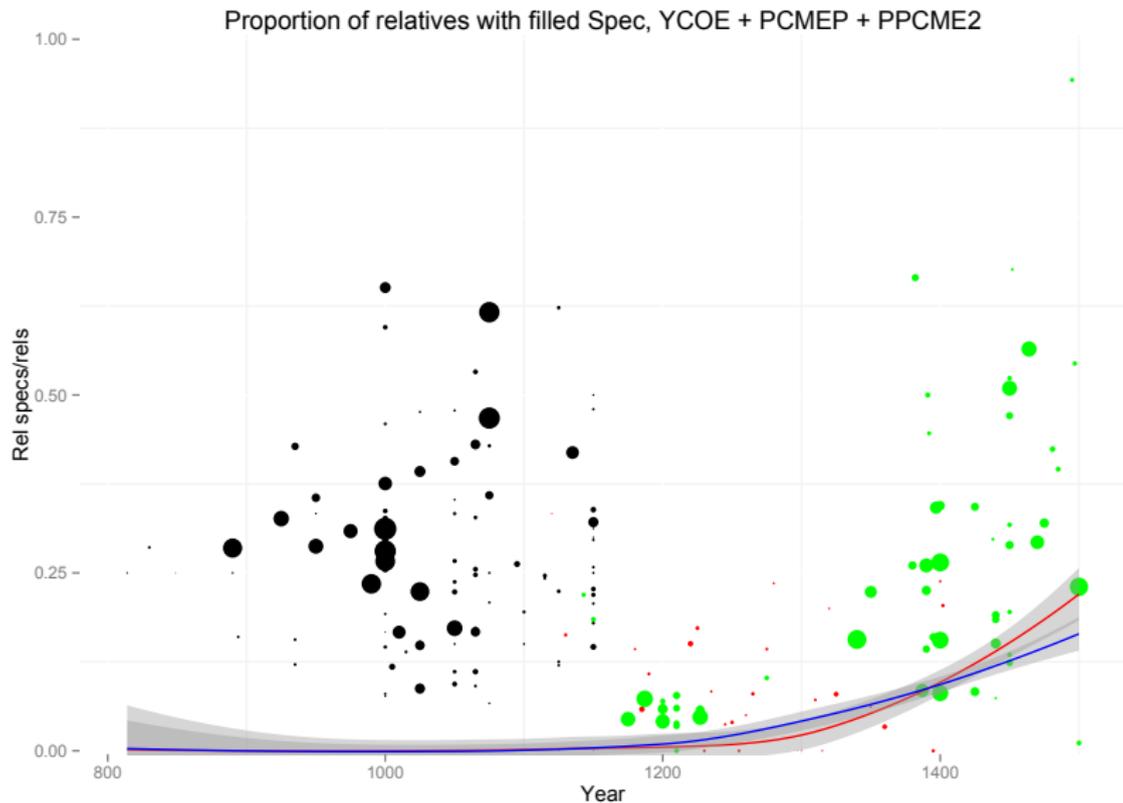
- (19) a. beo he hwuch-se eauer beo
be.SBJ he which-so ever be.SBJ
'whichever he may be' (cmhali-m1,152.352)
- b. Bo wuch ho bo (OwlNight,116.1378.751)

- ▶ *What*-FRs behave much as in OE through Middle and Early Modern English: generalizing with *se* or *ever*; often definite without.
- ▶ In other words, *which* largely leaves the FR system before entering the HR system. *What* apparently specializes as free relativizer in its absence.

Early Middle English headed relatives

- ▶ Demonstrative relatives largely disappeared with the collapse of case inflection c.1100.
- ▶ But *wh*-relatives weren't a direct replacement (Gisborne & Truswell 2016).
 - ▶ *where* and *there* coexisted for c.200 years.
 - ▶ Argumental *se*-relatives disappeared 100 years before argumental *wh*-relatives emerged.
- ▶ The first *wh*-relatives emerged in the low-frequency, low accessibility shadows, c.1150.
- ▶ Headed relatives with *which* followed c.1350, then *whom* (c.1400), and *who* (c.1500).
- ▶ All of this coexisted with stable, high-frequency relativization with *that* and \emptyset .

Demonstrative and interrogative relatives over time



Red = *wh*-rels, NP gaps; Blue = *wh*-rels, PP gaps.

Early *which/whom/who*-relatives

- (20) he is emperour of him-zelue. þet is of his bodye: and of
he is emperor of himself that is of his body and of
his herte. [huiche he demþ and halt ine guode payse]
his heart which he deems and holds in good weight
huerof he dep his wyl.
whereof he does his will
(cmayenbi-M2,85.1658, 1340)
- (21) But he [whom God hath sent], spekith the wordis of God
but he whom God hath sent speaks the words of God
(cmntest-M3,3,20J.234, c.1395)
- (22) This declaryth the Mayster of the storyes [who so lyste
this declares the master of the stories who so wants
to se it].
to see it
(cmfitzja-M4,A5R.71, 1495)

Comments

- ▶ The first headed relatives are all clause-final.
- ▶ They all *seem* nonrestrictive.
- ▶ This allows for a minimal specification of the reanalysis, in terms of scope of the maximization operator. Restrictive relatives would be further from the source construction, in that they do not involve maximization.

