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'No Negative Evidence': What's the Problem?

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1. Overview

This paper considers the implications of negative evidence for issues of language learnability. At present, there is a broad consensus of opinion which suggests that children's errors are not corrected (e.g. Pinker, 1989; Hyams, 1992; Jackendoff, 1993) and that, moreover, potentially corrective forms of input available to the child do not, in fact, exert any discernible influence on the child's recovery from error (e.g. Marcus, 1993; Morgan, Bonamo & Travis, 1995). However, it will be argued here that these empirical conclusions are somewhat premature. At the same time, it is suggested that the 'no negative evidence' assumption should generate far less controversy than has hitherto been the case (e.g. Bohannon, MacWhinney & Snow, 1990, versus Gordon, 1990). In support of this thesis, three separate points will be advanced in this paper, which can be summarised as follows:

- (1) a. Extant empirical data on negative evidence have barely begun to examine questions concerning its occurrence, long-term effects, and generality. Hence, far more research is required before we can genuinely begin to assess the true impact of negative evidence on child language acquisition.
- b. The 'no negative evidence' assumption provides a central instantiation of Chomsky's argument from the poverty of the stimulus. However, given competing explanations for a single phenomenon within UG theory, the 'no negative evidence' assumption cannot possibly function as an evaluation metric for choosing between them. Hence, the 'no negative evidence' assumption is of negligible importance in specifying the precise description and explanation of Universal Grammar.
- c. Convincing explanations for recovery from all kinds of errors (pertaining to both core and peripheral aspects of grammar) are still required. In this respect, negative evidence may prove to be one (amongst potentially several) sources of information available to the child. Negative evidence is typically presented as being in direct opposition to alternative explanations for error recovery in the child. Logically, however, there is no reason why negative evidence could not function in tandem, or in parallel, with alternative mechanisms. It would therefore make sense to talk more generally about the retreat problem facing the child rather than the 'no negative evidence' problem.

2. 'No negative evidence': a premature assumption

Opinions on the availability of negative evidence are critically conditioned by one's conception of what would count as a correction from the child's point of view. In this respect, it is apparent that a consensus has not yet been reached. At the same time, though, a great deal of empirical interest has been focused on one candidate form of correction in particular, namely, adult recasts (e.g. Hirsh-Pasek, Treiman & Schneiderman, 1984; Demetras, Post & Snow, 1986; Penner, 1987; Bohannon & Stanowicz, 1988; Furrow, Baillie, McLaren & Moore, 1993; Morgan, Bonamo & Travis, 1995). Thus, adult responses of the following kind have been examined for their corrective potential:

- (2) a. Child: The crocodile bited the giraffe's feet.
Adult: He bit his feet?
- b. Child: It's bored of being on the bike.
Adult: It's not boring.
- c. Child: He shooted the fish.
Adult: He shot the fish.

(Unless otherwise stated, the examples throughout are taken from a diary study reported in Saxton, 1995). The adult responses in (2) constitute a subset of responses which would normally qualify as recasts. In fact, on most definitions, any adult response in which the adult repeats part or all of what the child has said, whilst introducing certain changes or additions to the lexis or syntax, would qualify as a recast. Thus, recasts can follow both grammatical and ungrammatical child utterances, although a consistent finding has been that a differential response rate exists, whereby recasts are more closely associated with child errors (e.g. Morgan et al., 1995). More generally, it is clear that the category of recast comprises a limitless range of possible utterances with no unifying linguistic theme. How the child could ever identify such a nebulous category is simply one of many conceptual problems which militate against the concept of 'recast-as-correction' (for more detailed discussion, see Bowerman, 1988; Pinker, 1989; Marcus, 1993; Morgan et al., 1995; Saxton, forthcoming). A curious feature of this theoretical debate is that it has signally failed to bring a halt to empirical research based on recasts. Thus, Morgan et al. (1995) rehearse many of the familiar criticisms. At the same time, however, they are content to conduct an extensive empirical investigation which is based on several permutations of the notion of 'recast-as-correction.'

If one concentrates only on adult responses of the kind in (2), in which a child error is met by an adult response containing the correct alternative, then it is clear that many of the recasts which have attracted attention over the years do indeed look, *prima facie*, like corrections. However, the way in which the child might exploit potentially available corrective information must be entirely independent of the notion of 'recast.' Although it is not the main focus of this paper, alternative explanations are possible, as exemplified by the Contrast Theory of negative input which I set out elsewhere (Saxton, forthcoming). Undoubtedly, an alternative theoretical basis for research is

required which can build on what is known about correction-like adult responses in the input. Certainly, responses of the kind exemplified in (2) are a standard feature of the input to children, being reported in all of the studies on negative evidence cited above.

