Wh-words and semantic reanalysis

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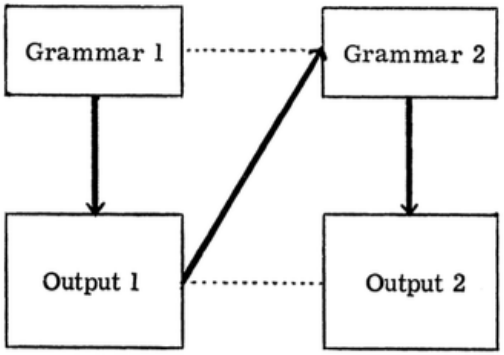
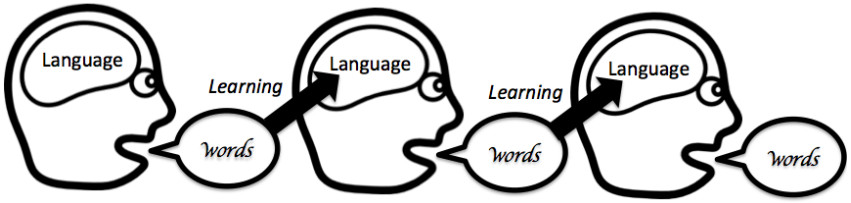
Reanalysis

- Reanalysis in the sense of Andersen (1973), Lightfoot (1979) relies on:
  - A many–one relation between underlying representations and surface forms;
    - (At least, the potential for such a relation: a latent structural ambiguity).
  - A requirement of extrapolation beyond observed data.
- Pervasive in explanations of grammatical change (phonology, syntax, even artificial languages).





Semantic reanalysis

- The best-known examples of syntactic reanalysis involve corresponding semantic reanalyses.
  - Emergence of English modals (main verb $\rightarrow$ modal).
  - Jespersen's cycle ('minimizing' adverb $\rightarrow$ negator).
- That is possible because the logic of reanalysis can aply equally to meaning (see also Eckardt 2006).
  - Surface form $\approx$ communicative intention.
  - Underlying representation $\approx$ compositional derivation of semantic object functioning as cue to communicative intention.

Reanalysis and gradualness

- Reanalysis is typically gradual w.r.t. at least one representation.
- But that gradualness can take one of two forms.
  - 'Grammaticalization'-esque reanalysis (small change, preserving global structure, minimal surface effects; Roberts & Roussou 2003, van Gelderen 2011);
  - Radical reanalysis (significant structural change, minimal surface effects; Andersen 1973, Lightfoot 1979).
- Radical reanalysis is controversial, especially among diachronic syntacticians.
- The major work in formal diachronic semantics has mainly ignored radical reanalysis, focusing on formal accounts of grammaticalization.
- Today's talk: a semantic take on a very large-scale example of radical reanalysis, and implications for relations between cognitive semantics, logical semantics, and syntax.

The usual counterargument

- 'But children are excellent learners so they've figured everything out by puberty and they've no social prestige before then so by the time they're in a position to spread their innovative reanalyses, the innovative reanalyses have disappeared'. (E.g. Bybee & Slobin 1982, Diessel 2012).
- At least two responses:
  - **Change starts before acquisition is complete**: Preteen children have more social prestige than expected and learn later than expected (Cournane 2017).
  - **Acquisition is harder than you thought**: You're not just learning one grammar but several grammars and conditions favouring one or another, so the task is harder than expected (Kroch 1989, Yang 2002).
- Today's talk indirectly supports the latter.

Meaning is hard

- We think that the task is even harder than often assumed, once meaning is taken into account.
- Three dimensions of difficulty:
  - Which aspects of inferred communicative intention derive from the lexicon + compositional semantics; which derive from pragmatic inference?
  - What is the division of labour between overt lexical items and null functional heads/operators/semantic glue?
  - What is the penalty (in terms of potential misunderstanding) associated with a given instance of miscommunication?
- The first of these is often taken as a motivating factor in primary grammaticalization (e.g. Hopper & Traugott 1993).
- The second is reminiscent of various proposals in diachronic syntax (e.g. Roberts & Roussou 2003).
- The third is largely unknown territory, but merits investigation.