- (23)
- a. $\iota x.(boy'(x) \wedge saw'(j, x))$
 - b. $\lambda P.[P(\iota x.(boy'(x)))](\lambda y.saw'(j, y))$
 - c. $\lambda x.(boy'(x) \wedge saw'(x))$

- ▶ (There is a change, contra De Vries 2002: appositive relatives denote propositions; free relatives typically denote individuals).
- ▶ But do we **know** that they're all nonrestrictive?

Sparse high-quality data

- ▶ A robust indicator of restrictiveness: only restrictive relatives can occur under opacity-inducing quantifiers.
- ▶ There are no such examples with *which*-relatives prior to c.1450.

(24) and anone he saw he was in a wylde mounteyne whych was
and soon he saw he was in a wild mountain which was
closed with the se nyghe all aboute, that he myght se **no**
closed with the sea nearby all about that he might see **no**
londe aboute hym [whych myghte releve hym], but wylde
land about him which might relieve him but wild
bestes.
beasts

(cmmalory-M4,664.4760, 1470)

- ▶ But such examples are rare anyway — insufficient data to distinguish real from accidental gaps.

Plentiful low-quality data

- ▶ Textbook examples of restrictiveness often work like this:

- (25)
- a. A car which I bought last year . . .
 - b. The car, which I bought last year, . . .

- ▶ This might suggest that indefinite antecedents correlate in some way with restrictiveness.
- ▶ They don't, and given the Kamp/Heim treatment of indefinites, we shouldn't expect them to.
- ▶ And intuitions about restrictiveness break down in the face of corpus examples.

- (26) Pa cwæð ic to him, æteowe me [þa byrigeles
Then said I to him show me the tomb
[hwar ic þe leigde]].
where I you laid
'Then I said to him, "Show me the tomb where I laid
you".'

We need more good data

- ▶ There is plentiful evidence for the endpoints of the change:
 - ▶ OE *wh*-relatives are all free;
 - ▶ Early Modern English restrictive *wh*-relatives are well-attested.
- ▶ There is a natural series of reanalyses:
 - ▶ Free → nonrestrictive (clause-final, maximizing);
 - ▶ Nonrestrictive → restrictive (take nominal antecedents, distinction often unclear).
- ▶ But direct evidence for the nonrestrictive-only stage is limited to intuitions and the few examples with opacity-inducing quantifiers.
- ▶ We shouldn't be convinced by the natural story unless it's supported by more robustly attested data.

Section 4

Synchronic semantics to the rescue

A new generalization

Head nouns in nonrestrictive relatives only

- ▶ A relative clause of the form *which N IP* is nonrestrictive.
- ▶ The proportion of nonrestrictive *which*-relatives correlates with the frequency of *which N*-relatives.

We will not derive this from first principles, but the following considerations make the generalization natural.

1. *Wh*-phrases in nonrestrictive relatives are maximizing by virtue of being interpreted as discourse anaphors (Evans 1980, Sells 1985).
2. Any 'head noun' is interpreted internal to a maximizing relative, and often also pronounced RC-internally (Grosu & Landman 1998).

Internal interpretation of head nouns

- ▶ Maximizing relatives: amount relatives, free relatives, some internally-headed relatives, correlatives.
- ▶ Grosu & Landman's generalization: a head noun in maximizing relatives is interpreted internal to the relative.

(27) I read the books that there were on the table:
'I read the unique individual composed of d -many books s.t. d is the maximal amount s.t. there are d -many books on the table.'

- ▶ *Books* does dual duty: I read books (RC-external), but also the predicate *books* is one of the restrictors that determine the restrictor of MAX (RC-internal).
- ▶ (Grosu & Landman have machinery in place to ensure that *books* need only be interpreted in one position, even if it does two jobs.)

Nonrestrictive relatives and head nouns

- ▶ Nonrestrictive relatives involve MAX in a different way, but still use a nominal restrictor in the scope of MAX (as with other discourse anaphors; Evans 1980, Elbourne 2001).

- (28) If a man owns a donkey, he always beats it.
[[always_{s₁} if a man(_{s₁}) owns(_{s₁}) a donkey(_{s₁})]_{s₂} he man(_{s₁}) beats(_{s₂}) it donkey(_{s₁})] (Elbourne 2001: 250)
- (29) I read the books, which were on the table.
I read the books \wedge they books were on the table.

Restrictive relatives and head nouns

- ▶ Standard accounts of restrictive relative semantics (e.g. Heim & Kratzer 1998) involve conjunction of predicates.

(30) I read the books that were on the table.
'I read the x : $\text{book}'(x) \wedge \text{on}'(x, t)$ '

- ▶ Although nothing goes wrong truth-conditionally if N is also interpreted within the restrictive relative, this is redundant.

