Mothers', fathers', and siblings' responses to children's language errors: comparing sources of negative evidence*

CHEHALIS M. STRAPP

Western Oregon University

ABSTRACT

Despite previous work showing that mothers, fathers, and siblings provide negative evidence regarding children's grammatical errors, the role of linguistic input remains controversial. Since most work in this area has concentrated on negative evidence in the mother–child dyad, this study extended prior work by comparing mothers', fathers' and siblings' corrective repetitions to children's errors across different family settings. Fourteen children (2;3) were videotaped interacting with their mothers, fathers, and siblings (4;1) in dyad, triad, and tetrad settings. Analyses revealed that mothers and fathers provided more corrective repetitions than siblings did. Although the size of the setting did not differentiate responding, when specific configurations were examined differences emerged. Analyses of individual families revealed that all children received feedback following syntax errors. These results are discussed in terms of current negative evidence research.

INTRODUCTION

The role of linguistic input or 'negative evidence' in grammatical de-velopment remains a central issue dividing accounts of language acquisition (Bohannon & Stanowicz, 1988; Pinker, 1989; Hyams, 1992; Saxton, 1997).

In a classic study of children's language, Brown & Hanlon (1970) found that parents do not provide explicit feedback or negative evidence to children's syntactic errors. This finding led to nativist language theories based on the assumption of 'no negative evidence' (i.e. Pinker, 1989; Hyams, 1992). Subsequently, several studies demonstrated that mothers (Hirsh-Pasek, Treiman & Schneiderman, 1984; Demetras, Post & Snow, 1986; Farrar, 1992) fathers (Penner, 1987; Bohannon & Stanowicz, 1988), and even siblings (Strapp, 1993) recast or repeat with corrections following children's grammatical errors. Consider the following example from Post (1995:139).

    Child: Brush pony hair
    Mother: Brush the pony's hair

This line of research argues that corrective repetitions provide children with implicit negative evidence. Unfortunately, reaching agreement regarding how repetitions may facilitate syntax has been a difficult task. Bohannon & Stanowicz (1989) suggested that the most beneficial type of feedback involves imitation of the child's utterance involving as many elements of the utterance as possible. Sokolov (1991) argued that the majority of syntactic errors produced by children are errors of omission. Recasts provide the most information to the child through the addition of correct lexical items to the original utterance. Maintaining the semantic topic of the child's utterance is another suggested facilitative feature of recasts (Nelson, 1991). Howe (1993) suggested that corrective repetitions provide opportunities for children to recognize instances of misunderstanding between their intention and an adult's interpretation. For example, consider the following from Howe (1993:21)

    Child: Play that
    Mother: You're going to play with that, eh?
    Child: Mummy, you play that

Such misunderstandings may spur children to produce more advanced forms in order to get their point across. In addition, when children's overregularizations such as 'blowed' and 'comed' are recasted with 'blew' and 'came' it allows for direct comparison between the two forms. If children apply a strategy of mutual exclusivity, as suggested in the semantic development literature (Markman, 1992), they will avoid two words to express the same idea and reject their incorrect form in favor of the adult form (Howe, 1993). Similarly, Saxton's (1997) contrast theory proposes that when an adult repeats with corrections, the child's erroneous form is in direct contrast to the adult's form. A child faced with this conflict will reject the error and retain the correct form.

374

Although many facilitative features of corrective repetitions have been identified, these conclusions were derived primarily from research on mother–child dyads when most children grow up in polyadic situations (Lieven, 1994). It will be argued that despite extensive research in this area, little is known about children's everyday exchanges with mothers, fathers, and siblings. This research seems necessary for determining the external validity of negative evidence and establishes usefulness within the domain of syntax acquisition. The current study sought to extend prior research to an area not previously investigated, multiple settings within families. In addition, this study will address questions regarding the relevance of negative evidence to current accounts of language acquisition.

Negative evidence in different family settings

The majority of studies investigating corrective repetitions have focused on linguistic interaction in the mother–child dyad (Hirsh-Pasek, *et al.*, 1984; Demetras, *et al.*, 1986; Farrar, 1990, 1992). Repeatedly, these studies indicate that mothers repeat verbatim children's well-formed speech and recast ill-formed speech as often as 34 % of the time (Bohannon & Stanowicz, 1988). Studies that have compared mother–child and father–child dyads (Penner, 1987; Bohannon & Stanowicz, 1988) have found comparable rates of responding across the two settings, suggesting that both parents are capable of providing negative evidence to a child acquiring syntax.

