Introduction

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INTRODUCTION

This collection of papers represents a variety of views about the problem of language acquisition. However on the whole it has a singular emphasis that is quite different from most books on the topic. The emphasis falls on the logic of markedness as a guide to how a child determines the language of his community. This introduction is meant to provide a brief commentary on that perspective.*

Chomsky has repeatedly defined the problem of explaining how a child can acquire language as the central problem of linguistic theory. There are a number of approaches to the problem which we can present in outline form.

1. Restrictions on the power of generative grammar
2. Universals of Language Typology
3. Determination of Core Grammar
4. Sequences in Real-Time Acquisition
5. Computational and Feasibility Problems

These approaches are interconnected and can be pursued jointly, but they have traditionally involved distinct methodologies. The first approach (1) invites a mathematical treatment of language to decrease the range of possible grammars (see Wexler and Culicover (1980)). The second (2) invites the examination of many languages for the induction of substantive universals. The third (3) invites in depth study of a few languages to produce a deductive account of how the assumption of universal grammar (UG) together with representative data allow the selection of a particular grammar. The logic of markedness can be developed within this system. The fourth (4) uses naturalistic data and experimentation to determine stages of acquisition that may bear either a simple or a complex relation to degrees of markedness. The fifth (5) uses computer simulation as a means to determine how computational restrictions may limit the range of grammars that are feasible for acquisition.

All of these approaches are in current use and several are represented in this volume. Of these approaches the third has a strong implicit presence in linguistic theory but has not been addressed explicitly very often. This volume and the conference that preceded

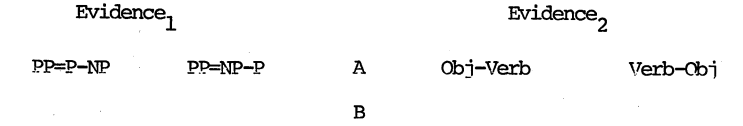
it were designed to elicit more extensive discussion of that topic. The reader can judge for himself if we have been successful.

How does the logic of markedness work? This quotation from Chomsky is a good starting point (Chomsky 1981):

> In a highly idealized picture of language acquisition, UG is taken to be a characterization of the child's pre-linguistic initial state. Experience—in part, a construct based on internal states given or already attained—serves to fix the parameters of UG, providing a core grammar, guided perhaps by a structure of preferences and implicational relations among the parameters of the core theory. If so, then considerations of markedness enter into the theory of core grammar....the child approaches the task equipped with UG and an associated theory of markedness that serves two functions; it imposes a preference structure on the parameters of UG, and it permits the extension of core grammar to a marked periphery. ... In the absence of evidence to the contrary, unmarked options are selected....Evidence to the contrary or evidence to fix paramaters may in principle be of three types: 1) positive evidence (SVO order, fixing a grammar of core grammar; irregular verbs, adding a marked periphery); 2) direct negative evidence (corrections by the speech community); 3) indirect negative evidence... if certain structures or rules fail to be exemplified in relatively simple expressions, where they would expect to be found, then a (possible marked) option is selected excluding them in the grammar...

A parametric theory of markedness may remove the need for an evaluation metric which played a central role in earlier versions of the acquisition device. If the acquisition device had the power to generate any combination of elementary transformations, then the device could project a variety of transformational grammars. It would need an evaluation metric to select among them. A model of core grammar, which is substantially enriched, allows a quite different image. A child can have decision maps where specific kinds of evidence must be found which trigger a set of decisions that define a particular grammar.

These decision maps are constructed of binary decisions that are sensitive to primary data (or minimally analyzed data). For instance we might have a decision tree that derived the structure of PP's and VP's via an implicational universal: (modified from Williams 1981)



This illustration is itself obviously a simplification and many questions

remain about the internal structure of a theory of markedness. For instance, 1) what is the structure of a dscision tree (does it have principled limitations?) 2) what are the unmarked cases and the presumed starting state of the organism? Is the organism in limbo between SVO and SOV or does it assume, say, SVO, which is then reversed when evidence is encountered? 3) how much do decision trees cross levels? In principle phonological information could trigger syntactic decisions (see Roeper 1981).

In contrast to these internal questions about the logic of markedness we can also take an external perspective; how does markedness relate to a realistic model of acquisition? The remainder of this introduction is devoted to these questions.