Having identified candidate forms of correction in the input to the child, the next logical step is to try and determine whether they actually exert any influence on the child's retreat from overgeneralization. That is, does negative evidence work? In fact, to date, there have been very few studies which address the issue of effectiveness. And those studies which have done so have tended to focus more on how corrective input affects the child's immediate speech output.

With respect to short-term effects, the conclusions of Farrar (1992) stand in direct conflict with those of Morgan et al. (1995). Thus, Farrar (1992) compared the level of child responsiveness to negative versus positive evidence and reported that children were far more sensitive to linguistic information when it is presented in the form of negative evidence. Morgan et al., on the other hand, compared the effects of negative evidence with those of move-ons and report a lack of distinctiveness in child responsiveness to the two forms of input. One reason for Morgan et al.'s pessimistic findings may be the unusually restrictive definitions of recast they adhere to. Thus, in their study of child article errors, a parental recast was scored when the adult supplied an article missing from the preceding child utterance. Additionally, however, recasts were only scored when the adult also reproduced the exact same noun as the child. Thus, in the following example, the first adult response, (3a), would be counted as a recast, while the second, (3b), would be classified as a move-on. In both cases, however, the adult exemplifies correct article usage, directly contingent on a child article error.

- (3) Child: He likes cat.
- a. Adult: Yes, he likes the cat. RECAST
- b. Adult: Yes, and he likes the dog, too. MOVE-ON

Given that in (3b), the adult is modelling an article, contingent on a child article error, one might predict a potentially corrective influence. The child's interpretation of the adult response is, of course, an empirical issue, but it is possible that Morgan et al. classified potentially many corrective responses as move-ons. As a result, Morgan et al. may simply have been comparing one form of correction with another.

The index of effectiveness adopted in these studies may also contribute to the difficulties experienced in interpreting the findings. When the adult responds to a child error with a recast, one can then gauge the effectiveness of the recast by observing whether the child adopts the correct adult version in her own immediate speech output. Thus, both Farrar and Morgan et al. establish the frequency of shifts from erroneous to correct forms (E→C) in the child's speech, as in (4) below.

- (4) a. Child: I'm not interesting of lunch.
Adult: You're not interested?
Child: I'm not interested.
I'm not interested of lunch.

- b. Child: It's a bit ripped, that white paper.
 Adult: A bit ripped?
 Child: Yeah, a bit ripped, that white paper.
- c. Child: Shall I make it a bit gooder for you?
 Adult: Better for me?
 Child: Better.

Farrar (1992) reports that E→C shifts were more frequent in cases of negative, rather than positive, evidence. Morgan et al., by contrast, reported similar levels of E→C shifts for both recasts (negative evidence) and move-ons. On this basis, Morgan et al. are compelled to conclude that, for the child, move-ons and recasts are indistinguishable, and hence, recasts do not actually function as a form of negative evidence for the child.

However, erroneous-to-correct shifts (E→C) are ambiguous in interpretation. The problem is that this single performance phenomenon may be prompted by at least two quite distinct underlying causes:

- (5) An E→C shift may be indicative of:
- a. a corrective influence: the child rejects an erroneous form in favour of the correct adult form;
- or b. an overgeneralized system: the child is simply vacillating between two forms (e.g. buyed and bought), which, from her point of view, are equally acceptable.

Both of these possible causes for E→C shifts are entirely plausible. The problem is that, unless one can determine the motivation for a particular E→C shift, one can never be absolutely certain whether it indicates either the existence of an overgeneralized system or the retreat from an over**Error!** **Reference source not found.**generalized system. In this respect, naturalistic data are entirely inadequate to the task of distinguishing which possibility might obtain on a given occasion of utterance (for an experimental approach, see Saxton, forthcoming).

Studies on the long-term effects of negative evidence are even more scarce than studies on its immediate influence. In fact, Morgan et al. (1995) provide the only published data on this issue (see also Saxton, 1995). In an exciting departure within child language studies, Morgan et al. adapt a technique from econometric theory, known as time series analysis, and apply it to Brown's (1973) data on Adam, Eve, and Sarah. Morgan et al. sought to determine whether recasts function as a so-called leading indicator, that is, whether information about the incidence of recasts at time T_x can improve predictions about the grammaticality of child speech in the future. From the pattern of results which emerged, Morgan et al. concluded that recasts actually function as a negative leading indicator, that is, recasts are predictive of decreasing levels of grammaticality over periods between 2 and 12 weeks.