Several studies investigating the mother–sibling–child triad (Tomasello & Mannle, 1985; Wellen, 1985; Barton & Tomasello, 1991; Post, 1995) indicate differences in both the quality and quantity of linguistic interaction in the triad setting when compared to the mother–child dyad. A few studies have directly investigated recasts in the triad setting. Wellen (1985) found that mothers produced fewer recasts in the mother–sibling–infant triad than in the mother–infant dyad. In contrast, Post (1995) found mothers' recasts in the triad setting comparable with levels reported in dyadic research. Unfortunately, neither study considered recasts produced by siblings. In terms of general linguistic interaction in the triad setting, Barton & Tomasello (1991) found that preschool-aged siblings failed to acknowledge the infant 83 % of the time. Other research found preschool aged siblings use less corrective feedback than adults in the triad setting (Tomasello & Mannle, 1985) and in the sibling–child dyad (Strapp, 1993). Although the language promoting features of adult–child dyads are probably superior to adult–sibling–child triads, or sibling–child dyads, little research exists comparing negative evidence across family settings. Such research may provide insight into the everyday occurrence of negative evidence and address arguments regarding the relevance of corrective repetitions to explanations of syntax development.

375

Learnability arguments

Learnability theorists criticize these studies and refute the importance of negative evidence. Pinker (1989) postulated four conditions which must be met before corrective repetitions are considered relevant to syntactic development including (a) negative evidence must be present, (b) it must be useful to the child, (c) it must be used by the child, and (d) negative evidence must be necessary for syntax acquisition. These conditions are described below along with analyses of how well prior research has met these conditions. It will be argued that further investigation of negative evidence across family settings will serve as additional support in meeting Pinker's conditions.

The first condition, that negative evidence must be present is met in the studies described above (Hirsh-Pasek, *et al.*, 1984; Demetras, *et al.*, 1986; Penner, 1987; Bohannon & Stanowicz, 1988; Farrar, 1992; Strapp, 1993; Post, 1995). These studies all found that family members provide negative evidence by repeating with corrections following children's errors. The presence of negative evidence beyond the dyad and mother–sibling–child triad will be investigated in the current study.

In relation to the second condition, that negative evidence must be useful, one must question the implicit nature of these corrections and wonder whether the 2-year-old children most frequently investigated even notice these subtle corrections. Some evidence suggests that young children are aware of this feedback and revise their speech following negative evidence. Investigating mother–toddler dyads, Farrar (1992) found that toddlers (mean age 1;11) were two to three times more likely to imitate a correct form following a maternal recast than to imitate the correct form presented in other discourse types such as non-corrective repetitions, topic continuations, or topic changes. More recently, Saxton (1997) found that older children (mean age 5;0) learned more novel past tense verbs when presented with negative evidence than when the same forms were modelled by the researcher. The children in this study ignored the positive evidence and persisted in their errors, suggesting that negative evidence may be more salient and useful than positive evidence.

The frequency of corrective repetitions is questionable and may undermine usefulness of the feedback. Critics have questioned whether negative evidence occurs often enough to be useful (Gordon, 1991; Marcus, 1993). Some researchers note the low rates at which negative evidence occurs in comparison to all the possible instances in which it could occur. For instance, Gordon (1991) points out that in Bohannon & Stanowicz (1988) only 34% of the ungrammatical utterances were followed by negative evidence, leaving the vast majority of incorrect utterances to receive no feedback. Bohannon, MacWhinney & Snow (1991) countered that not every opportunity needs to

376

receive feedback, but negative evidence should support the correct form in the long run. A few models have been proposed to account for how children could learn from even low levels of feedback such as through rare event learning (Nelson, 1987), fast mapping (Carey, 1985) or quick incidental learning of words (Rice, 1990). It should be noted that the studies described above reported frequency of corrective feedback in dyad settings, and a few mother–sibling–child triads (Tomasello & Mannle, 1985; Wellen, 1985; Post, 1995) but no study has investigated how negative evidence may change when several family members are present.

Recently, Saxton (1997) advocated abandoning emphasis on the frequency of negative evidence and instead focus on how recasts may facilitate revision of a child's error. As briefly noted above, Saxton's contrast theory predicts that when children are faced with a difference between what they say and what an adult says, they will reject their form and retain the correct adult form. This suggests that the usefulness of negative evidence comes from the immediate contrast between adult and child forms. Descriptive research regarding the occurrence of negative evidence in children's everyday inter-actions with family members would provide additional information regarding the circumstances under which a child's form is contrasted with adult and sibling forms.

