Optionality is Stable Variation is Competing Grammars

Joel C. Wallenberg and Josef Fruehwald
Newcastle University, University of Pennsylvania

May 15, 2013

Introduction

Variation in grammar is often described as falling into one of two categories.

1. Competing Grammars
   - Leads to language change via the replacement of one grammatical process by another.
   - Competition is parameterized in some fashion, as in competing flavors of the same functional head (Kroch, 1994).
2. Optionality (within a grammar?)
   - Diachronically stable variation between grammatical processes.

Introduction

We will argue that grammatical optionality is formally the same as competing grammars, with the following consequences:

- The difference between language change and stable variation/optionality must be explained by some mechanism outside of the grammar itself.
- We argue that it depends on the mathematical character of some extragrammatical dimension with which the variation interacts.
    - Partial specialization of variants along a continuous dimension.

Outline

Blocking and Contrast

"Blocking Effect"

- General cognitive pressure against two forms existing for one function ("doublet") (e.g. morphosyntactic doublets as in Kroch 1994).

  {*dived*, *dove*} (dive-PST)
  {*jimmies*, *sprinkles*} (candy topping)

"Principle of Contrast"

- A strategy that children use in acquiring language: assume that two forms have two meanings (or uses)(Clark, 1987, 1990, *inter alia)*.
- Children hypothesize that novel words also refer to novel objects (as in Markman and Wachtel, 1988, among many other replications of the effect).

Blocking and Contrast

- A doublet is two variants competing for finite resources, as in e.g. biological evolution.
  - Instead of competing for something like food, they are competing for use (time in the mouths/brains of speakers)
- Either one variant has an advantage, and so replaces the other (following a logistic function; Nowak, 2006).
- Or neither variant has an advantage, in which case random walk behaviour ensues.
- But in linguistic doublets, random walk cannot persist indefinitely because of the acquisition pressure of the Principle of Contrast.

Competing Grammars

- This entire interpretation is dependent on some notion of "competing grammars" (Kroch, 1989, 1994)

  Competing Grammars, general form: 2 variants are available to a speaker with overlapping functions (e.g. the same meaning), and can't both be used at the same time.
  - E.g. two featural versions of the same syntactic head.
  - E.g. two different output mappings for the same phonological input.
  - E.g. two different spell-outs of a morpheme.
- Necessary for the description of **any** linguistic change in a categorical dimension.
  - E.g. word-order parameters (Pintzuk, 1991; Santorini, 1992); a phonological rule like German final stop devoicing (Fruehwald et al., 2010).
  - In any such case, a speaker in the middle of the change in progress (code-)switches between categorical variants.

Blocking and Contrast

The possible historical outcomes of doublets (Competing Grammars) driven by the Blocking Effect and the Principle of Contrast are:

- Replacement of one by the other.
- Specialization of the two forms to different functions or meaning.

Proposal: every case of categorical linguistic variation or optionality can be reduced to competing grammars, leading to one of these two outcomes.
This simplifies the grammatical architecture necessary to account for both optionality and language change.

Example: English "Topicalization"

- Prince (1985, 1998, 1999): felicitous in two English discourse contexts, both of which require a certain type of contrast to appear on the fronted XP.

  (1) She's going to use three groups of mice. One, she'll feed them mouse chow, just the regular stuff they make for mice. Another she'll feed them veggies. And the third she'll feed junk food.

  (2) She was here two years. [checking transcript] Five semesters she was here.
  (Prince, 1999, 8,9)

- However, it is **never** obligatory.

Example: English Topicalization

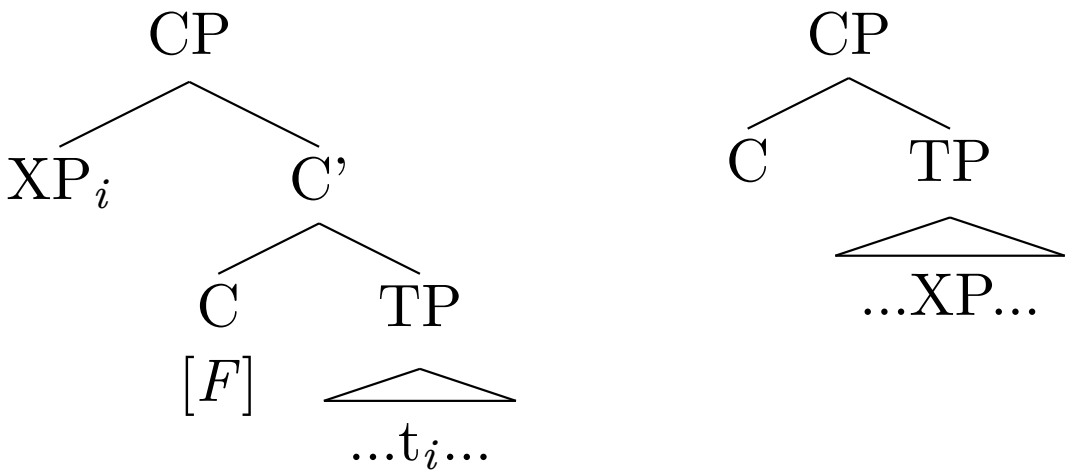
- As long as the accent pattern is kept constant, both orders are felicitous:

  (3) She's going to use three groups of mice. One, she'll feed them mouse chow, just the regular stuff they make for mice. Another she'll feed them veggies. And **the third** she'll feed **junk food**.

  (4) She's going to use three groups of mice. One, she'll feed them mouse chow, just the regular stuff they make for mice. Another she'll feed them veggies. And she'll feed **the third junk food**.

Topicalization in Minimalism

- Move is triggered by the feature content of some head.
- Given "Merge...preempts Move" (Chomsky, 2000), a feature cannot encode optional movement.
- Therefore, optional movement must involve a choice (for the **Numeration**) between two variants of a functional head, out of an inventory of possible heads:



- This is the core case of morphosyntactic doublet (i.e. competing heads) described in Kroch (1994).

A Minimalist Hypothesis

Given that:

- these mechanics are necessary to encode syntactic optionality in a Minimalist system,
- the same mechanics are necessary to describe a change in progress

Then, the system is simplest if no more machinery is added to deal with optionality/variation.

A Minimalist Hypothesis

- **Prediction:** every case of syntactic optionality or variation is one of the following:
  1. A replacement change in progress (outright competition going to completion).
  2. A specialisation change in progress (specialisation for different functions going to completion).
  3. **The only real case of diachronically stable variation/optionality:** variants have partially specialized along a continuous (or ordinal) dimension, e.g. style, prosodic weight.
- If categorical variants specialize along a categorical dimension, complete specialisation should eventually result.
- If categorical variants specialize along a continuous or ordinal dimension, then complete specialisation can **never** result (but replacement can still be arrested).

Example: Embedded Polar Questions

A quantitative study of embedded *yes/no*-questions in English and Icelandic, comparing the use of *whether* vs. *if*, and *hvort* vs *ef* found specialisation in English, and replacement in Icelandic (Bailey, Wallenberg, & van der Wurff 2012).

(5) John wondered whether Mary was coming to the party.

(6) John wondered if Mary was coming to the party.

Example: Embedded Polar Questions

In all stages of English and in historical Icelandic, a disjunction favors *whether*.

English

Disjunction:

(7) I wonder {**whether**,if} John or Bill is bringing coffee.

(8) I wonder {**whether**,if} John is bringing tea or coffee.

Simple:

(9) I wonder {whether, **if**} Bill is bringing coffee.

Example: Embedded Polar Questions

Disjunction:

(10) eftir því **hvort** maður vill heitt eða
according it-DAT whether man wants hot or
kalt
cold
"According to whether one wants hot or cold"
(*Sagan Öll*, date: 1985, from IcePaHC)