Arguably, however, this conclusion is not warranted. In the first instance, as Morgan et al. allow, the data samples analysed in this study were far smaller than would be the case in more conventional applications of time series techniques. The attempts made by Morgan et al. to compensate for this

deficiency lead to a highly liberal interpretation of what counts as a statistically significant finding ($p < .20$). Hence, the possible incidence of Type 1 errors is greatly increased. Time series analyses also require a minimum of 30 individual observations, but for one of the three children (Eve), there are fewer than 20. If one discounts the findings on Eve, therefore, the possibility of Type 1 errors is magnified even more.

Even more seriously, all of the data sets analysed by Morgan et al. comprise irregular time series. It is, in fact, a requirement of time series analysis that the data comprise a series of observations made at strictly regular intervals. Morgan et al. assume that the data for their three subjects were gathered at two-weekly intervals, but even if one rearranges the original transcripts in the most advantageous way possible (Jim Morgan, personal communication), it still remains the case that the time series are highly irregular. For example, very few of the lags between individual samples actually conform to the projected two-week interval: 0 out of 20 for Eve; 4 out of 139 for Sarah; and 12 out of 55 for Adam. All of these problems stem from the simple fact that the data analysed by Morgan et al. were not gathered with the purpose of conducting a time series analysis. It is not surprising, therefore, that the data on Adam, Eve, and Sarah are inherently ill-suited, both in terms of quantity and regularity, for the requirements of econometric techniques.

Even if one were to take Morgan et al.'s findings at face value, one could still argue that their pessimistic conclusions are unwarranted. Although recasts do seem to function as a negative leading indicator in the medium term, a consistent pattern of findings emerged whereby recasts become strong positive leading indicators over longer periods (e.g. after 12 weeks). It would seem, then, that recasts are functioning both as a negative *and* a positive leading indicator simultaneously. More to the point, though, it would seem that recasts are, ultimately, associated with increases in grammaticality, as one might predict if they were functioning as negative evidence for the child. Again though, extreme caution is required before one draws any firm conclusions from these findings. For the fact is that the pattern of findings reported by Morgan et al. is simply not found in more conventional applications of time series analysis within econometric theory. The mixture of positive and negative cross-regressors is highly unusual, and only serves to further diminish confidence in the strength of Morgan et al.'s conclusions.

It is clear that Morgan et al. have demonstrated where the future lies with respect to research on negative evidence. Time series analysis represents a highly sophisticated technique with considerable predictive power. However, it is essential that this analytical method only be applied when the dictates of econometric theory can be met in full. Brown's data on Adam, Eve, and Sarah patently fail to meet these requirements. One can only hope that future studies will be able to incorporate the necessary design features to permit a valid time series analysis. In conclusion, it is apparent that we still have very little idea about both the short-term and long-term effects of negative evidence. And until we do have far more relevant data, it is essentially premature to invoke the 'no negative evidence' assumption in theories of child language acquisition.

3. Innate Constraints and Negative Evidence

Bohannon & Stanowicz (1988) have suggested that if one could demonstrate that negative evidence were available for all children, one would not need to postulate innate constraints in theories of language acquisition. However, the logic of this argument is not especially compelling. For the simple fact is that the child's linguistic endowment at birth is entirely unaffected by the state of the linguistic environment. If Universal Grammar exists, the occurrence or non-occurrence of negative evidence cannot alter that fact. More particularly, negative evidence has no relevance for what linguistic items are acquired by the child. Thus, negative evidence has no bearing on the way in which overgeneralizations become established in the speech of young children. Instead, its function is to assist in the process of 'unlearning,' that is, the elimination of ungrammatical forms. Hence, the concepts of Universal Grammar and negative evidence are entirely independent, and should not be seen as being in some sort of competition with one another.

The 'no negative evidence' assumption tends to figure in discussions of Universal Grammar as an instantiation of Chomsky's argument from the poverty of the stimulus (APS) (e.g. Hyams, 1992). In essence, the APS furnishes researchers with a method of enquiry which might conceivably allow them to discover what is innate.

The natural way to proceed, if we are trying to determine the nature of S_0 , is to try to find some property of the steady state that is minimally affected by experience, a property for which E (experience) is reduced as close to zero as possible.

