Negative Input for Grammatical Errors:

Effects After a Lag of 12 Weeks

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Abstract

Effects of negative input for 13 categories of grammatical error were assessed in a longitudinal study of naturalistic adult-child discourse. Two-hour samples of conversational interaction were obtained at two points in time, separated by a lag of 12 weeks, for 12 children (mean age 2;0 at the start). The data were interpreted within the framework offered by Saxton's (1997; 2000) contrast theory of negative input. Corrective input was associated with subsequent improvements in the grammaticality of child speech for three of the target structures. No effects were found for two forms of positive input: non-contingent models, where the adult produces target structures in non-error-contingent contexts; and contingent models, where grammatical forms follow grammatical child usages. The findings lend support to the view that, in some cases at least, the structure of adult-child discourse yields information on the bounds of grammaticality for the language-learning child.

Negative Input for Grammatical Errors: Effects After a Lag of 12 Weeks

Definitions of Negative Input

Do parents correct their children's grammatical errors? For many researchers, Brown & Hanlon (1970) settled this question more than three decades ago when they reported that parental signals of Approval and Disapproval are not contingent on the syntactic well-formedness of child speech. It appeared that grammatical deviations were allowed to pass unchecked, leaving children to their own devices in determining the crucial distinction between what is grammatical and what is not grammatical. This finding generated huge interest, even being heralded as 'one of the most important discoveries in the history of psychology' (Pinker, 1988:104). While this may be overstating the case, Brown & Hanlon's findings did seem to provide empirical support for Chomsky's (1980) argument from the poverty of the stimulus. Normally-developing children eventually retreat from error to attain a mature system of grammar. If one cannot explain the origins of their grammatical knowledge in terms of support from the linguistic environment, then one can conclude instead that this knowledge is innate.

Parental correction comprises a form of <u>negative input</u>, that is, information that an utterance is ungrammatical.[1] If available, negative input could function as a powerful constraint on language acquisition, since it conveys the precise scope of grammatical rules to the child. In many cases this entails the retreat from overgeneralization, where the child grammar is a superset of the adult grammar. A well-attested example is the phase where children make errors with past tense forms of irregular verbs (e.g., Marcus, Pinker, Ullman, Hollander, Rosen, & Xu, 1992). During this phase, the child grammar permits both <u>breaked</u> and <u>broke</u>, while the adult grammar is more restricted in allowing only <u>broke</u>. Negative input could also be useful in underscoring the obligatory nature of certain forms. Thus, children pass through a phase where structures that are obligatory in the adult grammar appear to be optional in the child's grammar. A case in point is the omission of obligatory morphemes like determiners, plural suffixes and regular past tense markers. It is possible to view optional omissions as a form of overgeneralization, since the child grammar permits two forms (e.g., dog and dogs) where the adult grammar allows only one (dogs). The plausibility of this view is lent credence by the fact that many children with specific language impairment persist for years, even indefinitely, with optional omissions of this kind (e.g., Rice, Wexler & Cleave, 1995). Whether they are viewed as a form of overgeneralization or not, it is clear that negative input could be useful in confirming the obligatory nature of particular forms. It cannot, however, specify the nature of what is acquired in the first instance, nor how it is learned. Negative input is confined, instead, to the process of 'unlearning', or rather, the shedding of ungrammatical forms from the child's nascent grammar (Saxton, 1997).

The Contrast Theory of Negative Input

The power of the argument from the poverty of the stimulus depends on the extent to which children are supplied with negative input. In this respect, much empirical evidence has accrued since the 1980s to indicate that Brown & Hanlon (1970) were, in all likelihood, premature in their conclusions (e.g., Hirsh-Pasek, Treiman & Schneiderman, 1984; Demetras, Post & Snow, 1986; Bohannon & Stanowicz, 1988; Farrar, 1992; Saxton, 2000; Strapp & Federico, 2000; Chouinard & Clark, 2003). All of these studies report that the input to young children is replete with responses to grammatical errors which, prima facie, look like corrections.

A fundamental challenge is to demonstrate that what might look like a correction to the adult eye is, in fact, interpreted in that way by children from the earliest stages of grammatical development. One approach to this problem is to examine children's responses to putative sources of correction. One can be more confident that an adult response is corrective, if children utilize such input in the retreat from error. However, much of the empirical work on corrective input has failed to address these issues, leading, in certain cases, to conceptual difficulties in the interpretation of findings (see Saxton, 1997; in press, for reviews). A recent exception to this trend, however, has been the Direct Contrast hypothesis advanced by Saxton (1997, 2000) to explain how key adult responses (negative evidence) might fulfil a corrective potential. On this approach, negative evidence is identified in cases when an erroneous child form is followed directly by the correct adult alternative as in the following three examples.[2]

1. Child: I thought they were all womans.

   Adult: They're not all women.

2. Child: It's bored of being on the bike.

   Adult: It's not boring.

3. Child: He's got little nice feet.

   Adult: Oh, he has got nice little feet.

The Direct Contrast hypothesis predicts that the corrective power of negative evidence lies in the immediate juxtaposition of child error and correct adult alternative (Saxton, 1997). It is predicted that the contrast between the two forms is rendered especially salient in this particular discourse context. In (1), both child and adult are focused jointly on the same topic of conversation, and both make use of a plural form of woman. Yet the adult conspicuously eschews the child's selection of womans in favour of women, and the contrast in usage between the two forms is thrown into sharp relief.

Negative evidence creates a discourse context that is unique in its power to reveal the contrast in usage between alternative forms. In making this contrast, it is predicted that the child is supplied with two prerequisites, without which the retreat from error would not be possible. First, the child needs to know that the form favoured by the adult is grammatical. And second, the child needs to be apprised of the fact that their own selection is ungrammatical. Observe that information about the former point is available in abundance. Adults cannot speak to a child without modelling grammatical forms, in both error-contingent and non-error-contingent contexts. These linguistic forms, modelled by the adult, are traditionally referred to as positive input (e.g., Crain & Pietroski, 2001; but see Clark, 2003, for an alternative approach couched in terms of her Principle of Conventionality). There is a general consensus that positive input alone cannot explain the child's retreat from error. One reason is that simply being apprised of the grammaticality of women, as in (1), does not, in and of itself, constitute evidence about the ungrammaticality of womans. Of importance here is the fact that the young child's grammar is characterized by overgeneralization. That is, it permits both grammatical and ungrammatical forms at the same time, often for protracted periods extending into months and even years (e.g., Marcus et al., 1992). Hence, it is not sufficient simply to be apprised of the fact that women is grammatical. The child already knows this. The critical piece in the puzzle is information concerning the ungrammaticality of womans.

The Direct Contrast hypothesis assumes that this information is embedded in the structure of the discourse. The juxtaposition of child and adult forms is held to supply information over and above the simple existence of women as an acceptable adult form. In creating a contrast in usage between the two alternatives within the discourse, it is predicted that the ungrammaticality of womans is revealed to the child. In according the error-contingent adult model this special status, the contrast theory diverges sharply from traditional linguistic approaches to child language acquisition (e.g., Crain & Pietroski, 2001). In the latter case, the discourse structure of adult-child conversation is irrelevant. Grammatical forms modelled by the adult are taken to have the same status, regardless of their contingency on grammatical errors. Recent evidence on the status of error-contingent models is reviewed below.

