

Constraints on the Computational Component

vs.

Grammar in the Lexicon:

A Discussion of Bates & Goodman

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In The Emergence of Language, it is argued that much of what generative linguistics has characterized as ‘rules’ in fact can be derived from domain-general cognitive mechanisms. One example of this perspective is Bates & Goodman’s contribution ‘On the Emergence of Grammar in the Lexicon’, which Sabbagh & Gelman say offers ‘...a series of compelling arguments detailing how development and early acquisition shape the subsequent acquisition of new information.’ The thrust of the argument presented is that there is no need to posit the existence of an independent grammar domain, because grammar can be reduced to the lexicon, which in Bates & Goodman’s account, can be acquired using general purpose mechanisms. One of several major arguments in favor of this position, presented by the authors, is that grammar and vocabulary grow at the same rates in child speech. Thus, the authors argue that the development of the lexicon and grammar correlate because there is no grammar outside of the lexicon.

Bates & Goodman, indeed, go on to show a developmental correlation between vocabulary size and particular aspects of grammar. However, defining ‘grammar’ so that it can be correlated with growth in vocabulary size is extremely problematic. The two principle metrics for grammatical development used are MLU (mean length of utterance) and inflectional morphology. Using these metrics to measure the growth of grammar is a problem, which the authors recognize, because they include many of the elements used to measure grammar (e.g modal and auxiliary verbs, definite articles, etc.) in their ‘lexicon’ category, too. Thus, the initial curves the authors show could simply show a correlation between the growth of grammatical elements in the ‘lexicon’ category with the growth of grammatical elements in the ‘grammar’ category (i.e. correlating something with itself). To solve this problem, the authors then show that even when closed-class elements are removed from what is counted as the lexicon, there is still a correlation between the growth of grammar and the lexicon. All of this is to refute the contention by generative linguists that word learning and grammatical development proceed in a different way and at a different

pace because grammar and the lexicon are separate. This view of grammar is oversimplified, however.

Regarding the role of grammatical elements in the lexicon, the Minimalist Program (Chomsky, 1995), for example, proposes that lexical, grammatical and abstract features all form part of the lexicon. These elements are then combined by a computational component that builds successively larger structures out of these basic elements. This conception of grammar coincides with Bates & Goodman's claims in the sense that there are grammatical elements, even abstract grammatical elements, in the lexicon. Thus, the fact that certain grammatical elements are acquired at the same rate as non-grammatical aspects of the lexicon is consistent with generative grammatical claims.

There is evidence, however, that in addition to lexical grammatical elements, a computational component must exist independently. Such a separation between grammar and lexicon is motivated, in the case of child language acquisition, by the fact that while elements of the lexicon are acquired gradually, constraints on the computational component are obeyed from the very beginning. An example of such an apparently universal constraint on syntax is called Relativized Minimality (Rizzi, 1990). What it means is that in any structure, elements of the same 'flavor' cannot move over one another. In (1), for instance, we have a structure with two auxiliary verbs. Rizzi pointed out that in this structure, a question can be formed from a. by moving the upper most auxiliary, as in b., but not by moving the lower most auxiliary, as in c. He suggested that this followed from a general principle that restricts the way syntactic elements can move. This principle turns out to hold of many different kinds of syntactic elements in many different languages (cf. Chomsky, 1981; Lema & Rivero, 1990; Roberts, 1992 and others). Tentatively, then, we have a plausible principle of Universal Grammar.

(1) Relativized Minimality (examples from Rizzi, 1990, p. 11)

- a. They could have left.
- b. Could they t have left?
- c. *Have they could t left?

In Stromswold (1990), a detailed study is made of the all of the possible combinations and permutations of English verbal auxiliaries and it is shown that out of all of the English-speaking children on the CHILDES Data Base (MacWhinney & Snow, 1985), virtually no errors like (1) c. occur. Though Stromswold does not pronounce herself one way or another on Relativized Minimality, her findings are strongly supportive of the conclusion that this principle holds in early child English and prevents children from making errors like (1) c., which would constitute violations of Relativized Minimality. What this means for Bates & Goodman's account, is that core principles of grammar do not emerge gradually over time, tracking lexical development (of open-class or closed class morphemes), but rather are in effect from the very beginning.

