Synchronic theory and semantic change
Matching relatives in Middle English

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Introduction

- We (Nik and me) 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 talk, I draw on insights from formal semantics to establish distributional diagnostics for nonrestrictive relative clauses in Middle English.
- This allows us to correlate the pathway with distributional evidence.
- However, our findings on Middle English also inform debate over the syntax of present-day relatives.

Roadmap

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 $\dfrac{\emptyset \mid \text{which}}{\text{that} \mid \text{which that}}$ she ate

             b.   What she ate

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

Restrictive vs. nonrestrictive headed relatives

- A free relative denotes a (maximal) individual with a specified property.

  (3) Who(ever) left: $\iota x.[person'(x) \land left'(x)]$

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

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

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

  (5) The person who left: $\iota x.[person'(x) \land left'(x)]$

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 Fintel 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

- Discourse anaphors (including *wh*-phrases in nonrestrictive relatives) 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.   ($\rightarrow$ state buys all the sheep)

        b.   Each farmer owns some sheep that the State buys in the Spring.   ($\rightarrow$ 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.
- The free $>$ nonrestrictive pathway followed by English can be thought of in terms of scope of the maximization operator.

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 ⤳ 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.' ⤳
         '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
Wh-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)

- So *wh*-forms have followed a secondary grammaticalization pathway which recurs across IE but is very rare in other languages.

PIE⤳English

- Universal ⤳ definite *wh*-correlatives (Belyaev & Haug 2014);
- Loss of multiple correlatives (unattested in English written record);
- Generalization from clause-initial ⤳ 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

(11) [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)

(12) 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

(13) 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)

(14) 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.

Free *wh*-relatives > headed *wh*-relatives

- Early Middle English: erosion of OE system.
- *swa ... swa > se* (> *(so)ever*).
- *What* starts occurring with N′.
- *Which* N′ almost never occurs with *se* (2/14 tokens); *what* N′ almost always does (11/15 tokens).

(15)　　[Context: the journey from heaven to hell and back]

    a.　wiche strides he makede dunward. and
       which strides he made downwards and
       eft   uppard
       afterwards upwards

                      (cmtrinit-mx1,111.1511)

    b.　teȝȝ ... follȝhenn ure Laferrd Crist Whatt
       they   follow   our Lord   Christ what
       gate summ he ganngeþþ
       way SE   he goes

                      (cmorm-m1,I,285.2358)

Free *wh*-relatives > headed *wh*-relatives

- *Which* is specializing for regular, 'definite' interpretations, which overlap significantly with nonrestrictive headed relative interpretations (e.g. De Vries 2006)

- *What* is specializing for 'ignorance and indifference' interpretations, which are specifically free relative.

- The interpretive overlap makes reanalysis of *which* as headed relativizer more plausible.

(16) a. ... NP_i ... FR_i
     b. ... $[_{NP}$ ... $t_i]$ ... RC_i

- Because of significant similarities between appositive free relatives and nonrestrictive headed relatives, no clear date for emergence of headed *which*-relatives.

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

Proportion of relatives with filled Spec, YCOE + PCMEP + PPCME2
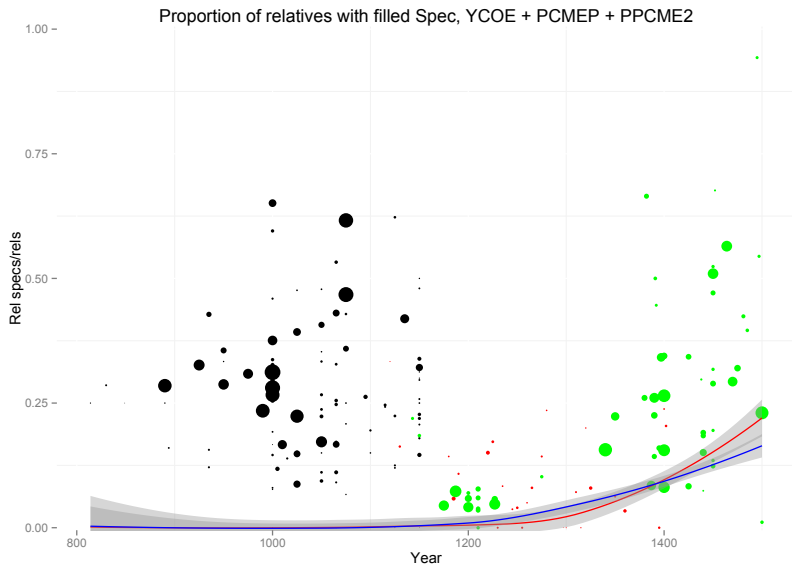
Red = *wh*-rels, NP gaps; Blue = *wh*-rels, PP gaps.

Section 4

Nonrestrictiveness of *which N′* relatives

The problem with intuitions

- The first headed relatives are all clause-final.
- They generally *seem* nonrestrictive.
- Assuming nonrestrictiveness allows for a simple specification of the reanalysis, in terms of scope of the maximization operator.