A critical consideration is how the child might alight exclusively on points of contrast relevant for the acquisition of grammar. Saxton (1997) suggests that the equivalence in grammatical function of, say, women and womans provides the key to this issue. Typically, the child's overgeneralized system already exemplifies, in this case, both women and womans, so the equivalence in function between the two is known in advance to the child. Given this prior knowledge, the child needs to know that one of the forms they allow (womans) is in fact ungrammatical. The Direct Contrast hypothesis predicts that error-contingent adult models hold a special status in this regard, since they have the power to alert the child to the contrast in usage between child and adult speech. Beyond the issue of functional equivalence, there is often a significant overlap in phonological form between erroneous and correct forms. Such phonological overlap could well prove beneficial in alerting the child to relevant points of contrast, although the equivalence of grammatical function remains the driving force in triggering retreat from error.

An important assumption in the preceding discussion is that the child interprets only relevant points of contrast within adult-child discourse as a form of negative input. Adult responses to child utterances contrast in an infinite number of ways. What, then, prevents the child from focusing on spurious points of contrast and rejecting perfectly acceptable forms in consequence?

4. Child: Pretend I dropped my bow and arrow down.

   Adult: You dropped it on the floor?

If the child were identifying points of contrast at random, they might substitute the adult's floor for their own form down in (4) above. But this is unlikely. Acquisition would be nigh on impossible if the child misconstrued every adult utterance in this way. Of course, this kind of destabilisation is not empirically attested. In the first instance, it is difficult to conceive what might motivate such random substitutions. Certainly, it could not be the equivalence of grammatical functions alluded to above. Unless there is good reason to suppose that the child might perceive this kind of equivalence, there will be nothing to trigger the perception of a direct contrast by the child.

Other forms of contrast between child and adult utterances may be more problematic. One such contrast occurs in (5) below:

5. Child: The alligators swim.

   Adult: The alligators will swim.

In this (constructed) exchange, an ostensibly grammatical child utterance is met with a highly similar, but nevertheless contrasting, adult response. However, Saxton (1997) points out that the child utterance here has at least two possible interpretations. The alligators swim may refer to an habitual event, in which case it is highly unlikely that the adult would respond as here. Or the child may be referring to a future event, in which case The alligators swim can be construed as ungrammatical on the grounds that an obligatory auxiliary verb (will) is missing. In this case, the adult response can be construed as negative evidence, on the definition and interpretation offered within the contrast theory (see Saxton, 1997: 157-159 for more detailed discussion).

A further potentially damaging kind of contrast is offered by a reviewer in the constructed exchange reproduced in (6) below:

6. Child: I have a dog.

   Mother: I have two dogs.

At first blush, this example seems to stretch credulity somewhat. In the first instance, we have to strain to contemplate a family where the mother owns two dogs quite separately from her two-year-old child, who owns just one, and where it is news to both parties that either owns any kind of pet at all. But maybe mother and child are talking about toy dogs, or pictures of dogs. If so, then we are left with an ostensibly grammatical child utterance, which, in tandem with the adult response, yields a contrast between the two forms dog and dogs. If the child perceived a direct contrast in this case, they might reject the use of dog in this context, with future utterances being more like I have a dogs. On this scenario, then, the child's understanding of plural markers would be in serious peril. In fact, though, the Direct Contrast hypothesis does not apply, because there is no basis for the child to apprehend any functional equivalence, grammatically, between the child and adult forms. In the first instance, the child seems to be talking about one object, while the adult is talking about two. Not only do both speakers mark the nouns appropriately, they also, incidentally, use appropriate modifiers. Moreover, it is likely in this particular case that the adult would place contrastive stress on two, thus highlighting in a very explicit manner the intention to talk about something different from the child: two objects instead of one. The distinctiveness of the grammatical functions being expressed would, in all probability, also be underscored by the context of utterance. In short, it is difficult to see what might mislead the child into apprehending the adult use of dogs as an alternative for talking about a single dog.

Of course, children often omit the plural marker –s when referring to more than one object. If the child in (6) intended to express plurality, then, they might perceive the adult use of dogs as contrasting with their own. One would need to demonstrate that both child and adult were referring to two (or more) dogs, at the same time, in the same context of utterance, in order for the child to apprehend that the adult usage contrasted with their own. The key, then, in all cases is to determine whether the child could plausibly apprehend two linguistic forms as fulfilling an identical grammatical function, in a given context of utterance. Without this prior cognisance, there is nothing, on this view, that could trigger the rejection of their own form for the adult alternative.

It may seem trivial to consider constructed examples of this kind in such detail. If the examples in (5) and (6) do not serve the discussion well, then perhaps one might readily find more suitable alternatives. We would argue, however, that it is not at all easy to come up with credible fictions in the domain of adult-child discourse. The very nature of the impulse to find extreme examples that disprove a theory often renders them inherently more likely to lack empirical plausibility. Even where such cases are logically possible, unless they are attested in genuine interactions, their value in testing the theory is diminished. When one examines actual child-adult discourse, there is no evidence yet forthcoming that the child is misled by spurious points of contrast within the discourse. Moreover, the Direct Contrast hypothesis provides a plausible explanation for why the child will only ever focus on relevant contrasts.

Availability of Negative Input

Something in the region of twenty studies have now demonstrated that negative evidence, as defined here, is supplied to young children (see, for example, Demetras et al., 1986; Bohannon & Stanowicz, 1988; Farrar, 1992; Saxton, 2000; Strapp & Federico, 2000; Chouinard & Clark, 2003). Of immediate note, though, is the wide variation in levels of corrective information reported. With respect to negative evidence, Farrar (1992) reports a frequency of 3% for past tense errors compared with 44% for article errors. More recently, Chouinard & Clark (2003) report levels of negative evidence as high as 65% in some instances.

A number of factors underpin the wide range in levels of negative evidence reported. These include individual differences among parents and the child's other interlocutors, the linguistic level of the child, and the particular grammatical structure under review. The linguistic level of the child is important if only because, as development proceeds, the child produces fewer and fewer grammatical errors. Hence, opportunities to provide corrections progressively diminish. With regard to the particular structure, it is not clear why certain categories, like the past tense errors in Farrar's study, should be subject to relatively low levels of correction. In other cases, though, the level of corrective input witnessed is more easily explained. For example, Saxton (2000) reports that 51% of subject errors meet with negative evidence. But given that adults can scarcely produce a full sentence without a grammatical subject in English, it is hardly surprising that a high level of child subject omissions are followed by adult responses which model a sentential subject. Despite considerable variation in the frequencies reported, negative evidence has been reported in every empirical study on the topic. In fact, for every individual child for whom data are available, and also for every grammatical structure examined, negative input, as defined here, is supplied.

The issue of availability can be extended to consider whether corrective input is available for every single child. The answer to this question is of theoretical interest, if only because negative input could be dismissed as a necessary component of language development if even one child could be identified that had been denied access to corrective information. Unfortunately, cross-cultural research on this issue is extremely scarce. What little there is tends to lack empirical rigor, relying instead on anecdotal descriptions. An exception is provided by Chouinard & Clark (2003) who report the occurrence of negative evidence for French-speaking children. A more sceptical view is hinted at by Ochs (1982) in her discussion of Western Samoan society. She reports that parents spend little time interacting directly with very young children and provide few of the features of child directed speech familiar in Western settings. However, in the absence of more detailed empirical evidence, two notes of caution should be sounded. First, in Samoan society, the task of interacting with very young children is commonly assigned to older siblings. Given that children as young as 4;0 produce the modifications associated with child directed speech

(Shatz & Gelman, 1973), the possibility is open that older siblings may provide corrective input in Western Samoa. Beyond that, Ochs (1982:101) observes that parents do in fact paraphrase their children's speech. No category definition is supplied, but it is plausible that paraphrasing might encompass the kinds of error-contingent adult models investigated here (see Chouinard & Clark, 2003, for further discussion). These remarks underscore the fact that cross-cultural research is needed that directly addresses the issue of negative input. At the very least, it should be apparent that conclusions about the general non-occurrence of negative input are, as yet, premature.

