Parameters: The View from Child Language

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1. Questions

In this paper I will be concerned with two principal issues: (1) Is syntactic variation a "deep" domain of inquiry, supporting rich, explanatory generalizations? (2) If so, how can we discover these generalizations? I will present three case studies to illustrate how acquisitional evidence can be brought to bear on parametric questions. My conclusion will be that syntactic variation is indeed a deep domain of inquiry, and that child language acquisition is a rich source of evidence concerning the parameters of variation.

2. Perspectives on Syntactic Variation

In *Lectures on Government and Binding*, Noam Chomsky (1981:6) characterized syntactic variation in terms of *parameters*: "In a tightly integrated theory with fairly rich internal structure, change in a single parameter may have complex effects, with proliferating consequences in various parts of the grammar." Each parameter provided a small set of options associated with a particular syntactic principle. In *The Minimalist Program*, however, Chomsky (1995:7) presents a much more restrictive view: "If these ideas prove to be on the right track, there is a single computational system C_{HL} for human language and only limited lexical variety. Variation of language is essentially morphological in character, including the critical question of which parts of a computation are overtly realized [...]."

Thus, where the early Principles-and-Parameters Framework treated syntactic variation as resulting from different settings of syntactic parameters, more recently the effort has been to factor syntactic variation out of the syntactic component proper, and reduce it to variation in other components of the language faculty (notably morphology and the lexicon). Nevertheless, the original Principles-and-Parameters spirit is retained: Points of variation in syntax are highly abstract, and can have simultaneous consequences for many different aspects of the surface grammar. Thus, despite numerous changes in technical details over the past twenty years, Chomskyan syntactic theory still leads us to expect rich, explanatory generalizations in the domain of syntactic variation.

3. Considerations of Method

A sensible next question is why so few generalizations about syntactic variation have been empirically successful. One possibility is that Chomskyan syntactic theory is simply mistaken, and that variation must in fact be expressed directly in terms of surface constructions, rather than abstract grammatical properties. Another possibility, however, is that Chomskyan syntactic theory is on the right track, and that the difficulty lies in the method of investigating syntactic variation.

The latter possibility merits consideration. For example, linguists in the 1980's were often looking for lists of surface properties that clustered together across languages. An immediate problem, however, was that the points of syntactic variation they were trying to identify were considerably more abstract than the surface characteristics one can determine through casual inspection of a language: Simple, superficial diagnostics can often be satisfied by a variety of constructions, each with a distinct grammatical basis.

Hence, a "comparative" approach to syntactic variation calls for in-depth analysis of each language in the sample. Moreover, as discussed by Baker (1996), the sample must include truly diverse, typologically distinct languages (rather than simply a collection of Romance dialects, for example), if one is to detect the operation of "macro-parameters" – major points of syntactic variation. Baker proposes that we have so far identified very few candidates for macro-parameters precisely because few researchers have attempted the in-depth comparison of typologically diverse languages. Hence, methodological difficulties are plausibly responsible for the limited success, to date, of Chomskyan research into syntactic variation.

4. A New Source of Evidence: Child Language Acquisition

A theory of syntactic variation is simultaneously a theory of the child's "hypothesis space" during language acquisition. The child's task is to identify the correct grammar for the community's language from among the possibilities permitted by Universal Grammar. In principle, then, we can gain insight into the nature of permitted variation by studying how the child's grammar changes during the course of acquisition.

If we think of each point of syntactic variation as a "parameter" (and set aside the issue of whether the parameter is fundamentally syntactic in nature), then we can derive acquisitional predictions as indicated in (1) and (2):

(1) If two surface properties of a given language are proposed to follow from a single, marked parameter setting, then any child learning the language is predicted to acquire the two properties at the same time.

(2) If the grammatical knowledge (including parameter settings and lexical information) required for construction A, in a given language, is a proper subset of the knowledge required for construction B, then the age of

acquisition for A should always be less than or equal to the age of acquisition for B. (No child should acquire B significantly earlier than A.) The term 'marked' in (1) is intended to restrict our attention to settings that are not part of the child's initial assumptions; rather, the settings relevant for (1) are those adopted later in the course of acquisition, on the basis of linguistic input.