Chomsky (1980:113)

An immediate problem with this formulation is that the 'no negative evidence' assumption can contribute very little to theoretical discussions concerning the nature of the innate language faculty. To illustrate this point, consider the traditional role allotted to negative evidence in discussions of language learnability. If we take, for expository purposes, the linguistic Principle (X) which is designated as a component of Universal Grammar. An oft-repeated argument can then be applied in favour of the idea that Principle (X) is, genuinely, part of the child's genetic endowment. Briefly, the argument runs as follows:

Principle (X) is acquired under conditions of:

no negative evidence
(underspecified) positive evidence only

Therefore, (X) must be innate

Thus, for certain aspects of grammar, the linguistic environment is held to be impoverished in two respects: first, there is 'no negative evidence,' that is, no information concerning the bounds of grammaticality; and second, the positive evidence available is underspecified, that is, it lacks critical information which might allow the child to discover the systematic, highly

abstract properties of grammar underlying the surface, performance phenomena they are exposed to.

As I have already argued, the empirical evidence in favour of the 'no negative evidence' assumption is currently rather sparse and difficult to interpret. If, at some point in the future, nativist assumptions about the input are confirmed, though, one still needs to examine how useful they would be in arriving at a full description and explanation of Universal Grammar. The problem is that, typically, for any purported aspect of Universal Grammar, there tends to be a whole range of conflicting and evolving linguistic-theoretical accounts on offer (see, for example, the various accounts of the null subject phenomenon). The question then becomes one of choosing between alternative accounts, in order to specify more correctly the nature of Universal Grammar. In order to verify the innateness of Principle (X), linguists can appeal to the 'no negative evidence' assumption. The problem is, though, that any and every candidate explanation of (X) can appeal to this assumption in support of the contention that it is innate.

In corroborating every competing explanation, though, the 'no negative evidence' assumption loses any force it may have had in helping specify what is and is not innate. Logically, therefore, the 'no negative evidence' assumption cannot function as an independent evaluation metric for choosing between competing theoretical formulations. At most, one would be left with the vague (and uncontroversial) assertion that 'something must be innate.' However, there are very few child language researchers, if any, who would not support this contention anyway (c.f. Braine, 1994). Moreover, one does not need to demonstrate the empirical validity of the 'no negative evidence' assumption first, in order to arrive at this conclusion. In order to characterise Universal Grammar precisely, therefore, one must inevitably look to *alternative* sources of evidence.

4. Extending Baker's Paradox

In this section, I will argue that negative evidence does remain relevant for issues of language learnability, even though its direct relevance for theories of UG is strictly limited. In this respect, it will be argued that the domain of the so-called 'no negative evidence' problem is potentially far wider than has previously been anticipated. That is, there are many kinds of errors which present the child with a potentially serious learnability problem. It is commonly assumed that the child only faces a genuine 'no negative evidence' problem in cases where the structure being acquired is a component of Universal Grammar, for which both negative evidence is unavailable and positive evidence is underspecified. For peripheral, language-particular structures, on the other hand, it is generally assumed that positive evidence is not underspecified. Thus, the child simply needs to be exposed to the correct form in the input in order to supplant incorrect forms (e.g. Pinker, 1984). Thus, a child who produces buyed simply needs to be exposed to the correct version, bought, in order to expunge buyed.

In Saleemi's (1992) terms, the child is commonly thought to face the substitution problem with respect to peripheral aspects of grammar like irregular past tense forms. On this view, it is assumed that the child grammar contains a single form (in this case buyed), for which the child must

eventually substitute the correct adult form (bought). In fact, though, it is well established by now that the child actually faces the overgeneralization problem in cases of this kind, since the child typically goes through an often protracted phase in which, say, both buyed and bought figure in the child's speech repertoire (e.g. Marcus, Pinker, Ullman, Hollander, Rosen & Xu, 1992). Furthermore, it becomes clear that the learnability problem posed by peripheral aspects of grammar, like past tense overgeneralizations, is identical to cases where innate constraints are held to be critical.

- (5) a. deliver NP1 to NP2
* deliver NP2 NP1
- b. bought
* buyed

The example in (5a) is taken from Pinker (1984), and provides an example in which the child is assumed to depend on some form of innate knowledge (so-called Linking Rules and Broad Range rules) in order to recover from errors when they arise. When viewed strictly in terms of the learnability problem facing the child, the case in (5b) appears to be identical on a number of counts:

- (6) a. both types of error exemplify overgeneralization, since correct and erroneous forms occur contemporaneously in child speech;
- b. in both cases, the child must expunge an ungrammatical form, whilst retaining the correct adult version;
- c. for both, the occurrence of the correct form in the input is not, in and of itself, evidence that the alternative form is ungrammatical.