Today

- We're going to focus on the 5,000-year history of English *wh*-relatives, tracing their roots in PIE *wh*-indefinites, in typological context.
- During this history, the *wh*-phrases shift from indefinite to definite to just a marker of λ-abstraction.
- They also acquire and lose a range of syntactic/semantic contextual restrictions.
- We'll discuss the following stages.
  1. PIE conditional + *wh*-indefinite;
  2. OE 'correlatives' (NB not correlatives);
  3. OE free *wh*-relatives;
  4. ME nonrestrictive *which*-relatives;
  5. later developments.
- These changes are underlyingly wild, but always gradual on the surface.
- Moreover, they're fairly predictable: similar grammars emerge in many IE languages.

Roadmap

1. Typological context: Parallel evolution.
2. History of English (c.500 years/minute).
3. The point.

Section 1

Parallel evolution

Wh-relatives are an IE thing

- The use of interrogative forms in embedded relatives is largely restricted to Indo-European.

	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)

- However, PIE didn't have embedded relatives at all (Clackson 2007).
- And contact-induced change can't explain everything (trust me, or ask me).
- So IE daughter languages have repeatedly evolved the same kind of cross-linguistically rare grammatical structure.
- This is parallel evolution.

Ingredients in parallel evolution

- Parallel evolution requires two ingredients:
  1. A distinctive initial state;
  2. Something to motivate a statistically nonrandom pattern of changes.
- Here, the distinctive initial state is something about PIE *wh*-forms.
- We'll say less about the motivation for nonrandom change, but some of the steps here can be thought of as reflecting a preference for grammatically encoded dependencies over e.g. discourse anaphora.

Section 2

History of *wh*

Starting point: Properties of PIE

- We assume three relevant distinctive properties of PIE:
  1. Interrogative forms also used as indefinites.
  2. The indefinites are dependent (only occur in the scope of certain operators; see Yanovich 2005).
  3. Left-adjoined conditional structures.

Conditional + *wh*-indefinite ≈ universal correlative

- Andrews (1975): The same string can be interpreted as a 'universal' correlative or a conditional (with *wh*-indefinites).

(1)

yasya	yat	paitṛkam	ritkam	sa
who.GEN	what.NOM	paternal.NOM	inheritance.NOM	he.NOM
tad	gṛhnīta,	netaraḥ		
that.ACC	should.get	not.another		

'Of whom what is the paternal inheritance, he should get it and not somebody else.'
'If someone has something as a paternal inheritance, then he should get it and not someone else.' (Sanskrit)

- Similar ambiguities exist in Warlpiri (Hale 1976), Hungarian (Lipták 2009), Serbo-Croatian (Arsenijević 2009), etc.
- The differences between universal correlative and conditional + *wh*-indefinite are small:
  - Correlatives require matching between relative pronouns and correlates.
  - Conditionals construe situations as topical, while correlatives construe individuals as topical (Bittner 2001).

Conditionals and situations

- Conditionals can be analysed in terms of quantification over situations.
- But the situations that conditionals quantify over are roughly the size of individuals (Elbourne 2001).

(2) a. If a bishop meets another bishop, he blesses him.
b. If two bishops meet, one of them blesses the other.

(3) a. $\forall s.[\exists b_1.[\text{bishop}(b_1, s) \wedge \exists s' \supseteq s.[\text{bishop}(b_2, s') \wedge \text{meets}(b_1, b_2, s')]][\exists s'' \supseteq s'.[\text{bless}(b_1, b_2, s'')]]$
b. $\forall s.[\exists b_1, b_2.[\text{bishop}(b_1, s) \wedge \text{bishop}(b_2, s) \wedge \text{meets}(b_1, b_2, s)]][\exists s' \supseteq s.[\text{bless}(b_1, b_2, s')]]$

- This means that the shift from quantifiying over situations (conditionals) to quantifiying over individuals ('universal' correlatives) may be smaller than it seems.

Variation in conditional markers

- The canonical conditional structure involves a form like *if*, which introduces a dependent clause and quantifies over situations described by that clause.
- Not all conditional structures have this form.
- They are marked by:
  - Prosody (many languages but not e.g. German, Italian);
  - V1 position;
  - Subjunctive or imperative verb forms;
  - *and* & *then*.
- They are always marked by something. Even the 'conditional' prosody can be associated with arbitrary meanings.

Conditional markers and correlative markers

- We don't know much about Proto-Indo-European conditionals, because early IE conditionals were already quite divergent (Clackson 2007, citing Meillet).
- However, the same markers that occur in conditionals frequently crop up in correlatives (not just in IE).
  - Prosody;
  - *if* (Tibetan correlatives; Cable 2009);
  - *and* (Basque correlatives; Rebuschi 2009);
  - Hindi uses a member of the *j-* series of relative forms for conditionals.