(17) a. $\iota x.(boy'(x) \wedge saw'(j, x))$
      b. $saw'(j, \iota x.(boy'(x)))$
      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?

A distributional test for restrictiveness

- A test for restrictiveness from Sells (1985):
- Discourse anaphors cannot have opaque antecedents.

  (18)　　Nobody$_i$ turned up. #He$_i$ was angry

- Because nonrestrictive relativizers are discourse anaphors, only restrictive relatives can modify opacity-inducing quantifiers (*no, few, little, every*, but cf. *all*).

  (19)　　a.　No person who left
  　　　　b.　*No person, who left

Properties of early headed *which* relatives

▶ According to this diagnostic, restrictive *which*-relatives are initially rare, but not nonexistent.

(20)   a.   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 deþ his wyl.
                  whereof he does his will

                                      (cmayenbi-M2,85.1658, 1340)

        b.   and for no richesse ye   shullen do no thyng [which may in
                  and for no riches   you shall   do no thing which may in
                  any manere displese   God]
                  any manner displease God

                                  (cmctmeli-m3,234.C1.665)

Which N′ relatives are nonrestrictive

- However, there are no examples of a *Which N′*-relative modifying an opacity-inducing quantifier (not even *all*).
- How surprising is this?
    - 4,691 NPs with opacity-inducing quantifiers + RCs, of which 588 have *which* (12.5%).
    - 19,250 *which*-relatives, of which *1,672* have *which N′* (8.7%).
    - If the two properties were independent, you might expect roughly $588 \times 0.087 = 51$ hits.
- A slightly fancier version of the same estimates the frequency year-by-year, calculates an expected value for each text, and sums them. Expected: 50 hits. $p = 0.05$ threshold value: 21 hits.
- So 0 hits is very surprising.

Expected *which N′* with opacity-inducing antecedent
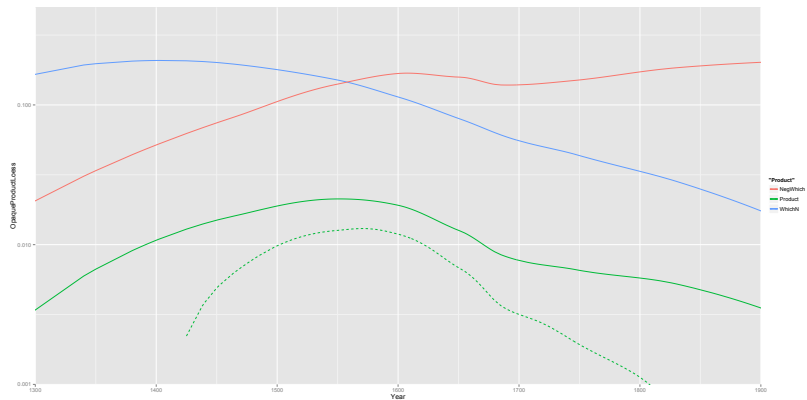
Nonrestrictiveness is independent of choice of N′

▶ The N′ inside the relative could be identical to the antecedent (overtly matching relatives).

> (21)   the bifore knowing of God, which bifore knowing of God
> bihooldith so without fayling thingis to comynge
> 'the foresight of God, which foresight of God beholds so
> infallibly things to come'   (cmpurvey-m3,I,55.2216)

▶ Or it could be different, standing in a variety of discourse relations to the antecedent (nonmatching relatives).

> (22)   Asa, kyng of Juda, . . . had sore feet, whech passioun oure
> bokys sey it was podegra
> 'Asa, king of Judea, had sore feet, which suffering our books say
> was gout'   (cmcapchr-m4,33.43)

▶ Initially, almost all *which N′* relatives were overtly matching relatives.

▶ But both kinds are still categorically nonrestrictive.

The grammar of *which* changes; the N′ restriction doesn't

- *Which N′* declines over time, frequency of *which* with opaque antecedents increases in lockstep.
- Among *which N′* relatives, overtly matching relatives decline while nonmatching relatives become the norm.
- We even see a significant by-text correlation between frequency of overtly matching *which N′*-relatives and frequency of *which* modifying opaque antecedents.
- No significant correlation with frequency of nonmatching *which N′*-relatives.
- All of this suggests significant changes c.1350–1800 in the grammar of *which*.
- But no matter what a speaker's grammatical representation of *which* was, that grammar didn't permit restrictive *which* N′-relatives.
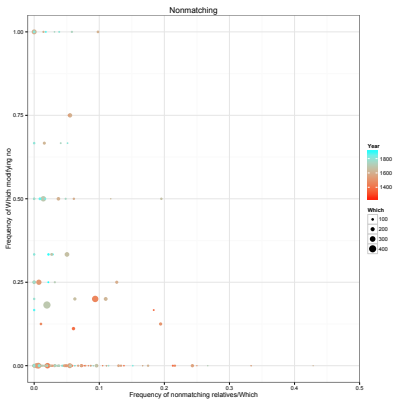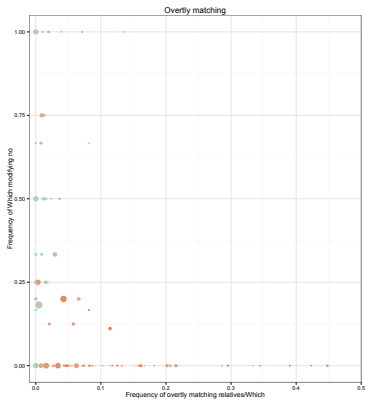
Nonrestrictiveness and *which N'*