Deriving and testing acquisitional predictions of the types in (1) and (2) has several major advantages over the comparative approach. First, we can focus on a single, well-studied language. In-depth analysis of diverse languages is not required. Furthermore, in testing the acquisitional predictions, each child provides evidence comparable to a new *language* in the comparative approach. Just as each new language presents an opportunity for two (putatively associated) grammatical characteristics to diverge, each new child presents an opportunity for the two grammatical characteristics to be acquired at different times.

A possible *disadvantage* of the acquisitional approach is that our information about a particular child's grammar at a particular point in development is normally quite limited. Yet, this disadvantage is not as severe as it might seem, because children appear to be engaged in what I will term "conservative acquisition." Two possible senses of conservative acquisition ("moderately" and "highly" conservative) are indicated in (3) and (4).

(3) Moderately conservative: The child does not begin to make regular use of a new construction until her grammar provides an analysis for the construction.

(4) Highly conservative: The child does not change the grammar arbitrarily, but rather waits for clear evidence that the change is correct for the target language.

We will see evidence that children are conservative learners in both these senses. One source of evidence is the typical pattern of acquisition for high-frequency constructions such as English verb-particle combinations: Initially the construction is absent from the child's speech, but fairly abruptly the construction comes into frequent, and predominantly correct, use. The scarcity of errors tells us that the child's use of the construction has a grammatical basis (indeed, probably the *correct* grammatical basis), because extragrammatical strategies that merely approximate the adult grammar are inevitably error-prone.

Another piece of evidence supporting (3) and (4) comes from the absence of nominal compounding in children's French. Snyder & Chen (1997) have conducted a single-child case study for French (parallel to an English study that will be outlined in Section 5, below). Despite the utility of compounding for a child with a limited repertoire of adjectives, and despite the ease of stringing together two nouns, novel nominal compounds are ungrammatical in adult French -- and correspondingly absent from child French.

Support for an especially strong form of conservatism (even stronger than what is required by 3 and 4) comes from the child's acquisition of preposition-stranding in English *wh*-movement (the topic of Section 7, below): While pied-piping of the preposition is cross-linguistically much more common than preposition-stranding, and would make a natural "unmarked option," English-learning children do not pass through any pied-piping stage along the way to acquiring preposition-stranding. Pied-piping is not the correct option for adult English, and children acquiring English actually refrain from *wh*-movement of prepositional objects until they know how it is accomplished in the adult language.

Crucially, the available evidence indicates that children make steady progress towards the adult grammar, with astonishingly few errors. If a grammatical construction is present in the child's speech, the construction occurs with a variety of different lexical items, and the child's use of the construction appears to be adult-like, then we may reasonably conclude that the construction indeed has the same grammatical basis (in terms of parameter settings and lexical information) as it has for the adult speaker.

If this view is correct, even fairly superficial diagnostics will be adequate to determine when the child acquires a given point of grammatical knowledge. In the case studies below, the criterion for acquisition of a given construction (for purposes of predictions based on (1) and (2)) will be taken as "first clear use, followed soon after by regular use" (cf. Snyder & Stromswold 1997). To the extent that the case studies provide coherent patterns of results, and the results converge with the evidence available from cross-linguistic comparisons, the conclusion will be that child language acquisition is indeed a valuable source of evidence concerning syntactic variation.

5. Case-study: The Compounding Parameter (Snyder 1995, 2001)

Our first case-study concerns a parameter that I have proposed in previous work: The Compounding Parameter (or 'TCP', in honor of the Tokyo Conference on Psycholinguistics). This parameter is stated in (5):

(5) **TCP:** The language {allows, disallows} formation of endocentric compounds during the syntactic derivation.

In [+TCP] languages (6a), but not [-TCP] languages (6b), novel endocentric compounds can be created at will.