Analogous to the strict ordering constraints on auxiliaries in English, there are also strict ordering constraints in Spanish and Catalan on the order of verbs, clitics and negation which dictate one pattern for imperatives and another pattern for non-imperatives. These patterns are argued by Rivero & Terzi (1995) to follow from this same principle of Relativized Minimality. It turns out that child Spanish and Catalan speakers respect Relativized Minimality's prohibition on certain syntactic patterns in negative commands, even before children have the grammatical tools necessary to produce adult-like negative commands. Thus, a core principle of grammar develops before one of the constructions it regulates is produced in child language. I take this disjunction to be relevant to Bates & Goodman's claim and also to be very much unrefuted by their evidence.

Thus, there is an early stage of child Catalan and Spanish in which children have not yet learned subjunctive morphology, which is necessary for producing negative commands, such as those given in (2) and (3).¹

(2) Adult Negative Command (unattested in the early stage of child Catalan)

No miris.

not look (2nd, sg., subj., imperative)

'Don't look.'

- (3) Adult Negative Command (unattested in the early stage of child Spanish)

No mires.

not look (2nd, sg., subj., imperative)

‘Don't look.’

What children seem to do in the absence of the adult-like means to express negative commands is to simply say ‘not’ (*no*) and are prevented from giving further grammatical form to their intention. Notice that this leaves a gap in the child’s communicative repertoire in that they cannot specify the proposition they wish to negate.

Significantly, at this same time children are able to use negation with declarative sentences, as in (4) & (5), and are able to use affirmative imperatives, as in (6) & (7). Thus, there is no general problem with using clausal negation or with producing utterances with an imperative illocutionary force.

SPANISH

- (4) Graciela (1;11.5)

No tiene miedo.

not has (3rd, sg., pres.) fear.

‘He isn’t afraid.’

CATALAN

- (5) Pep (1;4.24)

No vol.

not want. (3rd, sg., pres., declarative)

‘He doesn't want to.’

SPANISH

- (6) Graciela (1;6.15)
¡Oye!
listen (2nd, sg., fam., imp.)
'Listen!'

CATALAN

- (7) Pep (1;4.24)
Mira.
look (2nd, sg., familiar, imp.)
'Look.'

One could say, then, that there exists, at this point in the grammatical development of child speakers of Spanish and Catalan, all of the elements necessary to produce some kind of negated imperative, though not the adult form. So, how do children respond to this dilemma? Notice in the first three rows of Table 1, that in adult Catalan and Spanish the verb always follows negation and the clitic in interrogatives, declaratives and negative commands. The affirmative imperative is the only construction in which the verb precedes the clitic (negation, as we have pointed out descriptively, does not occur in imperatives). One possible way for children to respond to this dilemma, then, would be to place negative command verbs in the same place that affirmative imperative verbs belong, perhaps following some kind of 'semantic analogy' based on the fact that both negative commands and affirmative imperatives include a kind of 'command' illocutionary force. Were children to make this functionally motivated learning step, they would produce the ungrammatical syntactic pattern schematized in the last row of Table 1, illustrated in (8) and (9).

Sentence Type	Syntactic Pattern
Interrogative	[C¿Cuánto [Neg ^{no} [Clitic ^{le} [IP has entregado?]]]]
Declarative	[C [Neg ^{No} [Clitic ^{lo} [IP has entendido.]]]]
Negative Command	[C [Neg ^{No} [Clitic ^{lo} [IP comes]]]]
Imperative	[C Tóca [Neg [Clitic ^{lo} [IP]]]]
Unattested Possible Imperative	[C *Tóca [Neg ^{no} [Clitic ^{lo} [IP]]]]

Table 1 - Orders of Verbs, Negation and Clitics

SPANISH

(8) @¡Mira no lo!

look (2nd, sg., fam., imp.) not it (cl., sg., masc.)

‘Don’t look at it!’

CATALAN

(9) @Escolta no lo!

listen (2nd, sg., fam., imp.) not it (cl., sg., masc.)