Effects of Negative Input

Having established that both error-contingent models and error-contingent clarification questions are available to the child, it behoves researchers to assess what impact, if any, they have on grammatical development. In this regard, researchers have begun to investigate both the immediate and longer-term effects of (potentially) corrective input. With respect to immediate effects, a number of studies report a propensity on the part of children to reject erroneous forms and switch to the grammatical counterpart modelled for them by the adult (Farrar, 1992; Morgan, Bonamo & Travis, 1995; Saxton, 1997; 2000; Strapp & Federico, 2000; Chouinard & Clark, 2003). As with frequency of negative input, the rates at which children pick up on corrective information in this way varies considerably. Shifts in child speech from erroneous to correct (E → C) vary between 8% (Saxton, 2000) and 30% (Saxton, 1997), with levels for individual children reaching 58% (Morgan et al., 1995) and 45% for individual grammatical structures (Farrar, 1992). The frequency of corrective input may well be significant, in that it may be necessary to exceed a particular threshold level in order to exert any influence on the child. At present, there is very little evidence about what such threshold levels might be, nor yet whether children vary in their receptiveness to negative input. An indication is provided by the experimental studies conducted by Saxton and colleagues (1997; 1998). In these studies, some children rejected erroneous forms in favour of the correct version modelled for them after only one exposure. It is not clear, however, how much corrective input is needed to effect permanent improvements in the child's grammar.

Turning to longer-term effects, data from experimental and intervention settings all suggest that the effects of negative evidence can be observed after lags ranging from several weeks to several months (e.g., Saxton, Kulcsar, Marshall & Rupra, 1998; Proctor-Williams, Fey & Loeb, 2001). No effect was found, however, when Morgan et al. (1995) applied the econometric method of time series analysis to the data in Brown's (1973) corpus on three children. However, objections have been raised concerning both the adequacy of the modelling procedures used (Bohannon, Padgett, Nelson & Mark, 1996) and to the suitability of Brown's data for time series analysis (Saxton et al. 1998). On the latter point, the data in Morgan et al.'s study seriously violated the requirement that data be gathered at strictly regular intervals (for detailed discussion, see Saxton et al., 1998).

In examining the effects of negative input, it is not sufficient merely to examine improvements in the grammaticality of child speech. If the nativist description of the input is correct, what is described as negative evidence here would count as a subset of positive input. One could therefore attribute any effects witnessed to positive, rather than negative, input. One way of tackling this problem is to compare the effects of error-contingent and non-error-contingent models. On the nativist view, the context in which forms are modelled should make no difference in the effects observed on the child. In the contrast theory, on the other hand, the difference between the two is critical. In fact, available evidence supports the contrast theory. First, error-contingent models encourage significantly higher levels of E→C switches than non-error-contingent models (Farrar, 1992; Saxton, 1997; Saxton et al., 1998;

Saxton, 2000;). Second, E → C shifts are more frequent following negative input than following adult 'move-ons' (no correction; Morgan et al., 1995; Saxton, 2000). And third, children's intuitions concerning the status of grammatical and ungrammatical forms are closer to adult intuitions when past tense forms are modelled as negative, rather than positive, input. Overall, therefore, evidence is emerging that error-contingent models enjoy a special status in the input to the child, supplying a richer source of information on grammaticality than their non-error-contingent counterparts.

In the current study, we examine two types of positive input to provide bases for comparison with the effects of negative evidence. The first category, henceforth referred to as contingent models, comprises all adult models of target structures contingent on grammatical child utterances. The second, referred to here as non-contingent models, comprises all non-error-contingent adult models of target structures. Evidently, the first category comprises a subset of the second, and is promulgated on the assumption that contingent adult models may reinforce correct child uses and hence be of especial benefit to the child.

The current study aims to broaden and extend recent findings within the framework offered by the contrast theory. Data are currently required on the longer-term effects of negative evidence for normally developing children in naturalistic conversational settings. Studies with SLI children (e.g., Proctor-Williams et al., 2001) and experimental data (Saxton et al., 1998) lack ecological validity when it comes to assessing the effects of corrective input in the course of normal language acquisition. Without this kind of data, the relevance of negative input for theories of child language acquisition cannot be adequately assessed. Hence, the current study examines the effects of negative input on child speech after a lag of 12 weeks. Morgan et al. (1995) notwithstanding, the only extant data of this kind are reported by Proctor-Williams et al. (2001) for their control group of typically developing children with respect to two aspects of grammar, articles and copulas. Negative evidence was associated with improvements in the speech of children aged 2;0 for one of these structures (copulas) after a lag of eight months. The present study seeks to extend both the range of structures investigated and the size of language samples examined. In addition, the effects of negative evidence will be compared against the effects of the two forms of positive input described above (contingent and non-contingent models).

Method

Design

A correlational design was implemented, with frequencies of negative input at Time 1 being correlated with child grammaticality (CG) at Time 2. At first glance, standard concerns about direction of causation seem unnecessary, by dint of the lag between Time 1 (T1) and Time 2 (T2). It seems reasonable to assume that negative input at T1 might influence child grammaticality at T2, but not vice versa. However, it has long been established that the influence of adult input on child speech is tempered by the countervailing influence of the child's language on the speech of adults. In fact, child grammaticality at Time 1 (CG1) may be the causal factor underlying any positive correlation between negative input at T1 (NI1) and child grammaticality at T2 (CG2). This situation arises where child grammaticality at T1 underpins child grammaticality at T2, while at the same time being the causal influence on the adult's corrective behaviour at T1.

Given these caveats, an initial precaution is that children should be as similar as possible with respect to their language level at T1 (e.g., Scarborough & Wyckoff, 1986). A further consideration is the need to measure gains in child grammaticality from Time 1 to Time 2 (Richards, 1994). One reason is that a positive correlation might arise between NI1 and CG2, even in the absence of such gains. In this instance, any causal relationship between negative input and child grammaticality would be short-term via the child at T1. Unfortunately, gain scores tend to be negatively correlated with initial child status. Children with high scores for grammaticality at T1 are likely to make relatively small gains, while low scorers at T1 are likely to make larger gains. This diminution in variance has the consequence of attenuating the NI1xCG2 correlation. There is a danger, then, of producing conservative results which could underestimate the true strength of the NI1xCG2 relationship.

The preceding discussion serves to establish that simple gain scores for child grammaticality are best avoided. At the same time, Richard's (1994) observation that gain scores are required to gauge long-term effects remains valid. One solution to this problem, advocated by Richards and adopted here, is to use the residual gain scores derived from multiple regression analyses, since they have a zero correlation with CG1 by definition. In consequence, one removes what Gleitman, Newport & Gleitman (1984) refer to as 'the effects by the child on the child' (p.46). One is left, however, with 'the effects of the child on the mother' (ibid., p.46), in this case, the effect of CG1 on NI1. This latter problem can be addressed by partialing out the effects of CG1 from the NI1xCG2 correlation. This procedure allows one to use raw, rather than gain scores, since it yields the equivalent of a residual gain score (removing the effect of CG1 on gains in grammaticality at T2). At the same time, of course, the effect of the child on levels of negative input at T1 are removed. In summary, both regression analyses and partial correlations are used here to examine the effects of negative input on child grammaticality after a lag of 12 weeks.

The lag of 12 weeks between T1 and T2 was chosen for two main reasons. Firstly, this length of time is sufficient for the child to have made appreciable gains in grammatical development (cf., Saxton, 2000). And secondly, by taking the second sample before the child reaches full mastery, ceiling effects can be avoided. More generally, many studies which have investigated other aspects of input also report clear effects after an interval of three months or thereabouts (e.g., Nelson, Denninger, Bonvillian, Kaplan & Baker, 1984).