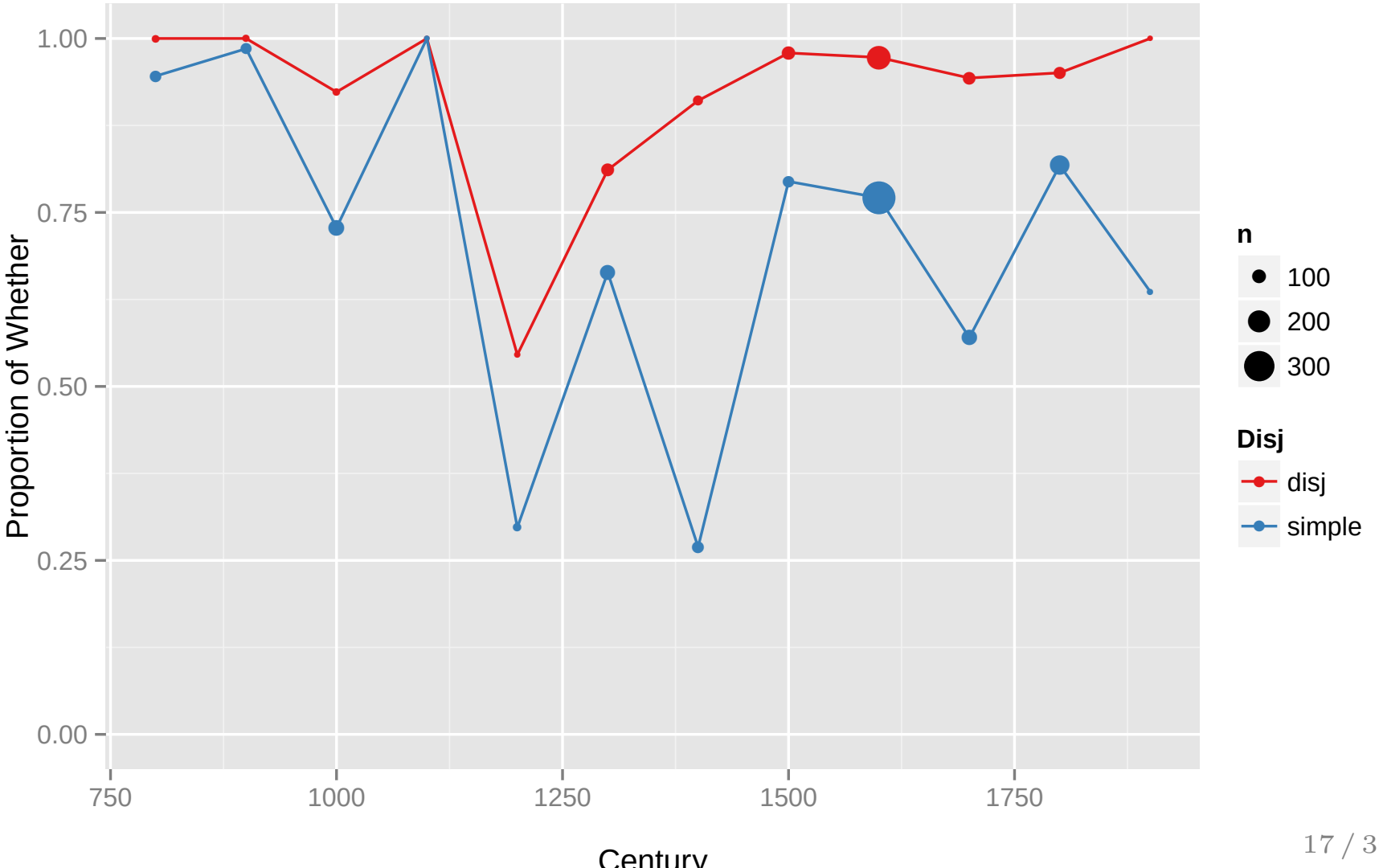
Simple, (older) Icelandic:

(11) vér vitum eigi, **hvort** vér tökum öndina
We know not whether we take soul-the

(12) og spurðu, **ef** hann væri Kristur
and asked if he were Christ
(*Icelandic Homilies*, date: 1150, from IcePaHC)