(6) a. English: *banana box* 'box in which bananas are stored'

  b. Spanish: **banana caja*, **caja banana*

This is because compounding is a freely available syntactic operation in the [+TCP] languages. In the [-TCP] languages, however, novel compounds result only from conscious coinage of a new lexical item.

  In my earlier work I have proposed that the TCP has further syntactic consequences: Certain complex predicates, including transitive resultatives (7) and separable-particle constructions (8), are possible only in [+TCP] languages (Snyder 1995).

(7) a. English: John <u>beat</u> the iron <u>flat</u>.

  b. Spanish: Juan <u>golpeó</u> el hierro (*<u>plano</u>).

(8) a. English: Mary <u>lifted</u> the box <u>up</u>.

  b. Spanish: María <u>levantó</u> la caja (*<u>arriba</u>).

The results of a comparative survey provide considerable support for these generalizations, as indicated in (9).

(9) *Cross-linguistic survey:*

Language Group	Novel N-N compounds?	Transitive resultatives?	Separable particles?
Austroasiatic: Khmer	Yes	Yes	Yes
Finno-Ugric: Estonian	Yes	Yes	Yes
Germanic: Dutch	Yes	Yes	Yes
Sino-Tibetan: Mandarin	Yes	Yes	Yes

Tai: Thai	Yes	Yes	Yes

Japanese-Korean: Japanese	Yes	Yes	No
American Sign Language	Yes	Yes	No

Basque	Yes	No	No

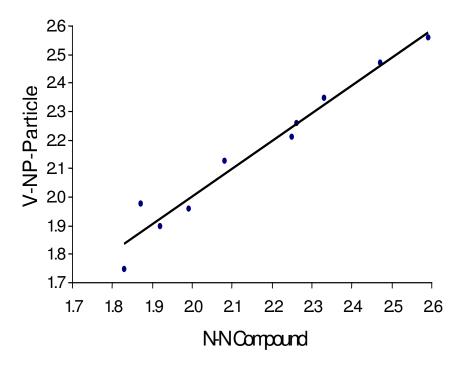|			
Afroasiatic: Egyptian Arabic	No	No	No
Austonesian: Javanese	No	No	No
Romance: Spanish	No	No	No
Slavic: Serbo-Croatian	No	No	No

Languages in the top group (Khmer, Estonian, Dutch, Mandarin, Thai) allow novel nominal compounds (as in 6a) as well as both transitive resultatives (as in 7a) and separable-particle constructions (as in 8a). Languages in the next group (Japanese, ASL) allow novel compounds and transitive resultatives (at least with certain verbs), but disallow the separable-particle constructions. The third language type, represented by Basque, allows novel compounds, but neither transitive resultatives nor separable-particle constructions are permitted. Finally, languages in the last group (Arabic, Javanese, Spanish, Serbo-Croatian) lack compounding and also disallow the resultative and particle constructions. Hence, the [+TCP] setting is plausibly a necessary, though not sufficient, condition for both transitive resultatives and separable particles.

A critic of the survey above might complain that the sample size (representing only ten distinct language families) is relatively small, by the standards of language typology. Moreover, the diagnostics employed are quite superficial, and may well break down as we try to enlarge the language sample. To maintain the generalizations, we will need to become much more precise about what counts as a "separable-particle construction" or a "transitive resultative construction," and why exactly these constructions are supposed to be associated with novel compounding. At some point we will probably need to abandon surface diagnostics altogether, and turn to in-depth investigation of each individual language.

To judge whether the additional work is justified, we can perform an acquisitional test. Our approach will be to study the longitudinal corpora of spontaneous-speech samples from ten children acquiring English. The corpora are drawn from the CHILDES database (MacWhinney & Snow 1990), and our focus is on the Verb-NP-Particle construction. This construction is high in frequency of use, for both older children and adults, and involves a clear separation of the prepositional particle from the verb. As indicated above in Section 4, we will take the age of acquisition for a construction to be "the age of first clear use, followed soon after by regular use." Our prediction (based on 2) is that no child should acquire the V-NP-P construction significantly earlier than novel compounding. As seen in (9), novel compounding is a necessary, but not sufficient, condition for the separable-particle construction. Rather more ambitiously, if it turns out that the availability of novel compounding ([+TCP]) is the *last*-acquired prerequisite for the V-NP-P construction, we predict (as in 1) that each child will acquire novel compounding and the V-NP-P construction at the same point in time.