Participants

Twelve mother-child pairs were recruited from nurseries in west London, UK, and came from middle class families where English was the only language spoken in the home. There were 7 boys and 5 girls with a mean age of 2;0 at the start of the study (range 1;9 to 2;5). The mean length of utterance (MLU), averaged across all 12 children, was 2.31 at the start (range 1.38 - 3.06).

Materials

Both audio and video recordings were made of the mother-child interactions. Video recordings were made on a Panasonic Super VHS AG-450 which has a relatively high quality built-in microphone. Video data were supplemented with audio recordings, made on a Sony Digital Audio Tape Corder (TCD-D8).

Procedure

Participants were visited in their own homes on two consecutive days at both T1 and T2. On each visit, a total of two hours of recordings were made. Owing to child boredom and fatigue, and the intervention of daily routines, each two hour sample was compiled from a number of shorter recording sessions across the two-day period. Recordings were typically made in the living room of participants' homes, with the camera mounted on a low tripod in the corner of the room and operated by one of the authors. Participants were encouraged to engage in a range of normal activities, which included playing with toys, drawing, cooking and reading together. The lag of 12 weeks between T1 and T2 recordings was adhered to as closely as possible. In the event, recordings were made within a range of 12 weeks +/- 9 days.

Transcription and Coding

Initially, the data were transcribed and coded by the second author. Two further examiners then checked the resultant transcripts for accuracy, using the audio and videotapes. Disagreements were noted and where possible resolved by mutual agreement among examiners. Outstanding disagreements were marked as untranscribable and omitted from analyses. Utterances containing any portion of untranscribable material were likewise not analyzed further. For the purposes of analysis, each sample was confined to the first two hours of transcribed material. Child utterances were coded for both grammatical and ungrammatical uses of 13 structures: subject; object; 3rd person singular; determiner; present progressive auxiliary verb; prepositions; possessive; copula; auxiliary verbs (comprising all auxiliaries other than present progressive auxiliary); regular plural; irregular plural; regular past tense; and irregular past tense.

Examples of child grammatical errors from the transcripts are provided in Table 1. It should be borne in mind that errors of omission predominate in this phase of development. It is also worth noting that child utterances often exemplify more than one kind of error, a fact which is apparent from some of the examples in Table 1. The grammatical categories investigated in this study closely mirror those adopted in Farrar (1992) and Saxton (2000). An innovation here is the creation of regular and irregular categories from the more generic past tense and plural categories. In most cases, identifying an error for a particular category was relatively straightforward, although it was necessary on occasion to refer to the wider context of utterance in order to confirm coding decisions.

TABLE ONE ABOUT HERE

Maternal input was coded for the following three categories: negative evidence (NE); contingent models; and non-contingent models. Negative evidence was identified according to the category definition given in (7) below. Examples from the transcripts, with respect to specific categories of error, are also given in (7). As in Table 1, errors of omission are marked with '^'.

7. Negative Evidence

Negative evidence occurs directly contingent on a child grammatical error, and is characterised by an immediate contrast between the child error and a correct alternative to the error, as supplied by the child's interlocutor.

a. Determiner

Child: We haven't got ^ box.

Adult: No, we haven't got a box.

b. Irregular past

Child: I drawed it for you.

Adult: You drew it for me

Adult utterances were also coded for positive input with respect to the thirteen target structures. Two forms of positive input were examined: contingent and non-contingent models. Non-contingent models comprised all those instances where a target structure was supplied in an adult utterance which modelled that structure, excluding all cases of negative evidence, as exemplified in (8) below. Contingent models, meanwhile, comprised instances where the adult modelled target structures contingent on a grammatical child utterance, as in (9).

8. Non-Contingent Models

a. Subject, Object, Auxiliary, Regular Past

Adult: Have you tried it?

b. Subject, Copula, Determiner, 3rd Person Singular

Adult: Where's the biscuit?

9. Contingent Models

a. Article

Child: A table.

Adult: Yeah we'll have a little table here.

b. Subject, Regular Past, Preposition, Article.

Child: I played in the sand.

Adult: Have you played in the sand?

The transcripts were produced in a machine-readable format compatible with the conventions of the Child Language Data Exchange System (CHILDES). CHILDES provides software for the automatic analysis of transcripts known collectively as Computerized Language Analysis or CLAN. For the purposes of the current study, CLAN allowed mean length of utterance to be calculated automatically. In addition, once the transcripts had been coded, frequency counts could also be made automatically.

To assess the reliability of input coding, eight hours of material taken from four children at T1 and T2 were recoded. Given that the final corpus used in analyses comprised 40 hours of material (see Results section below), coding reliability was estimated from 20% of the total data set. For each of the three input categories, reliability was estimated by calculating the number of agreements between the two coders divided by the total number of coding judgments made (cf., Proctor-Williams et al., 2001). For negative evidence there was 93.9% agreement (339/361), for non-contingent models there was 95.7% agreement (6864/7175), while for contingent models there was 96.5% agreement (2974/3083).

Results

Data Set for Analysis

Data on two of the twelve children were omitted from analyses. This decision was taken in order to enhance the homogeneity of the population sample at T1 for statistical purposes Accordingly, children were excluded if their MLU at T1 was less than 2.0 and/or they showed gains in MLU from T1 to T2 of less than 1.0. The baseline level of 2.0 was selected because this figure provides an indication that children have reliably reached the level of early word combinations and emerging grammar. A minimum increase of 1.0 across the two sampling periods provided a further indication that the sample was relatively homogenous at T1.

Of the two children excluded according to these criteria, the first was a girl, aged 2;3.25 at T1, whose MLU dropped very slightly across recording sessions (MLU at T1 = 1.88, T2 = 1.83). The second child was a boy aged 1;9.29 at T1. His MLU increased only very slightly over the sampling period (MLU at T1 = 1.38, T2 = 1.58). Of the remaining ten children, two had an MLU less than 2.0 at T1, but both showed appreciable gains in MLU across the testing period. The first was a boy, aged 1;11.22 at T1 (MLU at T1 = 1.69, T2 = 2.95). The second child was a girl, aged 2;1.11 at T1 (MLU at T1 = 1.97, T2 = 3.05). Data on these two were therefore included in analyses. For two of the original thirteen grammatical structures (irregular plural and regular past tense), there were insufficient data to permit meaningful analyses. The final corpus for analysis, therefore, comprised 40 hours of transcribed data on ten children with respect to eleven grammatical structures at two points in time, separated by a lag of twelve weeks.

Changes in Child Grammaticality

We measured the extent to which child grammar improved from T1 to T2 in two different ways: (1) Mean Length of Utterance in morphemes (MLU); and (2) percentage correct use in obligatory contexts. MLU is perhaps the most common measure of grammatical development used in child language research, despite a number of well-catalogued limitations (e.g., Klee & Fitzgerald, 1985). For this reason, we chose to supplement MLU with our second measure. In this way, the global measure of MLU, applying as it does across all grammatical categories was bolstered with a measure specific to each target structure. With respect to (1), MLU at T1 averaged across the 10 participants was 2.45 (SD = 0.46), rising to MLU 3.25 at T2 (SD = 0.55). As expected, MLU increased significantly over the 12-week period, $t(10) = 4.83$, $p < 0.0005$ (one-tailed), indicating that the children were making advances in grammar. With respect to the second measure, percentage correct use in obligatory contexts was calculated for each target structure by dividing the total number of correct uses by a denominator comprising the total number of both correct and incorrect uses (multiplied by 100). Percentage increase in child grammaticality was then calculated from the simple formula T2 – T1 (see Table 2). Of note is that percentage grammaticality increased for all of the target structures except irregular past tense (-4.3). Taken together, the two measures described here indicate that for all ten children, and for all but one of the grammatical structures, improvements in grammar occurred over the sampling period. It is therefore possible to explore the effects of adult input on changes in the grammaticality of child speech.

