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Editorial

Formalising syntactic variability: Context and issues

1. Introduction

Throughout most of the history of generative grammar, intra-speaker variation as a theoretical problem has received relatively little attention. Early generative work explained intra-speaker variability in terms of optionality of syntactic rules, and assumed that the mechanisms governing choice between the application and non-application of the relevant rules were distinct from the computational knowledge of language that the research programme aimed to characterise. Chomsky's early comments on the distinction between probability and grammaticality were influential in this regard. In particular, Chomsky's (1957:15) *locus classicus* contrasting *colorless green ideas sleep furiously* and *furiously sleep ideas green colorless* was intended to show that probability of occurrence must be distinct from grammaticality. From the perspective of optional rules and this modular distinction—that is between probabilistic (usage) knowledge of language and computational knowledge of language—intra-speaker syntactic variation promised relatively little insight for formal theory.

Minimalist work since the early 1990s has generally eschewed the possibility of optionality in grammar. This turn has prompted some syntacticians to take a greater interest in variability in order to explain it without reference to ''free variation.'' Kroch and colleagues' grammar competition framework, developed in the late 1980s and early 1990s provided a timely and attractive solution to this problem (Kroch, 1989, 1994, 2001; Kroch and Taylor, 1997, 2000; Pintzuk, 1991). In particular, Kroch (1989, 1994) proposed that intra-speaker variation in syntax reflects bi-dialectalism, where the dialects in competition are distinguished by minimal featural differences. In Kroch's classic example of variable verb raising in the history of English, the learner posits two competing variants: one T with an EPP (''strong'') feature responsible for the verb-raising variant, and another EPP-less (''weak'') T variant corresponding to contemporary English sentences with the verb lower in the structure. On this approach, the learner's response to variable input is to posit competing features responsible for the different surface forms. The learner keeps track of frequencies of use of variants across contexts, and uses this knowledge in production, but this probabilistic competence is extra-computational; the frequencies attaching to different forms play no role in the derivation (Kroch, 1989).

Kroch's competing grammars framework remains a touchstone for work in this area. In more recent literature, however, several promising alternative approaches to intra-speaker variation in syntax have reinvigorated debate on abiding problems including the formal status of probabilistic knowledge in syntax, and the nature of parameters (Adger, 2006; Yang, 2001; Clark, 2004; Asudeh, 2001; Bresnan and Nikitina, 2003; Manning, 2003). These issues are addressed in different ways in the articles in this volume.

2. This volume's contribution and perspectives

The articles gathered here grew out of a conference dedicated to these issues at the University of York in May 2007.[1] The conference brought together current researchers in formal syntax, language variation and acquisition in an effort to stimulate debate on issues including the following:

[1] We are grateful to participants Formal Approaches to Variation in Syntax for excellent papers and discussion. We gratefully acknowledge the financial support of the Department of Language and Linguistic Science of the University of York.

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- Is variability in child language at the root of syntactic change or is variation in the adult grammar a necessary impetus?
- What is the relationship between intra-speaker and inter-speaker variation in syntax?
- What formal and syntactic mechanisms best explain the existence of intra-speaker variation?
- Are frequencies of variants (partially) predictable from the formal properties (e.g. features) involved?
- What if any is the role of parameters in intra-speaker variation?

Each of the papers in this volume takes up a different subset of these issues and addresses them in somewhat different ways. We briefly summarise some of the contributions of these papers below.

Thráinsson's and Tortora and den Dikken's papers are broadly within the Pollock-Kaynean ''microparametric'' research tradition (Black and Motapanyane, 1996; Cinque and Kayne, 2005). Using comparative techniques not altogether dissimilar to those used in sound/paradigm reconstructions in historical linguistics, this line of research aims to infer loci of variation in structure from differences in constraints on surface forms across speakers and/or closely related varieties. Thráinsson's paper defends Bobaljik and Thráinsson's (1998) theory of verb movement linking the availability of verb raising to split agreement and tense (or aspect) morphology (Pollock, 1989). To this end, Thráinsson presents evidence from a broad comparison of word order, morphology and extraction facts across Scandinavian dialects suggesting that the availability of verb movement in these languages has a single abstract locus, namely the presence vs. absence of a split IP.

In a similar vein, Tortora and den Dikken focus on variation in patterns of past tense *be* agreement (*was*/*were* variation) across dialects of English. In particular Tortora and den Dikken propose that cross-dialectal differences in agreement patterns are usefully expressed in terms of differences in subject positions available in each dialect (Henry, 1995; Cardinaletti, 2004; Rizzi, 2006). They propose that Appalachian dialects share with Belfast English the availability of a spec, AgrsP position, where agreement always obtains. Appalachian English, differs from Belfast English however in that it has an additional high (SubjP) non-agreeing position, and lacks a low (spec, TP) non-agreeing position. They argue that this approach accounts for a range of agreement facts as well as differences in subject NPI licensing and pronominal case marking across these varieties.

Adger and Smith's paper develops and extends their previous combinatorial variation model (Adger and Smith, 2005; Adger, 2006, 2007). The model is based on standard minimalist assumptions (Chomsky, 1995) about the architecture of the grammar and the role of lexical features in computation, with two crucial enrichments. The first is Adger's (2006) learning algorithm for the featural content of individual lexical items. In cases of variable input where the learner has evidence that a single morphological feature set may spell out in more than one phonetic guise—e.g. *we were* and *we was*—the algorithm produces a one-to-many mapping of feature bundles to lexical items. The second enrichment is a choice function which randomly selects mappings of features to lexical items in production. These two assumptions have the consequence that differences in frequencies of variants across contexts in usage data are (partially) predictable from the features involved in the relevant paradigm (modulo extralinguistic social constraints on variation): in cases where the algorithm produces a set of mappings where a given phonetic string is mapped to more frequently than a competitor, the two variants will be favoured in production roughly in proportion to the number of times they are mapped to. Adger and Smith's paper in this volume tests the predictions of this approach with data on several features from a corpus of spoken English from the Scottish town of Buckie (Smith, 2000).