Frequency of which in negative opaque contexts (blue), Frequency of N with which (red)
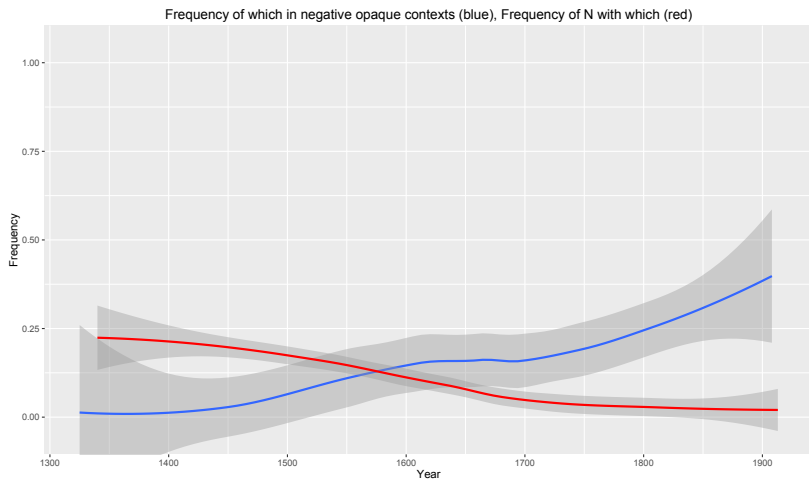
Diachrony of overtly matching relatives
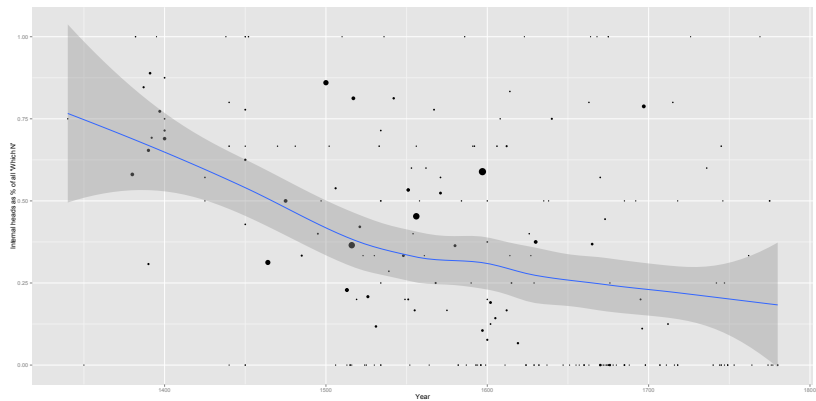
Matching and restrictiveness

Section 5

Discussion

Nonrestrictiveness makes sense

- ▶ 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.

  (23)   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.)

Nonrestrictiveness makes sense

- ▶ Sells (1985): nonrestrictive relatives are discourse anaphors
    - ▶ Explains prohibition against antecedents in opaque environments.
- ▶ Evans (1980), Heim (1990), Elbourne (2001): discourse anaphors are covert definite descriptions.

(24)   a.   John has a wife. She is sitting next to him.
       b.   John is married. ??She is sitting next to him.
          (Heim 1990: 166)

(25)   X S Y NP$_i$ Z $\Rightarrow$ 1 2 3 4 $+$ 2 5   (Heim 1990: 170)
      1 2 3   4   5
      conditions: 4 is a pronoun
                  2 is of the form [$_S$ NP$_i$ S]
                             6   7

- ▶ Elbourne (2001) recasts NP-copying as NP/N′-deletion.
- ▶ Overtly matching relatives show what happens without deletion.

Restrictiveness makes less sense

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

  (26)   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.

  (27)   '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).
    - ▶ This applies equally to nonrestrictive relatives, although possibly for different reasons (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*.

  (28)   How Kyng Arthure ȝaf   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.

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.

Historical data can inform synchronic analysis

- Many current analyses (e.g. Hulsey & Sauerland 2006) use copies to account for reconstruction phenomena involving relatives.

  (29) a. The pictures of each other that the twins took.
        b. The headway that we made.

- Overtly matching relatives look a lot like pronounced copies.
- But the interpretation isn't what copy-theory would like.
  - Overtly matching relatives are nonrestrictive.
  - Reconstruction effects are largely in restrictive relatives.
- So maybe this historical structure can inform debate on the analysis of reconstruction.

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