We shall focus on three issues, which are, in summary form: 1) the logic of markedness presupposes that universal grammar and input sentences are sufficient to uniquely determine particular grammars. That is, it assumes the validity of the instantaneous model. However, the model is false. We shall show that the instantaneous model is not just an idealization but also an hypothesis. 2) the markedness system delineates decision maps that may allow more than one path through the evidence to a particular grammar. Feasibility constraints may limit realistic acquisition to a subset of possible paths. 3) Evidentiary requirements (for instance the absence of negative data) may require auxiliary developmental principles. For instance it may help the child if markedness is extended to derivational relations (one surface structure for each deep structure in the unmarked case, see Chomsky and Lasnik (1977)). We shall explore the fact that (1) and (2) make opposite assumptions; (1) assumes that the instantaneous model underdetermines the choice of a particular grammar and (2) assumes that it overdetermines particular grammars.

Our figure (1) above illustrates (2) directly. The claim is that the structure of prepositional phrases and verb phrases are linked. Therefore a child needs to know information about only one structure and the other is known automatically. (In reality, of course, the matter is more complex.) The decision map allows the child to take either one of the other kind of evidence--either of two paths to this conclusion. (Here the theory overdetermines particular grammars). This could be a characteristic of a realistic acquisition mechanism. On the other hand, external constraints could limit the child to a single path. In general, the evidence suggests that developmental stages are remarkably uniform across children. It is unclear whether the external factors have to do with the vagaries of data (frequency, etc.) or whether developmental principles are at stake (growth of conceptual structure, etc.)

How could the instantaneous model (IM) be successful since its premise is contrary to fact? If one assumes that a child's successive grammars undergo total reanalysis at the final stage, then the earlier grammars are irrelevant to the final grammar. The earlier grammars could be in an alien notation. The acquisition mechanism treats the prefinal grammar as a data summary which is reanalyzed at the moment of attainment of the final grammar. (See Roeper et al (1981) for a discussion of how "long-distance" rules could shift grammar from lexical to syntactic notation.)

A second successful method for acquisition to proceed "as if" instantaneous works as follows. Assume all the relevant data is available to the child on a daily basis (which seems like a fair assumption). Then assume that the child orders the input into a grammar mechanism in such a fashion that it was equivalent to receiving all the data at once. In other words, the organism knows how, step by step, to avoid misleading data selecting from a sufficient sample that is constantly available which would lead it to make an incorrect hypothesis from which it could not recover, that is, it can always find the appropriate evidence to reject the hypothesis. This approach says, in effect, that one feature of universal grammar will turn out to be a requirement that simple data exist that allow correct conclusions. (If one could not recognize an NP without doing a long-distance transformation, the grammar might be knowable but not learnable.)

In the absence of detail one cannot evaluate either of these proposals. Neither of them, however, seems implausible. The notion of cognitive growth itself suggests that we may "shift the notation" in which we think about things. The notion that a child selects his own input is merely the converse of the observation that an organism must ignore most of the information available to it in order to make coherent steps forward. Thus both proposals are quite natural in the realm of biological growth.

How could the IM fail? It is possible that the effort to describe adult grammars in a principled fashion will, ultimately, fail. A number of valid principles have been proposed, but significant aspects of adult grammars remain without a principled account. Here the theory underdetermines particular grammars. One might then search for an ontogenetic explanation in which one added to UG and a set of input data a statement of when each construction was acquired. The adult grammar could then be viewed as a series of geologic layers. Each stage of acquisition would be aimed at a certain range of data about which immutable decisions are made. At the next stage further data comes into view and further decisions are made. Features of the grammar acquired at one stage might seem to "contradict" similar features acquired at another. This view of acquisition seems to me to be unlikely, but it is worth articulating because it may account for seemingly intractable subregularities in the language. Consider the following example.

It is clear that children do not learn all the verbs that take complements at once. In fact they learn a small set of frequent and simple verbs first. Most of these verbs relate to perception or verbs with a fairly simple meaning. For example we find "I saw Daddy swim", "I help Mommy work" and "I want you to have a sandwich". In each case the complement is describable as a bare infinitive. This behavior fits the old observation that children learn content words before function words. The old generalization misses the most interesting question: how does the child integrate the to auxiliary into his grammar?

When to appears it is clearly productive. We find forms like "I trying to fix it" and also thank you to do that" and "thank you to make it for me." If the grammar is completely reanalyzed, we would expect the entire verb vocabulary to switch to the new form of the

infinitive with to. This does not occur. There are one or two verbs (want and need) that switch and for which the adult language provides clear positive evidence. The rest remain as bare infinitives in the adult language. The productive rule, however, takes to and all new verbs thereafter into adulthood are given to (which one can discover by inventing a new verb).