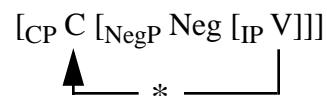
‘Don’t listen to it!’

So, why should children not produce the pattern instantiated in (8) and (9)? Producing such a form would make it possible for children to produce a kind of negative command, which is otherwise unavailable to them at this stage, increasing children’s ability to meet their ‘communicative needs’. Furthermore, placing the verb before the clitic in this way would follow a kind of ‘syntactic analogy’ by reproducing the syntactic pattern instantiated by affirmative imperatives with clitics. This is what one might expect if one believed that general learning mechanisms like analogy have something to do with grammar emerging. In fact, in such a framework one might expect that children should produce exactly the forms in (8) and (9).

Well, looking instead to relatively well understood properties of Universal Grammar, such as Relativized Minimality, for an explanation for why children fail to produce forms like (8) and (9), we conclude that children fail to produce these forms for the same reasons that adults fail to produce them, namely: to do so would violate Relativized Minimality. It is important for researchers studying language learning to remember that what children do not produce is as important as what they do produce. We know that children do not fail to produce utterances like (8) and (9) simply because they have not heard them before because children produce many utterances that they have never heard before. If, however, contra the emergentist view, we attribute a priori knowledge of the principle of Relativized Minimality to children, then we can explain how sharply reduced the problem space is for the language learning task, why the child language errors we find constitute such a narrow class and why some errors never occur at all.

Returning to Relativized Minimality, how does this principle block the ungrammatical cases in (8) and (9)? In summary (for more details see Grinstead, 1998), imperative verbs are argued to raise to a high position in the clause, based on evidence from clitic position (Rivero & Terzi, 1995). The imperative verb, because it is a clausal head, is argued to move one step at a time through the clause, up to this high position. It is blocked from moving in this way when a negative element intervenes, however, because negation is a logical operator in the same way that an imperative verb is a logical operator, i.e. they both carry a kind of illocutionary force. Thus, the imperative cannot move over negation, as in (10), because they are of the same ‘flavor’, informally speaking, which is ruled out by Relativized Minimality.

(10) Imperative Movement to C Blocked By Intervening Negation



Thus, Relativized Minimality appears to constrain the formation of negative commands, even before the lexicon has developed to include the subjunctive morphology necessary to produce the adult negative command construction. This disjunction is a counter-example to Bates & Goodman’s central contention that grammar and the lexicon develop simultaneously. To reiterate, there

is no gradual, developmental curve in the effectiveness of Relativized Minimality, given the complete absence of examples like (8) or (9). This constraint on verb movement is simply obeyed in every instance. This is because like other principles of Universal Grammar, it could not plausibly have arisen from the lexicon. The implausibility of children ‘learning’ such abstract principles is the foundation of the poverty of the stimulus argument, upon which generative linguistic theory is based.

To close, Bates & Goodman show a simultaneity of development of lexical and grammatical elements, which, given the status of the lexicon in current work in generative syntax, is completely consistent with the theory. Furthermore, when fundamental principles of the computational component of grammar, such as Relativized Minimality, are examined we find that they are in effect from the very earliest point at which we can detect them. More specifically, before the child Spanish and Catalan lexicons develop to the place where subjunctive morphology is actively used, Relativized Minimality restricts the possible alternative constructions children can use in its place. Thus the computational component of grammar is active and adult-like before grammatical elements in the lexicon develop. This ‘guiding’ characteristic of a constraint on the computational component distinguishes it dramatically from the more lexically bound aspects of grammar the authors consider. Evidence of this kind suggests that the ‘nature of nature’ is much as it has been argued to be by nativists for quite some time and thus calls into question any definition of ‘emergence’ which ignores the computational component of grammar.

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Endnotes

1. To be clear, this early stage is defined by the absence of subjunctive morphology. The stages for the seven children considered are as follows: **Spanish** [Eduardo (1;5 - 2;2); Graciela (1;6 - 2;3); Carlos (1;4 - 2;4)], from Grinstead, 1998; **Catalan** [Gisela (1;7 - 2;8); Guillem (1;0 - 2;2); Laura (1;7 - 2;8); Pep (1;0 - 1;8)], from Serrà and Solé, 1986.