Nevins and Parrott address the problem of probabilistic constraints on variation in production data from a somewhat different perspective. They propose to adapt the notion of variable rewrite rule (Labov, 1969; Cedergren and Sankoff, 1974) to impoverishment rules in a Distributed Morphology framework (Halle and Marantz, 1993; Noyer, 1998). In this framework, morphological rules are not necessarily categorical but rather may apply probabilistically. In particular, Nevins and Parrott propose that impoverishment operations, triggered by universally marked features or combinations of features, may be of this sort. Using data from three dialects of English—Monmouthshire (UK), Buckie (Scotland), and Smith Island, MD (US)—Nevins and Parrott illustrate how their model expresses variable agreement patterns in different types of paradigm leveling.

Papers by Yang and Miller and Schmitt focus on the implications of variable input for acquisition theory, both in reference to Yang's variational learning model (Yang, 2001, 2002). Yang's paper extends his earlier work based on mainly morphological evidence to the syntactic domain. He argues that the variation seen in child language production

comes from two different sources and these relate to what Chomsky (1981) identified as the Core and Periphery. One type of variation, relating to the Core, involves the child producing forms for which there is no direct evidence in the input. Yang argues that the most plausible explanation here is that the child is instinctively retrieving grammatical options from the genetic endowment, i.e. UG. The other type of variation relates to the periphery and relies on children's ability to develop appropriate generalizations from the input; he argues that here the child is conservative: cases of overregularization are found but these are rarely cases where the child over-generalizes an irregular pattern. Although probabilistic information is used in Yang's model, it is not the source of linguistic hypotheses as it would be in a statistical learning model. Yang acknowledges the failure of purely parameter setting models of syntactic acquisition to capture the gradualness of syntactic development by incorporating both experience and general, not necessarily linguistic, principles of learning. Yang's paper, however, suggests that the notion of parameter must be retained.

Miller and Schmitt report on a study intended to test one of the predictions of Yang's (2002) model, namely that the setting of a given parameter may be retarded by variation which renders evidence for the setting unreliable. Miller and Schmitt test this with data from the acquisition of plural morphology in Chilean Spanish. In this dialect, variable deletion of syllable final /s/ has the consequence that noun phrases are sometimes marked with a word-final [s] and sometimes not. This variation is also socially stratified: /s/-deletion applies at a higher rate in working class communities in Chile and less frequently in middle class communities. Miller and Schmitt's data show that children from working class communities with higher rates of *–s* deletion in production (including child directed speech) perform lower on comprehension tasks targeting plural *–s*, than do children from middle class communities with lower rates of *–s* deletion in production data. The results provide strong evidence in favour of the claim that variation in input data may delay parameter setting.

3. Outlook

Several of the papers collected here take novel approaches to the question of how/whether probabilistic constraints in production data should be understood in formal terms. Since the late 1980s, a popular understanding of this issue has been in terms of Kroch's competing grammars framework, discussed above. Again, in Kroch's framework, stochastic knowledge lies in the domain of performance, outside the computational system. Some rather different approaches to this issue have been proposed in recent literature. In their contribution to this volume and elsewhere, Adger and Smith propose that the narrow syntax may strongly shape frequencies of variants in production data. Their approach is to be contrasted with the more radical departure from the assumption that syntactic knowledge is non-probabilistic by Bresnan and colleagues in a stochastic optimality theory framework, where probabilities are built directly into the formalism (Bresnan and Nikitina, 2003; Boersma and Hayes, 2001; Clark, 2004, cf. Manning, 2003). We see the debate between these opposing views as potentially instructive.

Not represented in the papers gathered here is a new line of research focusing on the formal status of gradient intuitions of well-formedness (Keller, 2000; Hayes, 2000; Boersma and Hayes, 2001; Sorace and Keller, 2005; Featherston, 2005). Generative linguists routinely refer to gradience in well-formedness in formal description, and have done so since the beginning of the research programme (cf. Chomsky, 1964). Chomsky (1975:131–132) in fact proposes that the ability to explain gradience in judgment data must be a criterion of an adequate theory of competence. Generative linguistics, however, has been slow to develop theories capable of explaining gradient well-formedness within an approach to the computational component as binary, rather than probabilistic and gradient. As Embick (2008) notes, the fact that judgment data (in controlled and non-controlled conditions) may be gradient does not entail that the computational component of the grammar itself must be gradient. It cannot be excluded that knowledge of gradience (and probabilistic knowledge more generally) is rather the product of interaction between the computational component and some interfacing external system (e.g. pragmatic component). Explicating such a theory of gradience that maintains a distinction between computational knowledge and (probabilistic) usage knowledge has nevertheless proved a persistent problem for the generative research programme.

Recent literature has seen more studies using controlled experimental techniques that take greater account of gradient data (Cowart, 1997; Alexopoulou and Keller, 2007; Sprouse, 2009). We hope that this experimental turn will stimulate theoretical advances on the problem of gradience.

Order:
1. Thráinsson
2. Tortora and den Dikken
3. Adger and Smith
4. Nevins and Parrott
5. Yang
6. Miller and Schmitt

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