Pinker's third condition for negative evidence is that it must be used. Children must notice and learn from this information. Naturalistic studies (Farrar, 1992) as well as experimental work (Nelson, 1987; Saxton, 1997) suggest that children are more likely to adopt an adult form following a corrective recast than they are to adopt the same form modelled in positive evidence. Yet observing that children imitate adult forms immediately following negative evidence does not infer long term changes in grammar. In addition, children's imitations of recasts in mother–child or experimenter–child dyads may not generalize to other settings and family members. One could question whether a child is as likely to notice and benefit from a father or sibling's corrective reply. Mannle & Tomasello (1987) suggested the bridge hypothesis to explain how mothers, fathers, and siblings may differ in their linguistic interactions with young children and how young children may respond to these differences. They propose that while mothers may be flexible conversational partners, fathers and siblings may be more challenging partners requiring children to adjust their language. Barton & Tomasello (1994) argued that these differences will influence the pragmatic-con-versational aspects of communication, such as the way that language is interpreted in a given context, rather than the structural-linguistic context, such as the amount of negative evidence. It is unclear how these con-versational and linguistic dynamics may change and interact across children's exchanges with multiple family members and how they may influence children's imitations of correct forms.

377

Finally, Pinker states that negative evidence must be necessary. All children must develop syntactic competence in the presence of negative evidence. While negative evidence is seen in several cultures (Berman, 1985; Rondal, 1985; Clancy, 1989; Erbaugh, 1992) some cross-cultural studies indicate that children develop syntax without parental corrections (Gordon, 1991). Unfortunately, research often cited as contradictory evidence is difficult to compare with other studies in the field because of methodological differences. Lieven (1994) contrasts studies of children learning English or European based languages with children learning non-Indo-European languages. Psychologists or psycholinguists focusing on the quantity of adult–child speech often investigate English or European based languages, while non-Indo-European languages are often studied by native English-speaking anthropologists or cultural linguists and focus on the overall context in which language evolves rather than on specific quantitative measures.

In addition, it is unclear from the many studies finding negative evidence whether all of the children investigated received this feedback. Marcus (1993) suggested that the overall rate of corrective repetitions reported in many studies might be an artifact of averaging across children. If some children receive significant amounts of feedback, while others receive no feedback, negative evidence is clearly not necessary. To determine if negative evidence is available for each child and address the question of necessity, researchers must examine individual families.

The current study

As argued above, most children grow up in the presence of several family members, yet not much is known about how corrective feedback may change in different settings. This information is directly relevant to addressing arguments against the role of this input such as those proposed by Pinker (1989). Providing information about the existence of negative evidence in settings not previously investigated including father–sibling–child, or mother–father–child triads would further substantiate the claim that such feedback is present. Comparisons across family settings would supplement prior work addressing the usefulness of negative evidence. Because little research exists comparing multiple family settings, this study was descriptive and did not attempt to determine whether such feedback facilitated language development. In the present study, negative evidence provided to children was examined and compared in seven family configurations including three dyad settings (mother–child, father–child, sibling–child), three triad settings (mother–sibling–child; father–sibling–child; mother–father–child) and one setting involving all four family members. In this way the feedback available to the children was assessed and compared across the seven configurations. Finally, this study investigated individual families to determine if all children

378

receive negative evidence and if this varied across family members and settings.

METHOD

Subjects

Fourteen families were observed. Each family included both parents, a child, and an older sibling. The mean age of the children at the onset of observation was 2;3 (S.D. = 3·88) and their mean MLU was 2·29 (S.D. = 0·61). Older siblings were 4;1 (S.D. = 4·03) and their mean MLU was 3·62 (S.D. = 0·66). Nine children were females and five were male. Siblings included eight females and six males. The child–sibling dyads included five female child–female sibling pairs, one male child–male sibling pair, four female child–male sibling pairs, and four male child–female sibling pairs.