TABLE TWO ABOUT HERE

TABLE THREE ABOUT HERE

Frequency of Corrective Input.

Table 3 shows the mean frequencies of adult input categories (negative evidence, contingent and non-contingent models). Given that 10 children participated, total frequencies are easily calculated from this table. In almost all cases, frequencies of negative input decline from T1 to T2. This trend simply reflects the increasing grammaticality of child speech over time. As the child produces fewer errors at T2, there are, correspondingly, fewer opportunities for parents to supply corrections. Observe that this decline is not witnessed for either form of positive input (contingent and non-contingent models). For example, in the case of non-contingent models, changes from T1 to T2 are not dramatic, and while frequencies decline for six of the structures, they remain practically the same or increase for the remaining five. A second point of note is that non-contingent models occur far more frequently than negative input (cf., Farrar, 1992, Saxton, 2000). The size of the discrepancy is huge in some cases. For instance, at T1 the adult models sentential subjects some 24 times more often than as negative evidence. At first glance, negative evidence appears to be quite infrequent in some instances. For example, negative evidence for irregular past forms at T1 occurs with a mean frequency of 1.7 over the two-hour sampling period. Low as this may seem, if one takes Maratsos' (1999) suggested 'talk week' of 40 hours, the child would receive something like 34 such corrections per week. Viewed in these terms, even the very lowest frequency of corrective input appears more substantial.

FIGURE ONE ABOUT HERE

Figure 1 shows the proportion of errors that meet with negative evidence. For the sake of clarity, the eleven target structures have been collapsed into four sub-categories: syntax (subject, object); unbound morphemes (determiner, preposition, copula, auxiliary, progressive); noun morphology (possessive, regular plural), and verb morphology (3rd person singular, irregular past). Figure 1 reveals that the morphological subcategories are very similar with respect to the overall proportion of errors meeting with some form of correction.

Rounding up, at T1, the totals for corrective input are: noun morphology, 57%, verb morphology, 58%, and unbound morphology, 59%. At T2, the totals are: noun morphology, 51%, verb morphology, 58%, and unbound morphology, 57%. As can be seen, for each of the three sub-categories, there is a fall over time in the proportion of errors corrected. However, when the nine individual morphological categories were compared, no significant difference was found in the percentage of errors corrected at T1 and T2, $t(9) = 1.65$, $p < .14$ (two-tailed).

Figure 1 also shows that corrections for syntactic errors are somewhat more frequent than for morphological errors. The percentage of errors corrected at T1 is 75%, while at T2 , the corresponding figure is 68%. While percentage corrections for object errors are in line with those for morphological errors, corrections for subject errors are more frequent (cf. Saxton, 2000). As mentioned above, though, it is rare for adults to produce sentences without a grammatical subject, so the child's subject omissions are especially likely to be corrected. With only two individual structures in the syntax sub-category, a meaningful comparison between levels at T1 and T2 cannot be made, but it is apparent that the fall over time is similar to that for morphological errors.

Effects of Input on Child Grammaticality

The effects of corrective input were assessed initially by correlating level of negative input at T1 (NI1) with child grammaticality at T2 (CG2), as shown in Table 4. This table also shows corresponding correlations for both forms of positive input. As discussed in the Design section above, raw scores were used for all measures.

TABLE FOUR ABOUT HERE

Table 4 reveals that, for three of the 11 target structures, a strong positive correlation exists between negative evidence at T1 and CG2: possessive, $r = 0.84$; 3rd person singular, $r = 0.77$; and copula, $r = 0.85$, all significant at $p < .01$. Turning to non-contingent models (NCM), the NCM1xCG2 correlations are uniformly low, ranging from -0.13 to 0.33. Similarly, correlations for contingent models at T1 with CG2 are low for all grammatical structures, ranging from -0.15 to 0.37.

For the three structures where significant correlations with negative evidence were found, further analyses were conducted in which the effects of child grammaticality at T1 (CG1) were partialled out of the NI1xCG2 correlation. As mentioned above, this procedure yields both a residual gain score as the measure of negative input and simultaneously removes the effect of the child's own speech at T1. The strength of correlations was preserved following this procedure. Thus, for negative evidence the partial correlations were: possessive, $r = 0.77$; 3rd person singular, $r = 0.74$; and copula, $r = 0.79$, all significant at $p < 0.01$. Given the small sample size employed in this study, the effect sizes observed need to be sufficiently robust to compensate for the loss of power engendered by the small N. Accordingly, power analyses for one-tailed tests were conducted for the three significant partial correlations reported. For the possessive and the copula, power emerges as 0.74 in each case, while for the 3rd person singular, power was 0.71. Given that 0.80 it is typically taken to indicate a very strong effect size, we can be confident that our findings are sufficiently powerful for us to have confidence in the positive findings we report, despite the small sample size.

For the three structures where effects were found, hierarchical regression analyses were conducted to assess the relative contributions at T1 of negative evidence (NE1) and child grammaticality (CG1) to child grammaticality at T2 (CG2). With a participant sample of 10, regression analyses are problematic. There should be an absolute minimum of 5 participants for each variable entered into a regression model, and although the data reported here conform to that constraint, the results should nevertheless be interpreted with caution.

For 3rd person singular, taking negative evidence and CG1 as predictor variables, the overall model was significant, $F(1,8) = 6.15$, $p = 0.029$. CG1 did not make a significant contribution to the model and was excluded, whereas negative evidence accounted for 53.3% of the variance (standardized beta 0.70, $t(10) – 2.88$, $p = 0.024$). This pattern was repeated for the copula. When NE1 and CG1 were entered as predictor variables, the overall model was significant, $F(1,8) = 9.29$, $p = 0.011$, but child grammaticality did not make a significant contribution and was excluded from the model. Negative evidence, on the other hand, accounted for 64.8% of the variance (standardized beta 0.78, $t(10) = 3.38$, $p = 0.012$). Finally, for the possessive, the overall model was significant when NE1 and CG1 were entered, $F(1,8) = 7.46$, $p = 0.026$, although CG1 was excluded from the model because of its insignificant contribution. Negative evidence, on the other hand, accounted for 41.8% of the variance in this model (standardized beta 0.70, $t = 2.73$, $p = 0.026$).

Overall, therefore, there is converging evidence that, for this group of children, negative evidence is associated with gains in the grammaticality of child speech after 12 weeks for three grammatical structures: 3rd person singular, possessive, and copula. In contrast, neither form of positive input (contingent and non-contingent models) showed any significant associations with child grammaticality at T2.

Discussion

Of the four kinds of input signal examined in this study, only error-contingent adult models were associated with any appreciable gains in the grammaticality of child speech. These effects were observed for only three out of thirteen grammatical structures examined. However, the three effects that <u>were</u> observed contribute to a growing body of work suggesting that the structure of the discourse can exert an influence on grammatical development (e.g., Saxton, 2000; Strapp & Federico, 2000; Chouinard & Clark, 2003). Confidence in the strength of these findings is enhanced by the triangulation provided by partial correlations, multiple regression analyses and the power analyses reported. The current study is also valuable for confirming a number of previous findings in the literature. First, the effect of negative input observed for the copula was reported by Proctor-Williams et al. (2001) for their sample of ten normally developing children. They report a simple correlation of .63 between rate of corrective recasts and child grammaticality at a remove of eight months. When percentage correct use in obligatory contexts is taken as the measure of child grammaticality, the correlation is .87. This accords well with the correlation of .85 reported here. Similarly, Proctor-Williams et al. (2001) report a negligible NI1xCG2 correlation for articles of .09 (taking rate of correct use as the child measure). The equivalent correlation here is the .14 reported for determiners, a category which largely overlaps with that of articles. A further finding confirmed from previous research is that levels of negative input vary according to the particular structure. Thus, corrections for subject errors are especially high (cf., Saxton, 2000), while the rates for past tense errors are low (cf., Farrar, 1992).