As illustrated in (10), the latter, stronger prediction is borne out.

(10) *Acquisitional findings:*

The table in (10) compares the age (in years) of the first clear use of a novel (non-lexical) N-N compound, to the same child's age of first clear use of a V-NP-P construction. In each case the example taken as the first clear use was followed soon after by additional uses. Imitations, repetitions, and formulaic expressions were consistently excluded. Further methodological details are reported in (Snyder 2001).

Crucially, the age of acquisition of the V-NP-P construction is almost identical, for every child, to the age of acquisition of novel N-N compounding. This provides strong acquisitional support for the proposed parametric relationship, and also provides indirect support for the hypotheses in (3) and (4): The children in the study went abruptly from never using the constructions of interest, to using the constructions routinely. Aside from errors of word-omission, the children's uses of the constructions were overwhelmingly grammatical, from an adult perspective.

6. Case-study: Compounds and Resultatives in Japanese

In the previous case-study we focused on acquisition of the V-NP-P construction, rather than the transitive-resultative construction, because the latter construction is used infrequently in spoken English, and because the possibility of novel compounding in English is acquired very early (around 2;3, on average). The earliness of compounding means that during the relevant period, spontaneous speech is the best available source of data about the child's grammar; yet, the low frequency of the resultative means that spontaneous speech is an unreliable indicator of when the resultative becomes available to the child.

Sugisaki and Isobe observe that in Japanese, novel compounding is acquired considerably later than in English. Accordingly, one can reasonably test for a relationship between resultatives and compounding in older children, through laboratory experiments. Sugisaki & Isobe (2000) performed a cross-sectional study on three- and four-year-old Japanese children, to test the prediction that resultatives would be available to a given child only if the child's grammar allowed novel, endocentric compounds.

Subjects were 20 children, aged 3;4 to 4;11 (mean age 4;2). Each child received a test of novel compounds (as in 11), in the form of elicited production; and a test of transitive resultatives (as in 12b), in the form of a truth-value judgement task (Crain & Thornton 1998). The predicted contingency, with children passing the resultative test only if they passed the compounding test, was evaluated by Fisher Exact Test.

(11) *kame pan* 'turtle bread' (i.e., bread in the shape of a turtle)

(12) a. Pikachu-wa aka-i isu-o nutte-imasu.

  'Pikachu is painting the red chair.'

  b. Pikachu-wa aka-ku isu-o nutteiru.

'Pikachu is painting the chair red.'

As illustrated in (13), Sugisaki & Isobe obtained a significant contingency between passing the test on transitive resultatives, and passing the test on novel compounding (p=.0194 by two-tailed Fisher Exact Test). "Passing" here was taken as producing at least three out of four elicited compounds; and answering correctly on all three resultative/attributive examples with *nuru* 'paint', or with *kiru* 'cut', or both.

(13) Contingency table:

		Resultatives	
		Pass	Fail
	Pass	10	2
Compounding			
	Fail	2	6

One caveat is that 2 of the 20 children passed the resultative task, yet failed the compounding task. In principle this could indicate a problem with the parametric hypothesis, or it could simply reflect the difficulty of the experimental task. As discussed in (Stromswold 1996) and (Snyder & Stromswold 1997), a major virtue of naturalistic observation is that it minimizes task demands on the child. The greater task demands of elicitation and comprehension studies could cause them to underrepresent the child's grammatical competence. In sum, the noise in Sugisaki & Isobe's data remains to be explained, but the statistical significance of the contingency supports the interpretation that Japanese resultatives are in fact dependent on the grammatical availability of compounding.