Under a synchronic analysis--in which we make no reference to stages--we can find attempts to explain the division between the two types of verbs semantically. The customary generalization is that perception verbs take bare infinitives. The defect in this explanation is the straightforward argument that it is false. The verbs let, make, and help all take bare infinitives, but they are not perception verbs. And the perception verbs perceive, observe, gaze at, and ogle do not take bare infinitives. Therefore for the former group it is ungrammatical to say *I let John to sing and for the latter it is ungrammatical to say *I perceived John to be a fool. A change in semantic classes will not help. If we include verbs of permission and coercion to account for let and make, then we must explain why permit and coerce do not work that way. It is noteworthy that the verbs which require to are not the kind of verb acquired before the age of three (with the exceptions noted), while the verbs that take bare infinitives are all common in the speech of two-year olds.

The diachronic (or ontogenetic) explanation says that the criterial characteristic of verbs that take bare infinitives is, simply, that they are learned in Stage I and not Stage II. At Stage I all verbs take bare infinitives; at Stage II and thereafter all verbs take to. Both rules are perfectly general. We account for the partial generality in the final adult language (the existence of bare infinitives) by the following assumption; verbs learned at Stage I are not reanalyzed (unless there is specific evidence for each verb that causes the earlier form to delete).[1] The general form of the assumption is: decisions in one stage are not subject to complete reanalysis in the next stage.

One might also consider the class of perception verbs to be a set of exceptions like irregular verbs. In acquisition stages, however, they do not behave alike. The perception verbs precede the unmarked infinitive forms and they never undergo a stage of overregularization (*I let John to sing) as the irregular verbs do ("comed"). The fact that perception verbs precede the unmarked infinitives means, in essence, that the child can master the semantics of compound sentences before he learns the syntax.[2] This sequence occurs in tensed complements as well. Forms like "let's see Mommy is here" precede the form with a complementizer let's see whether Mommy is here. (See Hamburger (to appear) for discussion.) Thus the acquisition process may take many smaller steps than linguistic theory can articulate.

Linguistic markedness is not "incorrect" with respect to these facts, but neither does it illuminate the micro-structure of developmental stages. As Chomsky (1981) has remarked: "processes of maturation may be such as to permit certain unmarked structures to be manifested only relatively late in acquisition." The task of explanation here

belongs to an acquisition theory.

A number of interesting questions arise when we attempt to make the markedness model function mechanically. One point of interest is the relation between markedness and negative data. Evidence from acquisition suggests that "correction" has at most a marginal impact upon acquisition. A child must therefore rely primarily upon positive data.

Chomsky and Lasnik (1977) have proposed a language-specific filter for some dialects that would rule our for-to sequences (See Lasnik (this volume) for related discussion). This would mark as ungrammatical the sequence *I want for to go. (More current formulations in terms of the government-binding framework do not change this argument.) How does the child know if he should or should not eliminate for-to sequences in his dialect? In fact there is evidence that children speaking the standard dialect do use such expressions:

(6) let's bring a bench for to jump in
I have a place for to put my girls, right here
(What do you want to get in there for?) for to eat
You have a pocket for to put them in Dad?
I can draw something, but I need a pencil for to
The milk is for to drink
This is for to break
there's one for Mom for to brush he's too
these buttons are for to sew on you
toys are for to play with
(See Roeper, 1980, Phinney 1980)

Wexler (1979) has proposed a solution. He suggests that a child follows a "uniqueness" principle that permits in the unmarked case only one surface structure for each deep structure (see also Chomsky and Lasnik (1977)). This applies the principle of markedness to relations between levels in a grammar and not to specific structures. Under this perspective, a child discovers that both the for to alternative and to-alternative are derived from the same deep structure and then the one is kept that matches the input. Elsewhere (Roeper (1980)), I have suggested that the child realizes the equivalence between the two forms when he learns that for can occur without a purposive reading. In effect then the uniqueness principle applies to aspects of the semantics as well.

In conclusion, before we develop a full biological theory of language acquisition, we must answer many internal questions about the logic of markedness and many external questions about its relation to a realistic acuqisition process.

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Footnotes

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[1]The evidence here, of course, is also more complicated. There is evidence that I have gathered that both the to form and the want-verb continue to exist for a period of time. It is possible that they have slightly different meanings for a period of time. It is also of interest that only the want-verb permits extraction initially: "What you want have".

[2]See Rouveret and Vergnaud (1980) and Vergnaud and Roeper (forthcoming) for a discussion of the syntactic features of complex verbs.

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