Selective Effects of Negative Evidence

The thesis advanced here is that error-contingent adult models constitute a form of negative evidence for the child. To be characterized as negative evidence, though, one must demonstrate that the child is informed not only about what is permissible in the adult grammar, but also about what is inadmissible. Thus, evidence is required that such input has prompted the child to realign an immature grammar to conform to adult norms. For three structures in the present study, the evidence is consistent with this view, since child speech becomes more adult-like after a lag of 12 weeks. At the same time, one must consider why negative evidence is so selective in its effects. The most obvious explanation is that the child is impervious to corrective input in the majority of cases. That being so, one would have to explain why some errors are susceptible to corrective input. One possibility lies in the perceptual salience of the structures in question. Perhaps there is something especially salient about the structures where effects were observed: the copula, 3rd person singular (3PS) and possessive. In the case of all three, they can occur as word-final –s in English. But so does the regular plural, so one would predict similar effects for all four structures, if perceptual salience alone were responsible for the child's susceptibility to negative evidence. The copula can also occur as one of several free-standing word-forms (am, is, are, be). But in these cases, its salience is unlikely to be any greater than for the other unbound morphemes examined, such as the auxiliary verbs, where no effects were found. Perceptual salience is therefore unlikely to provide a comprehensive explanation for the selective effects of negative evidence.

Perhaps a more plausible explanation for the observed non-effects lies in the methodology. One of the perennial challenges facing child language researchers is to isolate the effects of key aspects of the input on the child's developing grammar. The clear effects observed in experimental studies (Saxton, 1997; Saxton et al., 1998) must always contend with the charge that they lack ecological validity. Studies like the present one, meanwhile, based as they are on naturalistic data, suffer from a number of limitations. First, there are numerous factors that are either difficult or impossible to control for, including the child's experience of the input outside the particular sampling frame adopted for the study. The sampling process is a little like casting a net onto the waters, in the expectation of catching fish of every size. But it is well known that the developmental course for different grammatical structures varies considerably (Brown, 1973). It is likely, therefore, that the child's susceptibility to negative input will also vary, according to the point in development reached for a given structure. By extending the range of structures studied from two (Morgan et al. 1995; Proctor-Williams et al., 2001) or, in one case, from seven (Farrar, 1992) to thirteen, as here, the chances of sampling an optimum period for all structures automatically recede.

It is vital that studies of negative input continue to expand the range of grammatical structures investigated. This effort is needed to address the central theoretical issue of generality: do all children receive negative input for all grammatical structures? The current study is valuable in this respect for confirming that, for all 13 structures investigated, corrective input is available to the child. Unfortunately, the desire to extend the range of structures automatically reduces the chances of achieving homogeneity in child grammaticality at T1. It will be recalled that this constraint is desirable from a statistical standpoint. As noted, though, the child will not be at the same developmental stage even for two different structures at a given point in time, let alone for the 13 that we started out with. When homogeneity is breached in this way, Type II errors are more likely to arise. In consequence, there is an increased chance that genuine effects will be missed. Sampling problems could therefore be partly responsible for the lack of effects observed in some cases. To combat this problem, it may well be necessary to focus on particular grammatical structures one at a time, taking to care to select children who display a similar level of grammaticality at T1.

Another factor that might explain the selective effects of negative evidence is the rate of development for each structure. Germane to this point, Morgan et al. (1995) and Saxton (2000) both report stronger effects of negative input when the sample is confined to the period beyond which the child attains 50% correct usage. In the present study, it is notable that negative evidence is associated with gains in child grammar for structures where the child's rate of development is quite substantial. Thus, percentage increase in child grammaticality ranges from 12.2% (copula) to 35.0% (possessive) from T1 to T2. Other structures, meanwhile, show considerably slower rates of growth during this period. Object (1.4%), subject (4.7%), progressive (5.6%) and regular plural (5.2%) are all fairly stagnant in this respect. One might add to this list the negative correlation reported for irregular past tense (-4.3%). Not only is the percentage change in grammaticality low, it goes in the opposite direction to that expected. Indeed, if decreases in grammaticality correlated with increases in error-contingent models, one might call into question its function as a form of corrective input. The low range of variation for these five structures creates attenuation in the correlations between adult input and child grammaticality. It is not surprising, therefore, that no strong relationships were identified in these instances.

However, this argument cannot be applied in the case of determiners (23.9% increase from T1 to T2), prepositions (13.9%) or auxiliary verbs (22.7%). Of note is that all three structures are unbound morphemes, but as noted above, so (in part) is the copula, where the effects of corrective input are in evidence. The situation with regard to determiners is particularly puzzling. In addition to the high gains in child grammaticality, one might point to the high frequency of negative evidence supplied at T1 (60.0%). However, determiners stand out from all the other structures investigated here with respect to variability within the sample. At T1, standard deviations are unusually high for both child grammaticality and the level of negative evidence supplied. There is, then, considerable heterogeneity at T1 in levels of both child use and adult corrections. The chances of a Type II error occurring for this structure are especially high. As noted above, one possible remedy in future work would be to focus on this particular structure, paying particular attention to the issue of homogeneity at T1.

A general point can also be made concerning the desire to capture input effects. It should be borne in mind that, for each structure, there may be a critical point in development where the child becomes susceptible to corrective input. One must distinguish between this scenario and the more obvious interpretation, whereby the child is simply immune to corrective input in some cases. Further research should broaden the range of sampling periods and consider the issue of identifying different developmental stages in the acquisition of specific structures.

Non-Effects of Positive Input

A final point of interest to emerge from the data concerns the effects of positive input, investigated here in two forms: all adult models of target structures, save those following child errors (non-contingent models), and those adult models contingent on the child's own grammatical use of a given target structure. It will be recalled that neither form of positive input was associated with later child grammaticality for any of the thirteen structures. Correlations were uniformly low, with most correlations being around .20. This confirms work on the child's immediate responses, where similar non-effects for positive input have been reported (Farrar, 1992; Saxton, 1997, 2000; Saxton et al., 1998). Evidently, the sheer quantity of linguistic forms modelled by the adult is less critical than the context in which they are modelled. Put another way, when the linguistic forms are presented contingent on the child's own errors, the benefits for grammatical development are (sometimes) more readily apparent.

Logically, language acquisition is impossible without positive input, however construed. The child cannot learn anything about a language unless they are exposed to it in some way. But it would seem that there is no direct or obvious relationship between positive input and the grammaticality of child speech, at least not for the time frame sampled. One possible reason for this is that positive input may already have exerted its influence to a large extent. Thus, at Time 1, child speech exemplified all of the structures under investigation. In a sense, this is proof enough that positive input has had an influence on the child. This influence is likely to be on the initial acquisition of grammatical structures by the child. Of particular interest here, though, is whether positive input can also contribute to the retreat from error. Many theorists assume that positive input is insufficient in this regard (e.g., Morgan et al., 1995) and the current study lends support to this position.