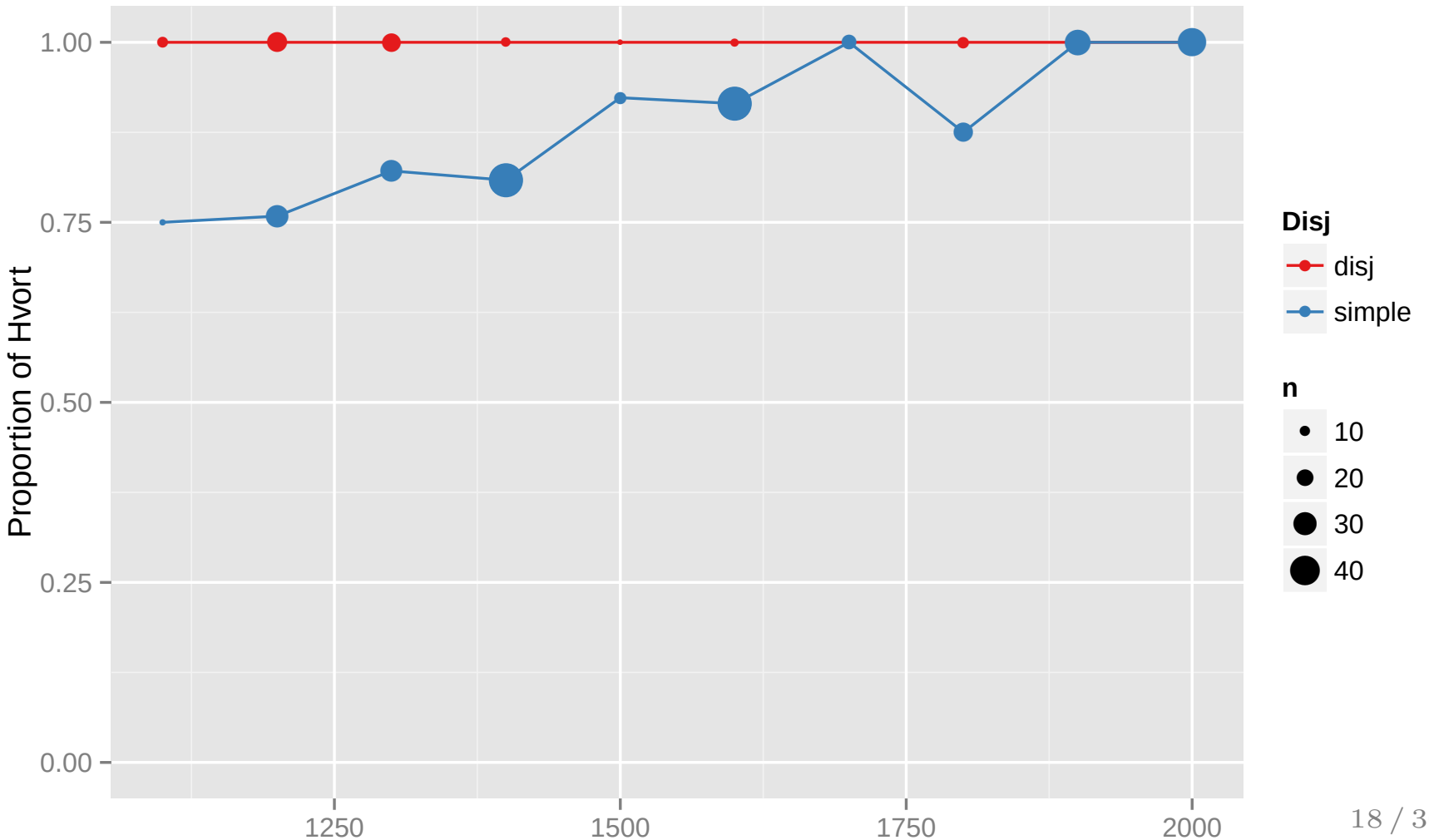
Specialisation in English (N = 1929 clauses)

Parsed Corpora: YCOE, PPCME2, PPCEME, PPCMBE



Replacement in Icelandic (N = 397 clauses)

IcePaHC (Wallenberg, AK Ingason, EF Sigurðsson, & E Rögnvaldsson 2011)



Continuous Dimensions

Hypothesis: Stable variation, i.e. optionality, results from categorical variants specializing along a continuous dimension.

There are many possible continuous dimensions, including language internal dimensions like

- weight (word length)
- prosodic accent (number of aligned prosodic peaks, degree of stress clash between two positions)

and language external dimensions like

- style
- speech rate

Example: English Topicalization

- Is the frequency stable over time? Probably, at least since Late Middle English (Speyer, 2010).
- Is it specialized for different speech styles (registers)? Not that we know of.
- Is it sensitive to prosody? Definitely (Speyer, 2010).

(13) The first she'll feed mouse chow, the second she'll feed veggies, and **the third** she'll feed **junk food**.

(14) ? The first Anders will feed, the second Joel will feed, and the third Wim will feed.

(15) ?? Joel Anders will pay, Jill Wim will pay, and Ann Maggie will pay.

Example: -ɪn∼-ɪŋ

(16) John has been {singing/singin'}.

(17) {Dunking/Dunkin'} Donuts.

- Is the frequency stable over time? Probably, as the variation has its roots in OE morphology (Houston 1985), and both variants were present in Middle English texts (Labov, 1989).
- Is it specialized for different grammatical contexts? Yes, in part, along a nominal↔verbal dimension (Labov, 1989).
- It it specialized for different speech styles? Yes, in part, along a continuous dimension of formality.