7. Case-study: English Preposition Stranding

For our final case-study, we turn to two of the more exotic properties of English syntax: preposition stranding, as in (14), and prepositional complementizers, as in (15).

(14) What is he talking about *t*?

(15) John wants (for) Mary to leave.

Kayne (1984) proposed that the parameter-settings required for English preposition-stranding are a <u>proper subset</u> of the parameter-settings required for English prepositional complementizers. In support of this view, Kayne reported the results of a very small-scale comparative survey, summarized in (16).

(16) *Kayne's cross-linguistic survey:*

Language	P-stranding?	P-complementizers?
French	No	No
Icelandic	Yes	No
English	Yes	Yes

One reason for the small sample size in Kayne's survey is that P-stranding is extremely rare; aside from English, most languages known to allow P-stranding belong to the North Germanic group. Languages with prepositional complementizers are even scarcer. Hence, this is a domain in which acquisitional evidence can be especially valuable. Sugisaki, Snyder, & Yaffee

(2000) and Sugisaki & Snyder (2001) recently conducted an acquisitional investigation, which I will outline here.

Following the reasoning in (2), the prediction from Kayne's analysis is that any child who uses the prepositional-complementizer construction should also allow P-stranding. To test this prediction, we again selected a sample of ten children for whom longitudinal corpora were available in CHILDES, and asked whether any child in the sample acquired prepositional-complementizer constructions significantly earlier than P-stranding.

Our approach was as follows: (i) Locate the child's first clear use of either P-stranding or a P-complementizer construction. (ii) Identify each use of this first construction, up to the point when he or she begins using both constructions. (iii) Determine the relative frequency of the two constructions in the next five transcripts, or until the end of the child's corpus, whichever comes first. (iv) Use the Binomial Test to calculate the probability of the child's producing at least the observed number of examples of the first construction, before starting to use the second construction, simply by chance. The null hypothesis for the test is that the second construction was grammatically available at least as early as the first construction, and had the same relative frequency observed in later transcripts.

The results were as follows: Five children acquired P-stranding significantly earlier than the P-complementizer construction. Four children acquired the two constructions at approximately the same age (no significant difference by Binomial Test). One child acquired neither construction by the end of his corpus. Crucially, <u>none</u> of the ten children acquired the P-complementizer construction significantly earlier than P-stranding. Thus, the acquisitional evidence greatly strengthens Kayne's generalization about syntactic variation in the domain of P-stranding and prepositional complementizers.

8. Concluding Remarks

Is syntactic variation a deep domain of inquiry? The evidence from the case studies presented here indicates that it is. The comparative evidence and acquisitional evidence converge on a direct implicational relationship from complex predicates such as resultatives and separable-particle constructions, on the one hand, to fully productive root compounding, on the other. The comparative and acquisitional evidence again converge on a direct implicational relationship from the existence of prepositional complementizers in a language, to the possibility of P-stranding. The exact source of these relationships remains to be discussed, but the relationships cannot even be expressed unless a point of syntactic variation is permitted to be highly abstract, with consequences for superficially unrelated constructions.

A further question is whether the types of parametric effects observed here are compatible with the current Minimalist Program in syntactic theory. I believe that they are. For example, the effects involving root compounding are consistent with the Morphological Parameterization Hypothesis, below; and the MPH appears consistent with Minimalist conceptions of syntax.

(17) **The Morphological Parameterization Hypothesis (MPH):**

Points of syntactic variation that are "global" (i.e. independent of any single lexical item or functional head) are fundamentally parameters of *morphological* variation.

The intuition developed in (Snyder 2001) is that complex predicates such as resultatives and verb-particle combinations require the creation of a *complex word* at some point during the syntactic derivation, and that this in turn is possible only in [+TCP] languages. Similarly, preposition-stranding has often

been treated as requiring the reanalysis of a V and a P (and possibly additional material) to create a complex verb. Once again, this possibility could be constrained by parameters affecting the creation of complex words during the syntactic derivation. For now, I will leave the evaluation of the MPH - by theoretical, comparative, and acquisitional methods - as an idea for future research.

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