Procedure

Data collection. Families were videotaped in their home on seven occasions within one month (approximately twice a week). Prior to the first videotaping session, each family established a common two hour time frame in which all family members were available for videotaping. All videotaping was conducted within this two hour time frame. Families were videotaped in the following seven configurations for two 7 min segments: (a) mother and child (MC); (b) father and child (FC); (c) sibling and child (SC); (d) mother, sibling, and child (MSC); (e) father, sibling, and child (FSC); (f) mother, father, and child (MFC), and (g) mother, father, sibling, and child (MFSC). To control for order effects, two families were randomly assigned to begin videotaping at each of the above configurations, such that for two families the first videotaping session included the mother and child, and for two families the first videotaping session included the father and child, and so forth. The subsequent order of the sessions proceeded in a forward fashion (a through g) for half of the families and in a backward fashion (g through a) for the other half of the families. For each session the child and the family members sat on the floor playing with standard set of toys provided by the experimenter. All families were told that we were interested in language development and that they should interact as they normally would. The specific purpose of the study was explained at the end of the final videotaping session.

Videotape transcription and coding. One coder orthographically transcribed all of the videotapes. Twenty percent of each family's videotape (three randomly selected seven minute segments) was also transcribed independently by another coder and the two transcriptions were compared for a measure of agreement for the wording of transcriptions. 90 % agreement was observed for the wording of the transcriptions for each family. Next all

379

speech samples were coded into three general language categories: morpheme, utterance, and mean length of utterances following guidelines suggested by Brown (1973). Utterances were defined as a string of words, communicating one idea usually bound by a pause (Golinkoff & Ames, 1979). Twenty percent of the speech samples were independently coded for these three general language categories and the two sets of codes were compared for a measure of agreement yielding the following: morpheme ($M =$ 0·96, S.D. = 0·06), utterance ($M =$ 0·90, S.D. = 0·14) and mean length of utterance ($M =$ 0·91, S.D. = 0·11). All differences in transcription wording or coding for the categories used in this study were resolved using a modified version of the consensus procedures outlined by Shriberg, Kwiatkowski & Hoffman (1984). Resolutions were incorporated into the agreed upon data set used for all subsequent analyses.

Children's utterances. All children's utterances were coded as well-formed or ill-formed. The criteria used to define ill-formed was similar to those used by Bohannon & Stanowicz (1988). Any child utterance that did not contain one of the following errors was considered well-formed. Ill-formed utterances included one or more of the following errors: semantic, syntactic, or phonological. SEMANTIC ERRORS consisted of children's inaccurate use of word meaning (e.g. calling a horse a 'cow'). SYNTACTIC ERRORS consisted of mistakes in word order (e.g. 'This I want'); omissions of an obligatory grammatical morpheme (e.g. 'give me truck'); and errors in matching gender, tense, case, or number between subject and verb (e.g. 'They is eating ice-cream'). PHONOLOGICAL ERRORS consisted of errors of pronunciation (e.g. '/wʊk/ at my shoes' instead of 'look') and were identified by means of a phonological analysis performed on target speech samples (Shriberg & Kent, 1982).

Next all ill-formed utterances were coded as containing a single error or multiple errors. Single error utterances included all utterances that contained only one of the three possible error types described above. Multiple error utterances included all ill-formed utterances that contained two or more errors. Multiple error utterances were further categorized as within type errors or between type errors. WITHIN TYPE ERRORS included all utterances with two or more of the same type of error (e.g. two syntactic errors). BETWEEN TYPE ERRORS included utterances with two or more errors coming from different error categories (e.g. one syntactic error and one phonological error).

Family member responses. Maternal, paternal, or sibling sentences that immediately followed the child's utterances were coded into one of the following response categories. Table 1 provides examples of each type of family member response. To allow for direct comparison between replies to

380

TABLE 1. *Family member discourse types to well- and ill-formed speech*

Discourse type	Child utterance	Family member response
Approval	My ball	That's right
	Me get toys	Yeah
Disapproval	I show outside	No
	I put it on	That's wrong
Exact repetition	Big bird eating	Big bird eating
	Here we go	Here we go
Contracted repetition	There's big bird	Big bird
	That my shoe	My shoe
Expanded repetition	I need more	I need more water in my cup
	/Wωk/	/Wωk/ at all of these toys
Recasted repetition	That my ball	That's my ball
	That's big bird	That's huge bird
Contracted repetition with correction	Put back on right there	Put it on
	Red candle	/kændo/
Expanded repetition with correction	That climbing	That's for climbing and it's called a ladder
	I can't	I can not lift this up
Topic continuation	I need more water	What do you want it for?
	Pretty flowers	I bet they smell nice
Topic change	Comes sister	Wanna play with this car?
	Suck my thumb	Here let's play this
No response	All back on	
	That my car	

well and ill-formed speech, all family member response types were defined such that they could apply to either well or ill-formed speech.