Example: -ɪn∼-ɪŋ

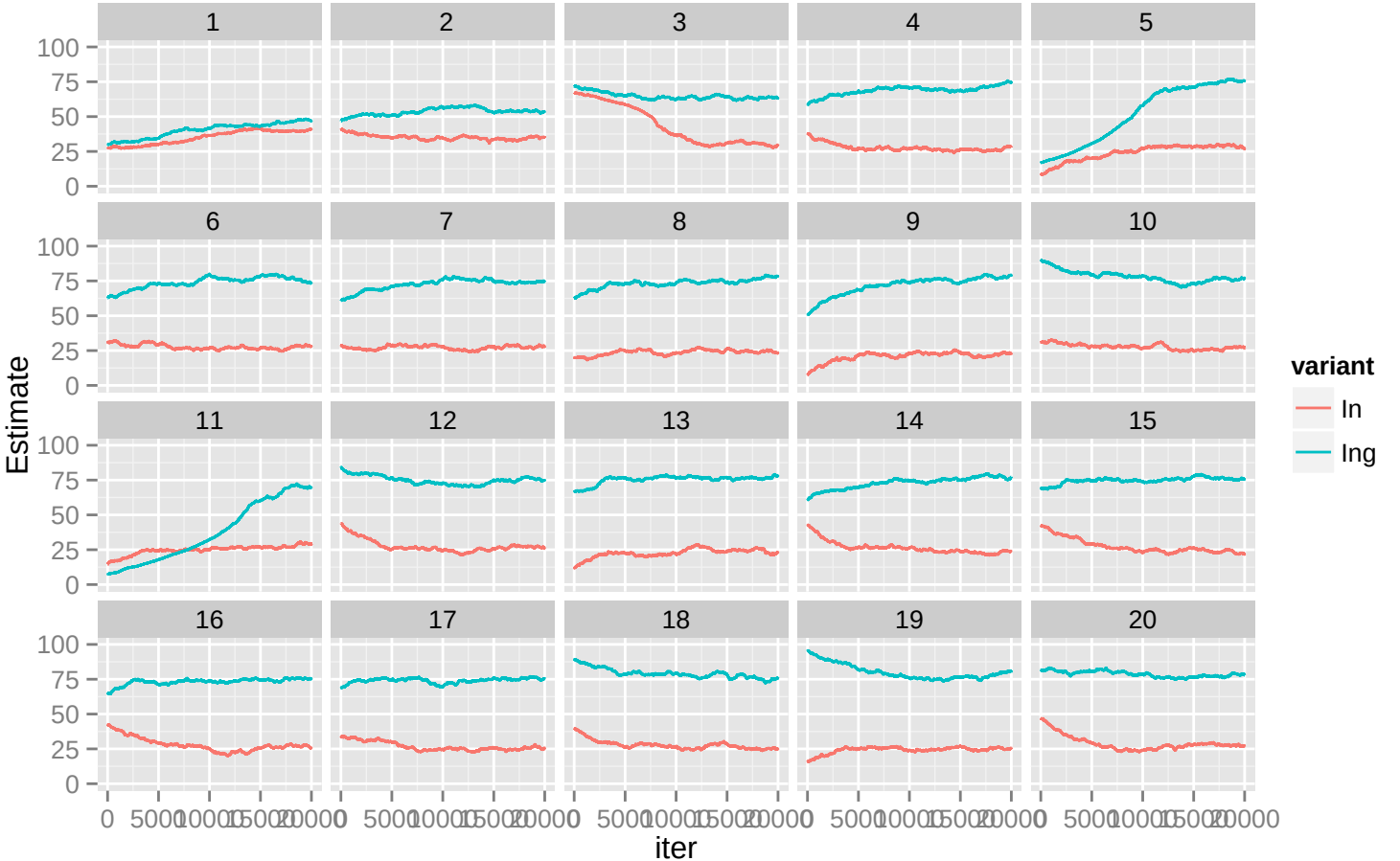
A proof of concept simulation shows that plausibly, under minimal acquisition assumptions:

- Variants specialize along a continuous dimension like style.
- For a continuous dimension, the process will stabilize at **partial** specialization.

Gen 0: -ɪn∼-ɪŋ doublet is innovated, with no stylistic conditioning. **Gen 0** picks a style to speak in, and produces a variant, repeats.

Gen 1: **Gen 1** learns an estimate for the style value of -ɪn, ɪŋ, as soon as she hears the first tokens of each from **Gen 0**. She adjusts this estimate as she gets more data from **Gen 0**.

Gen 2: **Gen 1** picks a style, produces one of the variants with a probability weighted by how far her style estimates are from the current style, repeats. **Gen 2** learns style estimates for variants as above.