Errors with the dative alternation, as in (5a) are dubbed instances of Baker's paradox by Pinker (1989). However, it should be clear that the identifying feature in cases of Baker's paradox is the occurrence of overgeneralization: the adult grammar is a superset of the child grammar. Since this situation also obtains in cases of past tense errors (and many other observed morphosyntactic errors), it should be apparent that overgeneralization (and not the substitution problem) is the norm. Apparently, Baker's paradox is simply overgeneralization by another name.

A characteristic feature of Baker's paradox, as described by Pinker (1989) and Gropen, Pinker, Hollander & Goldberg (1991), is that positive evidence is held to be inadequate for guiding the child in recovery from errors. The problem is that the child is quite content to tolerate alternations, where two linguistic forms fulfil a single grammatical function. In the case of deliver-class verbs, of course, the child has ample opportunity to observe that a whole range of give-class verbs do alternate fully. The problem then is that the child could easily assume, in the absence of evidence to the contrary, that deliver-class verbs are also licensed to alternate, on analogy with give-class verbs.

In the case of past tense errors, there is also ample evidence that the child tolerates alternation, as indicated above. And of course, there are several verbs in English which possess alternant past tense forms in the mature

grammar (e.g. burnt / burned; dreamed / dreamt). Evidently, children tolerate alternant forms in many linguistic domains, and critically, the range of domains is not restricted in any way by whether or not the relevant aspect of grammar is subsumed within Universal Grammar. Hence, one can conclude that if positive evidence alone is inadequate for recovery from dative errors, it is also inadequate for recovery from past tense errors. The problem is that positive input provides no information on the legality or otherwise of alternations per se. For example, although adult speech may exemplify the correct form, bought, that fact, in and of itself, tells the child nothing about the inadmissibility of buyed.

One is left wondering how retreat from error can be achieved for aspects of grammar which are not part of Universal Grammar. Of course, if negative evidence were available to the child, the learnability problem would be far less acute. In addition to negative evidence, a range of other possible solutions have also been entertained. For example, Marcus et al., (1992) suggest that general improvements in the child's memory capacity will eventually block the process of overregularization in the case of irregular verbs. In consequence, overregularized forms like buyed will eventually fade out, thus allowing the correct form bought to predominate in the child's speech. It is important to note that explanations of this kind are entirely independent of the possible occurrence and functioning of negative evidence. Both kinds of explanation could easily co-occur. For instance, the provision of negative evidence would presumably provide a far more effective 'reminder,' to a child with an underdeveloped memory capacity, than the simple occurrence of the correct version in the form of positive evidence.

In conclusion, therefore, the learnability problem facing the child is far more extensive than the handful of cases considered by Pinker under the heading of Baker's paradox. Instead, overgeneralization is manifest in many linguistic domains and, in each case, presents a learnability problem for which positive evidence only is inadequate (c.f. Morgan et al., 1995). Since so little is currently known about the provision of negative evidence, we do not yet know whether the child genuinely faces a 'no negative evidence' problem. We *do* know, however, that the child faces the problem of recovering from overgeneralization. What is more, for many errors the child does not have the luxury of Universal Grammar to draw on in the process of recovery. It seems appropriate, therefore, to reject the notion of a 'no negative evidence' problem and refer instead to the retreat problem facing the child.

5. Summary

This paper has sought to re-evaluate the status of negative evidence in theories of child language acquisition. It was argued that the empirical data currently available to us are simply inadequate to the task of assessing in any meaningful way the true import of corrective input on the course of language acquisition. More substantial data, from a variety of sources, are required, both on the short-term and long-term effects of candidate forms of corrective input, before one can begin to arrive at any substantive conclusions. In the meantime, it was suggested that we need to reconsider the relevance of negative evidence for issues of language learnability. It was argued that the traditional view of negative evidence as part of the argument from the poverty

of the stimulus is simply unhelpful in terms of advancing the debate about how one might characterise precisely the contribution of genetic factors in language acquisition. At the same time, though, it was argued that negative evidence may still turn out to be an important factor (perhaps one amongst several) in helping explain how children do eventually recover from overgeneralizations. Evidently, children *do* face a *retreat* problem in many linguistic domains. And until far more is known about the child's exploitation of available input resources, it is essentially premature to equate the retreat problem with the 'no negative evidence' problem.

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