Argument from the Poverty of the Stimulus

Numerous researchers, mainly in the nativist tradition, continue to adhere to the 'no negative evidence' assumption (e.g., Chomsky, 1999; Maratsos, 1999; Marcus, 1999). This assumption is unlikely to fall by the wayside, even in the unlikely (or distant) event that corrective input proves to be a necessary component of language acquisition. The reason is that the 'no negative evidence' assumption provides an important stimulus to theorising about language acquisition, one that has generated numerous useful theoretical insights. It is seductive, but misguided, to think that demonstrations of a rich input give one license to reject the existence of innate constraints on language learning. Logically, both could co-exist. Essentially, nativist theorists pose the question 'what would the child's endowment for language look like if negative input were not available?' In so doing, one is more likely to discover the full nature and extent of innate structure in language acquisition.

As mentioned above, the 'no negative evidence' assumption provides empirical support for the argument from the poverty of the stimulus (APS) (Chomsky, 1980). However, the connection made between (the lack of) corrective input and the APS is, perhaps, of limited value. Saxton et al. (1998) illustrate this point by examining, for argument's sake, an aspect of Universal Grammar, dubbed principle (X). When the APS is applied, one assumes that acquisition of principle (X) is constrained jointly by underspecified positive input and an absence of negative input. Hence principle (X) must be innate. But there remains the challenging issue of specifying the nature of principle (X). This task has been the remit of linguists, who promulgate theoretical accounts of linguistic principles. But for any given linguistic phenomenon, one can typically find a slew of competing accounts. The widely differing explanations of the null subject phenomenon offered by Hyams (1986) and Huang (1995) provide a case in point. One arrives at a situation where each and every account of the null subject phenomenon can appeal to the 'no negative evidence' assumption in support of its claim that it corresponds to a genetically determined property of grammar. ‘The 'no negative evidence' assumption could therefore never function as an evaluation metric for assessing the relative merits of one theoretical account over another’ (Saxton et al., 1998:718). Apparently, even if one accepts the 'no negative evidence' assumption at face value, its impact on the task of characterising the precise nature of the innate component in language acquisition is minimal. At best, it supports the conclusion that 'something is innate', but this contributes nothing new to the nature-nurture debate.

The Mechanism of Retreat: Form versus Meaning

The Direct Contrast hypothesis, as detailed above, applies in cases where the child grammar is overgeneralized. Typically, the child system allows two forms where the adult grammar permits only one. A case in point would be the commonly observed vacillation between the use and omission of obligatory morphemes (e.g., Gary cake and Gary’s cake to express possession). Another example would be the period when children use both irregular and overregularized past tense forms for a single verb (e.g., buyed and bought). The child is thus apprised that two given forms are equivalent, in the sense that they fulfil the same grammatical function. The Direct Contrast hypothesis then predicts that the child will be shaken in this belief by the contrast in usage engendered in cases where the child's (erroneous) selection is followed immediately by the (correct) adult alternative. It is predicted that this unique kind of contrast creates the basis for the child to reject their own selection in favour of the adult form. The stimulus is thus provided for the child to shed forms that, from an adult perspective, are ungrammatical.

This focus on the contrast in linguistic forms has been challenged recently by Chouinard & Clark (2003), who emphasise instead the child's intended meaning. They argue that 'parents often check on their children's intentions when these are unclear' (p.643) and use so-called reformulations to express the child's meaning in a conventional form. In reformulating the child utterance, a contrast between child and adult forms is created in the discourse, highlighting different ways of expressing the same meaning. Clark's (1987) Principle of Contrast is then invoked to explain why the child might proceed to reject their own form in favour of the one modelled by the adult. This principle decrees that children 'do not use or accept two forms for the same meaning, but defer instead to adult speakers, the experts on the conventional forms for expressing specific meanings' (Chouinard & Clark, 2003:643).

The use of the term contrast in both accounts is liable to create confusion, so a careful comparison of the two approaches is called for. To maintain distinctiveness, the term Principle of Contrast will be confined to Chouinard & Clark's exposition, while the term Direct Contrast will be used when discussing Saxton's (1997) approach. When Clark (1987) first advanced the Principle of Contrast, its application was confined to the field of lexical development. Now, though, Chouinard & Clark apply their notion of contrast more widely, at the levels of phonology, lexis and grammar. A more pointed development is the application of this notion to the issue of negative evidence. In the process, however, it emerges that considerable violence is done to Clark's original proposals. For example, the Principle of

Contrast is predicated on the fact that 'wherever there is a difference in form in a language, there is a difference in meaning' (Clark, 1987:1, original emphases). Critically, therefore, this Principle centres on contrasts within a language, not within the structure of conversation. The explanation for expunging errors, in the original version, was that 'children narrow down over-extensions as they acquire new, contrasting vocabulary items' (Clark, 1987:10). There is nothing in this approach about the creation of contrasts between adult and child speech within the discourse between them (as dealt with by Saxton's Direct Contrast hypothesis).

A further problem with Chouinard & Clark's approach lies in their focus on parents as constant monitors of children's meaning. Undoubtedly, there are occasions when parents are not sure precisely what meaning their child intends to express. Arguably, however, for the vast majority of grammatical errors, confusions of this kind are rare. For example, it is very doubtful that a parent would need to check up on the child's intended meaning when the latter says: I drawed a lovely picture for you. We would argue that the meaning of drawed is entirely transparent. It is only the linguistic form that the adult might take issue with. Concomitant with Chouinard & Clark's approach is an image of the parent in a permanent state of puzzlement about what their child intends to say, given the high level of reformulations reported in their study. In effect, the parent is portrayed as lacking the expertise to communicate effectively with their own child. A more conventional view, one subscribed to by Clark herself, sees the parent as especially well tuned to the child's linguistic efforts, such that 'familiar adults can more readily deal with imperfections in children's pronunciations, while unfamiliar adults will have a harder time identifying the intended targets' (Clark, 2003:329). For this reason, we would reject Chouinard & Clark's suggestion that the adult is constantly checking up on the child's intentions. We would argue that the reformulations identified by Chouinard & Clark are more readily interpreted as a means, deployed by parents and others, to facilitate the flow of conversation with a linguistically and cognitively naive interlocutor (Saxton, in press).

It is also worth noting that Clark's Principle of Contrast has difficulty explaining how the child can maintain two forms for expressing the same meaning for any length of time. For example, Gathercole (1989:697) points out that Clark's Principle of Contrast 'cannot explain the acquisition of allomorphs. If children assumed that two forms must have different meanings, it would be impossible for them to come to the position that representations of the same morpheme mean the same thing.' In the arena of negative evidence, one might argue that this problem is magnified considerably. Take the case of irregular past tense errors. As noted, child speech typically exemplifies both grammatical and erroneous forms (e.g. broke and breaked), for periods of many months, even years (e.g., Marcus et al., 1992). But if, as Clark suggests, children have an inherent bias towards rejecting two forms for one meaning, how could they tolerate both forms in their own speech for so long? Within Saxton's approach, on the other hand, the co-occurrence of equivalent grammatical forms like breaked and broke is the very basis on which the Direct Contrast hypothesis operates. It is only when the two forms are juxtaposed directly in the context of child-adult discourse that the contrast, or conflict, between the two forms is revealed to the child.

Ultimately, it is a matter for empirical enquiry as to whether a contrast in meaning or a contrast in form drives the child's response to negative evidence. As it stands, we believe that the weight of theoretical argument favours Saxton's Direct Contrast hypothesis. However, extant empirical evidence is broadly consistent with both approaches. It remains for future work, therefore, to disentangle these competing explanations with any assurance. In the meantime, it is worth noting that Chouinard & Clark's (2003) contribution to the growing literature on negative evidence is to be welcomed for its attention to theoretical concerns, as well as for the richness of its empirical contribution to the field. The promotion of competing theoretical positions can only invigorate the debate on an important topic in child language acquisition.