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Estimate
iter
variant
ln
lng

Conclusions

Conclusions

- Within syntax, only one formal account of optionality is available, the same one that accounts for language change: Competing Grammars.
- This results in replacement, specialization, or stable variation (true optionality).
- The latter is (only) the result of mapping categorical variation onto a continuous dimension of specialization.
- An acquisition simulation shows how stable variation can emerge under a minimal Principle of Contrast.
- It is possible and desirable to extend this formal account to other domains of variation, like morphology and phonology.

Conclusions

Further Work

- Figure out what factors influence specialisation vs replacement, as they do not **appear** to be deterministic.
- Figure out how to appropriately parameterize phonological variation.

References I

Bailey, Laura, Joel C. Wallenberg, and Wim van der Wurff. 2012. Embedded yes/no questions: reanalysis and replacement. Paper presented at Presented at the 2012 Annual Meeting of the Linguistics Association of Great Britain (LAGB), University of Salford.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In *Step by step: Essays on minimalist syntax in honor of howard lasnik*, ed. Roger Martin, David Michaels, and Juan Uriagereka, 89–155. Cambridge, Mass.: MIT Press.

Clark, Eve. 1987. The Principle of Contrast: A constraint on language acquisition. In *Mechanisms of language acqusition*, ed. Brian MacWhinney, The 20th Annual Carnegie Symposium on Cognition. Lawrence Erlbaum Associates, Inc.

References II

Clark, Eve. 1990. On the pragmatics of contrast. *Journal of Child Language* 17:417–431.

Fruehwald, Josef, Jonathan Gress-Wright, and Joel C. Wallenberg. 2010. Phonological Rule Change: The Constant Rate Effect. In *Proceedings of 40th Meeting of the Northeast Linguistic Society (NELS) 40*.

Kroch, Anthony, Beatrice Santorini, and Lauren Delfs. 2005. Penn-helsinki Parsed Corpus of Early Modern English. Size 1.8 Million Words.

Kroch, Anthony S. 1989. Reflexes of grammar in patterns of language change. *Language Variation and Change* 1:199–244.

References III

Kroch, Anthony S. 1994. Morphosyntactic variation. In *Papers from the 30th Regional Meeting of the Chicago Linguistics Society: Parasession on Variation and Linguistic Theory*, ed. K. Beals et al et al.

Kroch, Anthony S., Beatrice Santorini, and Ariel Diertani. 2010. Penn Parsed Corpus of Modern British English. Size ∼ 950000 words.

Kroch, Anthony S., and Ann Taylor. 2000. Penn-Helsinki Parsed Corpus of Middle English. CD-ROM. Second Edition. Size: 1.3 million words.

Labov, William. 1989. The child as linguistic historian. *Language Variation and Change* 1:85–97.

References IV

Markman, Ellen M., and Gwyn F. Wachtel. 1988. Children's use of mutual exclusivity to constrain the meanings of words. *Cognitive Psychology* 20:121–157.

Nowak, Martin A. 2006. *Evolutionary dynamics: exploring the equations of life*. Cambridge, MA: Belknap Press of Harvard University Press.

Pintzuk, Susan. 1991. Phrase structures in competition: Variation and change in Old English word order. Doctoral Dissertation, University of Pennsylvania.

Prince, Ellen. 1985. Fancy syntax and shared knowledge. *Journal of Pragmatics* 9:65–81.

Prince, Ellen. 1998. On the limits of syntax, with reference to left-dislocation and topicalization. *Syntax and semantics* 281–302.

References V

Prince, Ellen. 1999. How not to mark topics: 'Topicalization' in English and Yiddish. In *Texas linguistics forum*, chapter 8. University of Texas, Austin: Citeseer.

Santorini, Beatrice. 1992. Variation and Change in Yiddish Subordinate Clause Word Order. *Natural Language & Linguistic Theory* 10:595–640.

Speyer, Augustin. 2010. *Topicalization and stress clash avoidance in the history of english*. Topics in English Linguistics. Berlin/New York: Mouton de Gruyter.

Taylor, Ann, Anthony Warner, Susan Pintzuk, and Frank Beths. 2003. The York-Toronto-Helsinki Parsed Corpus of Old English Prose.

References VI

Wallenberg, Joel C., Anton K. Ingason, Einar F. Sigurðsson, and Eiríkur Rögnvaldsson. 2011. Icelandic Parsed Historical Corpus (IcePaHC). Version 0.9. Size: 1 million words. URL `http://www.linguist.is/icelandic_treebank`.