(4) [JEr to ithE yel], tEr miN tya-Ia goli mar-in
[*if* that.M here comes], *then* me.ERG that.M-ACC bullet kill-FUT
'*If* he comes here, *then* I'll kill him.' (Hindi)

- This suggests that conditionals and correlatives have an incestuous past: many different syntactic types of conditional influenced the attested forms of correlatives.

One path to headed relatives

- Belyaev & Haug (2014)'s pathways for *wh*-correlatives (based on comparative typological data):
  1. universal > definite (> restrictive) interpretation;
  2. non-obligatory anaphoric relation > obligatory anaphoric relation (> matching > not-anaphora).
- This composes with the correlative > headed relative pathway in Haudry (1973), to suggest one pathway from PIE to headed *wh*-relatives.
- We'll show that English followed a slightly different path between those endpoints.

Old English ‘correlatives’

- OE has correlative-like constructions, where the left half is headed by *swa wh*-XP *swa*.
- They are always generalizing.
- An anaphor in the right half is common, but not obligatory.
- So OE hadn’t started down either of Belyaev & Haug’s pathways:

(5) Swa hwylc eower swa næfð nane synne on him, awyrpe
So which you.GEN.PL so NEG.have no sin in him, cast.out.SBJ
se ærest ænne stan on hy
he first one stone on her
‘He that is without sin among you, let him first cast a stone at her.’

(6) swa hwider swa he com he cydde þas wundra
so whither so he came he told the wonders
‘Wherever he came to, he told about the wonders’

(7) swa hwæt swa he mid his worde lærde, he ær mid dædum gefylde
so what so he with his word taught he before with deeds fulfilled
‘What he taught with his word, he had earlier done with his deeds.’

OE correlative = conditional + *wh*-indefinite

- We think that OE correlatives are still semantically conditionals, with an unusual syntax.
- Three pieces of circumstantial evidence:
  - Other OE conditionals (with *gif* or V1) love present indicative morphology (used in 58% of examples, vs. 38% baseline). '*Wh*-correlatives' love it even more (74%). No other class of relatives shares this preference.
  - Regular definite NPs (*se* N/proper name/personal pronoun) are dispreferred in left-adjoined position in OE (c.14%, vs. c.70% in corpus as a whole). So this position is not typically used for descriptions of topical individuals.
  - OE *wh*-indefinites like to occur in the antecedent of conditionals, way more than other DE environments.

Context	*hw*	*ænig*	*sum*/Num
Matrix	7%	12%	**60%**
Other DE	4%	**50%**	5%
Conditional	**50%**	13%	1%
butan etc.	**15%**	1%	1%

OE free *wh*-relatives ≈ PDE free relatives

- OE also had free *wh*-relatives in clause-final position.
- Internal syntax very similar, but *swa . . . swa* optional.

(8) Gaþ to Iosepe & doþ [swa hwæt swa he eow secge].
Go to Joseph and do so what so he you.DAT say.SBJ
'Go unto Joseph; what he saith to you, do.'

(9) Gemyne, [hwæt Sanctus Paulus cwæð]
Remember what Saint Paul said
'Remember what Saint Paul said.'

- Without *swa . . . swa*, a regular definite interpretation.
- Effect of *swa . . . swa* ≈ PDE *-ever*.
- This makes it natural to adopt current analyses of free relatives as definite descriptions (Jacobson 1995, Dayal 1997, von Fintel 2000).
- $[\![\textit{wh NP C}']\!] \approx \iota x.[\![\text{NP}]\!](x) \,\&\, [\![\text{C}']\!](x)$
- *Wh*-forms are shifting from indefinite to definite.

Early Middle English: The data gap

- Very few examples from 1150–1340.
- But general picture is erosion of OE system and specialization of *what* vs. *which*.
- *swa . . . swa* > *se* (> *(so)ever*).
- *What* starts occurring with NP complement.
- *Which NP* almost never occurs with *se* (2/14 tokens); *what NP* almost always does (11/15 tokens).

(10) a. [Re the journey from heaven to hell and back]
wiche strides he makede dunward. and
which strides he made downwards and
eft uppard
afterwards upwards

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

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.

(11) a. $\ldots\ \mathrm{NP}_i\ \ldots\ \mathrm{FR}_i$
b. $\ldots\ [_{\mathrm{NP}}\ \ldots t_i]\ \ldots\ \mathrm{RC}_i$

- Because of significant similarities between appositive free relatives and nonrestrictive headed relatives, no clear date for emergence of headed *which*-relatives, but roughly:
- Headed relatives with *which* c.1350, then *whom* (c.1400), and *who* (c.1500).