Concluding Remarks

Corrective input might facilitate language acquisition without being in any way essential. The current study suggests that contrastive discourse fulfils a facilitative (corrective) function for at least three grammatical structures. As mentioned, though, it may well turn out that negative input is not a <u>necessary</u> ingredient for successful language acquisition. Although theoretical interest would thereby diminish in some quarters, its position as an important topic of enquiry should nevertheless be unaffected. If for no other reason, there is increasing evidence that children who experience language delay can benefit from intervention programmes geared around the provision of adult-contingent modelling (e.g., Fey, Cleave, Long, & Hughes 1993; Fey, Long & Finestack, 2003). The present study demonstrates that, in a few instances at least, negative input is associated with long-term gains in the grammaticality of child speech. More generally, there are clear signs that the structure of the discourse can convey information over and above the simple confirmation that particular linguistic forms exist. Evidence is now forthcoming that young children can exploit that information in the realignment of an immature grammar.

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Figure 1

Percentage Grammatical Errors Subject to Negative Evidence

Note. Syntax: subject, object. Noun morphology: possessive, regular plural. Verb morphology: 3rd person singular, irregular past. Unbound morphology: determiner, preposition, copula, auxiliary, progressive (auxiliary).

Table 1

Child Utterances Exemplifying Thirteen Categories of Grammatical Error

Type of Error			
Syntactic	Noun Morphology	Verb Morphology	Unbound Morphology
Subject	*Possessive*	*3rd Person Singular –s*	*Determiner*
^ thinks it's funny, Mum. Do ^ want the T-shirt?	Megan ^ dog. Oh, Hannah ^ foot.	And this one do ^ not open. It still hurt ^	Give piggy ^ kiss. I want to stay in ^ car.
Object	*Regular Plural –s*	*Regular Past –ed*	*Preposition*
On the foot I spilt ^ You stamp ^ together.	Big shed for train ^ Six rabbit ^	I think he poke ^ it at Jake. Bump ^ his head.	I play ^ Soft Stuff. Jumping ^ a bed.
	Irregular Plural	*Irregular Past*	*Copula*
	Lots of leave ^. And the ticket *mans.*	Hannah F*all* off. It's *stucked* on the wall, look.	There ^ the farm. And that one ^ blue.

Table 1 (continued)

Type of Error			
Syntactic	Noun Morphology	Verb Morphology	Unbound Morphology
			Auxiliary Verb[a]
			Where ^ this go?
			Why ^ you got cover for it?
			Present Progressive (Auxiliary)
			I'll hiding from you, Phillip.
			What ^ he doing?

Note. For a given category, the locus for an error of omission is highlighted by '^', while errors of commission are italicized.

[a]Includes all auxiliary verbs except the present progressive auxiliary.

Table 2

Grammaticality of Child Speech Expressed as Mean Percentage Correct Use in Obligatory Contexts

Structure	Time 1 (T1)	Time 2 (T2)	Percentage increase (T2 – T1)
Subject	90.3 *(8.1)*	95.0 *(3.6)*	4.7
Object	96.1 *(4.3)*	97.5 *(1.8)*	1.4
Determiner	62.4 *(24.4)*	86.3 *(9.1)*	23.9
Preposition	81.3 *(20.3)*	94.6 *(5.1)*	13.3
Copula	76.0 *(14.6)*	88.2 *(6.7)*	12.2
Auxiliary Verbs	62.2 *(21.6)*	84.9 *(8.5)*	22.7
Progressive (Aux)	88.2 *(6.7)*	93.8 *(4.3)*	5.6
3rd Person Singular	68.4 *(17.0)*	85.9 *(5.3)*	17.5
Irregular Past	84.4 *(10.1)*	80.1 *(10.4)*	-4.3
Possessive	32.1 *(24.7)*	67.1 *(27.0)*	35.0
Regular Plural	79.1 *(12.8)*	84.3 *(3.4)*	5.2

Note. SD in parentheses

Table 3

Mean Frequencies of Adult Input Categories

Structure		Negative Evidence			Contingent Models	
	T1	T2	T1	T2	T1	T2
Syntax						
Subject	16.9 *(11.1)*	12.4 *(6.7)*	413.4 *(98.7)*	339.7 *(93.9)*	80.4 *(33.0)*	99.8 *(30.4)*
Object	2.3 *(2.1)*	2.5 *(1.8)*	179.7 *(42.5)*	166.8 *(37.7)*	47.2 *(25.8)*	53.3 *(18.0)*
Noun Morphology						
Possessive	7.6 *(9.7)*	2.9 *(3.9)*	36.8 *(13.5)*	38.7 *(14.6)*	1.7 *(1.9)*	4.3 *(5.3)*
Regular Plural	4.6 *(2.8)*	4.3 *(2.5)*	114.4 *(58.5)*	107.8 *(44.9)*	16.2 *(8.1)*	16.4 *(6.4)*
Verb Morphology						
3rd Person Singular	18.6 *(8.1)*	10.4 *(4.9)*	181.2 *(48.1)*	146.5 *(39.7)*	28.2 *(16.7)*	33.1 *(16.8)*
Irregular Past	1.7 *(2.5)*	3.1 *(1.8)*	49.7 *(27.4)*	59.4 *(21.1)*	8.7 *(6.9)*	8.4 *(5.7)*
Unbound Morphology						
Determiner	49.3 *(36.2)*	23.3 *(15.4)*	200.7 *(48.0)*	171.8 *(38.8)*	54.8 *(23.3)*	76.5 *(22.7)*
Preposition	3.6 *(3.5)*	1.9 *(2.0)*	101.8 *(47.8)*	102.0 *(30.7)*	16.3 *(10.8)*	24.9 *(12.3)*
Copula	11.4 *(9.3)*	7.9 *(5.1)*	149.8 *(42.0)*	129.1 *(35.9)*	23.8 *(17.2)*	26.7 *(13.1)*

Auxiliary	14.4 (6.9)	13.3 (5.8)	235.7 (72.2)	231.2 (63.9)	18.0 *(13.5)*	35.8 *(13.3)*
Progressive (Aux)	1.4 *(1.4)*	0.7 *(0.7)*	59.5 *(23.7)*	64.7 *(22.7*)	13.0 *(6.4)*	17.2 *(12.0)*

Note. *SD* in parentheses

Table 4

Correlations between adult input at T1 and child grammaticality at T2

Structure	Negative Evidence	Non-Contingent Models	Contingent Models
Syntax			
Subject	0.35	0.17	0.25
Object	0.02	-0.13	0.22
Noun morphology			
Possessive	0.84**	0.29	-0.15
Regular plural	0.19	0.07	0.15
Verb morphology			
3rd person singular	0.77**	0.20	0.31
Irregular Past	0.02	0.33	0.18
Unbound morphemes			
Determiner	0.14	0.13	0.35
Preposition	0.03	0.24	0.37
Copula	0.85**	0.28	0.36
Auxiliaries	0.32	0.23	0.24
Progressive	0.27	0.09	0.31

Note. ** p <.01

Figure Captions

Figure 1. Percentage frequency of negative evidence for grammatical errors at T1 and T2

Footnotes

1 <u>Negative input</u> is used here as an umbrella term. Within the Contrast theory (Saxton, 1997), two distinct forms of negative input are identified: <u>negative evidence</u> and <u>negative feedback</u>. The focus here is on negative evidence, but see Saxton (2000) and Saxton, Houston-Price & Dawson (in press) for a consideration of the occurrence and effects of negative feedback.

2 Examples 1 to 4 are taken from the diary study reported in Saxton (1995), in which the child was aged 4;1 to 4;9. Examples 5 and 6 are constructed, while examples 7 to 9 are drawn from the current study. Italics are used to highlight relevant linguistic forms, not to indicate emphasis in pronunciation.