(31) 'I read the x : $\text{book}'(x) \wedge \text{book}'(x) \wedge \text{on}'(x, t)$ '

- ▶ In sum:
 - ▶ Head nouns are interpreted inside maximizing relatives (Grosu & Landman 1998).
 - ▶ Although nonrestrictive relatives use *MAX* differently, we still expect head nouns to be interpreted inside them (Sells 1985, Elbourne 2001).
 - ▶ Head nouns inside restrictive relatives are redundant, and so probably not there.

Plentiful high-quality data

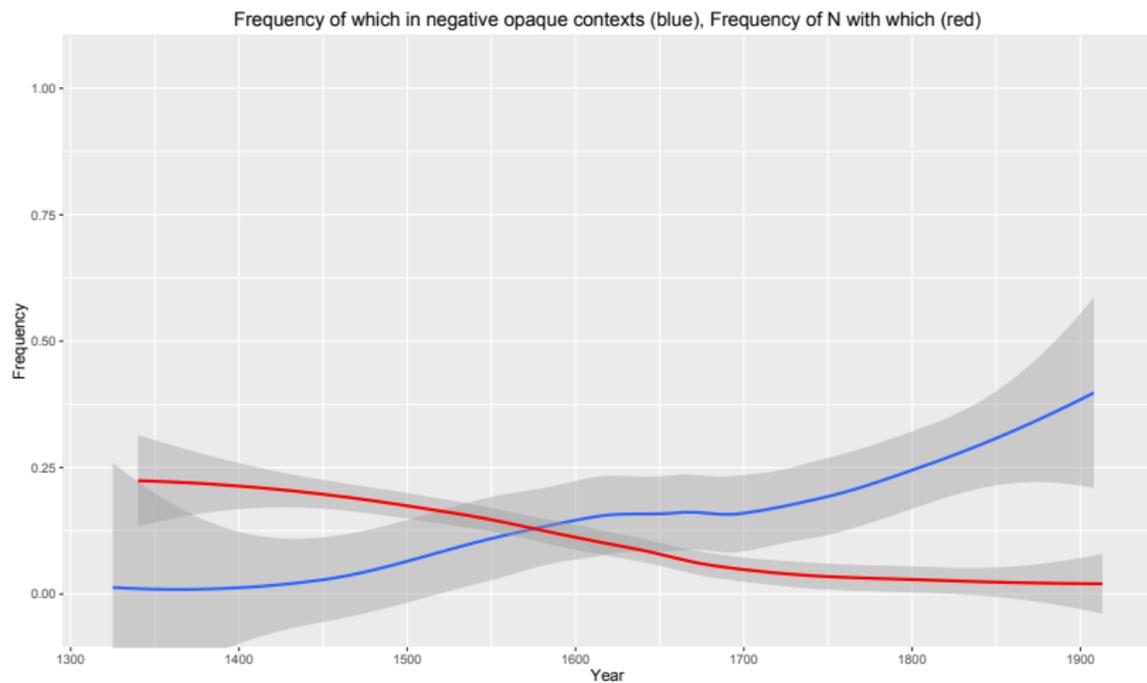
Internal *realization* of head nouns

- ▶ Early headed *which*-relatives frequently have a full *which*-NP, not just pronominal *which*.

(32) How Kyng Arthure gaf bataile to þe Emperour, [in þe
how King Arthur gave battle to the Emperor in the
whiche bataile þe Emperoure was slayn].
which battle the Emperor was slain
(cmbrut3-M3,85.2588, c.1400)

- ▶ This reflects the likely source of headed *which*-relatives in free relatives (almost always of the form *which N*).
- ▶ If the head noun is **pronounced** RC-internally, it must be interpreted there.
 - ▶ E.g. no QR-like mechanism to get N out of the RC.
- ▶ Therefore **pronunciation** of N within RC implies **interpretation** of N within RC.
 - ▶ ... which implies nonrestrictive interpretation.
- ▶ RCs without overt head nouns could be restrictive or nonrestrictive.

Rise of restrictive *which*-relatives



Section 5

Conclusions

Diagnosing nonrestrictiveness is easy now

- ▶ *Which N* → nonrestrictive.
- ▶ But *which N* is visible, unlike restrictiveness.
- ▶ And the classification of examples according to whether the *which*-phrase contains a noun is crisp, unlike classifications according to restrictiveness.

The entire pathway is visible

- ▶ We now have distributional evidence for each step in a complex series of semantic changes.
 - ▶ Erosion of *swa* ... *swa*;
 - ▶ Loss of *which N*;
 - ▶ Co-occurrence with *no N*, etc.

Synchronic formal semantics can generate new distributional hypotheses

- ▶ There is no common-sense reason to associate presence of N with nonrestrictiveness.
- ▶ It is only because of the work of Evans, Sells, Heim, Kadmon, etc. that we can propose this distributional diagnostic.

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