Nonrestrictiveness

- Early headed *which*-relatives often have an NP complement.

(12) 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'

- These *which NP*-relatives are all nonrestrictive.
- Or at least, no examples modify nonreferential antecedents (which would require a restrictive relative), and this is surprising ($p < 0.01$);
- So the shift here is from the whole relative as definite description to *wh*-phrase as definite description (as in e.g. Sells 1985), inside a relative denoting a parenthetical proposition.

Restrictiveness

- *Which NP*-relatives are always nonrestrictive (and this is interesting).
- But restrictive *which*-relatives emerged within c.50 years.

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

- This is a final change in the denotation of *which*, to basically $\lambda P.P$ (Heim & Kratzer 1998).
- We suspect that this is possible simply because in many cases, restrictiveness doesn't make a huge interpretive difference.
- In PDE, prosodic intuitions are more robust than semantic intuitions.

(14) At the bar was a man (,) who was wearing a fedora.

Interim summary

English

- We've seen *wh*-phrases go through the following stages:

1. Indefinite, specialized for conditional environments (PIE $\rightarrow$ OE).
2. $\lambda P \lambda Q.\iota x.P(x) \wedge Q(x)$ (OE, EME)
3. $\lambda P.\iota x.P(x)$ + overt antecedent requirement (ME $\rightarrow$ PDE)
4. $\lambda P.P$ (late ME $\rightarrow$ PDE)

- That's not the end: the grammar of *wh*-relatives has changed roughly every generation since then.

Interim summary

Typological context

- Many other languages got from A to something-like-B.
- Some may have followed the same route (Early New High German? Early Modern Icelandic? See Youmerski 2016).
- Others may instead have followed the Belyaev/Haug → Haudry path (Romance?)

1. Indefinite, specialized for conditional environments (PIE)
2. Definite correlatives
3. Embedded relatives

- One way or another, if(f) you start there, you're likely to end up here.

Section 3

The point

Division of labour

- A learner has to make guesses about at least two types of information:
  1. The speaker's communicative intention;
  2. The semantic composition of an utterance as cue to that intention.
- Often, the first is clearer than the second.
- Solving the second can be like a giant simultaneous equation.
- Working out the denotation of *which* involves working out how it interacts compositionally with an unknown number of overt and covert functional heads in the sentence.

Miscommunication

- Getting the simultaneous equation wrong could lead to misunderstandings.
- But often, these misunderstandings are necessarily minor.
  - No content words involved.
  - Lesson from the Jacobson/Dayal approach to free relatives: things like tense and aspect can be as much of a cue to the intended referential/quantificational force as the particular choice of determiner.

An example

(15) and swa hwa swa bið buton þære annysse Cristes
and so who so is outside the oneness Christ.GEN
gelaþunge, ne becymþ ðam nan hæl.
congregation.GEN NEG comes DEM.DAT no health
'and whoever is outside the oneness of Christ's congregation will receive no salvation.'
'and if anyone is outside the oneness of Christ's congregation, he will receive no salvation.

- Off-the-peg conditional analysis:
  $\forall s.[\exists x.\text{outside}(x, c, s)][\neg(\exists s' \supseteq s.[\text{saved}(\text{him}, s')])]$
- Free relative analysis, following von Fintel (2000):
  Asserts: $\lambda w \neg(\text{saved}(\iota x.\text{outside}(x, c, w), w))$
  Presupposes: $\forall w' \in \min_w[F \cap (\lambda w'.\iota x.\text{outside}(x, c, w') \neq \iota x.\text{outside}(x, c, w)] : \neg(\text{saved}(\iota x.\text{outside}(x, c, w'), w')$
  'If someone else had been outside the congregation, he wouldn't have been saved either'
- Wildly different denotations, both justified for aspects of PDE, either appropriate in vast majority of cases.

Conclusion

- Synchronic formal semantics is concerned with very precise hypotheses about the compositional contribution of individual lexical items to logical form.
- Learners are apparently often not so precise.
- They don't need to be, because there are often multiple compositional routes to approximately the same place.
- (And approximately the same place is often good enough).
- Semantic reanalysis is possible because of the degrees of freedom in this compositional approach.
- Thinking in these terms may help us understand how there can be so many languages progressing in parallel along the long and meandering path from PIE $*k^w$- to PDE *wh*.

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