Explicit responses. Only those utterances that were judged to be approvals or disapprovals of the child's preceding utterance were coded as explicit responses. APPROVAL included responses indicating the correctness of an utterance such as 'yes', 'yeah', 'that's right', or 'good'. DISAPPROVAL included responses indicating the incorrectness of an utterance such as 'no' or 'that's wrong'. As noted above, either type of explicit responses could follow well- and ill-formed speech (e.g. child: 'He go', mother: 'That's right.').

Non-corrective repetitions. Repetitions that did not correct a child's error or revise the child's well-formed speech were coded as non-corrective repetitions. Three types of non-corrective repetitions were coded: exact, contracted, and expanded. EXACT REPETITIONS were coded if the family member's reply included a verbatim reproduction of the entire original utterance. CONTRACTED REPETITIONS included reproduction of a reduced set of elements from the preceding utterances, while EXPANDED REPETITIONS reproduced the original utterance and added new information. All three types of

381

non-corrective repetitions could be applied to children's well- and ill-formed speech (e.g. child: 'They all sleeping', sibling: 'They all sleeping here on the farm.').

Corrective repetitions. Repetitions that corrected a child's error were coded as corrective repetitions. In addition, family member's repetitions that included semantic, phonological or syntactic revisions following a child's well-formed utterance were also coded as corrective repetitions (e.g. child: 'That's big bird.'; father 'That's huge bird.'). Although these repetitions did not correct an error, the family member's response differed from the child's response such that they could not be coded as non-corrective repetitions. Three types of corrective repetitions were coded: recasts, contracted, and expanded. RECASTED REPETITIONS included reproduction of the original child utterance with the addition of semantic, syntactic, or phonological revisions. CONTRACTED REPETITIONS WITH CORRECTIONS included reproduction of a reduced set of elements from the preceding utterance with the addition of semantic, syntactic, or phonological revisions. EXPANDED REPETITIONS WITH CORRECTIONS included reproductions that added new information and included semantic, syntactic, or phonological revisions.

Other responses. Family member replies that were not classified into one of the above categories were coded: topic continuations, topic changes, or no response. TOPIC CONTINUATIONS included family member's utterances that followed the same semantic theme of the previous utterance, but did not repeat any portion of it. TOPIC CHANGES included utterances that initiated a new semantic theme without repeating any portion of the previous utterance. NO RESPONSE included instances where the child produced a second utterance before the family member responded.

Reliability. To determine agreement of the coding categories applied to children's utterances and family members' responses one 14-minute segment for each of the 14 families was coded independently by two coders. Agreement was calculated as the ratio of the number of agreements for a specific category to the total number of judgments (agreements +disagreements) for each coding category. A version of Cohen's kappa suggested by Lampert & Erwin-Tripp (1993) for analysis of discourse data was also calculated as a more stringent measure of interrater agreement. Percent agreement averaged 0·92, and Cohen's kappa was 0·86, both well above acceptable levels.

RESULTS

A total of 32 217 utterances was coded for the 14 families examined. The mean number of utterances per family was 2467·07 (S.D. = 323·47). Children

382

produced 8781 utterances ($M = 627$, S.D. $= 166·71$). Of the 8781 utterances, 5145 (59%) were coded as well-formed and 3636 (41%) were coded as ill-formed. (Per child: well-formed $M = 367·50$, S.D. $= 95·80$, ill-formed $M = 259·71$, S.D. $= 104·17$). Of the 3636 utterances classified as ill-formed 2255 contained a single error (62%), while 1381 contained multiple errors (38%). Within type errors, semantic errors, utterances including two phonological and one syntactic errors (PPS) and other between type errors occurred in less than 5% of the total child utterance sample. Utterances containing these types of errors were not considered in subsequent analyses. Utterances with single syntax and phonological errors and utterances including one phonological and one syntactic error (P+S) were investigated. The proportion of each family member's use of each response type from the total types was computed as the number of family member's responses to the different types divided by the total number of child utterances for that session. This yielded a proportion for each type of member response given the chance to reply to the child's speech.

Family member replies to well and ill-formed speech

The eleven types of family member replies that followed well-formed and ill-formed speech were analysed in a series of ANOVAs. The results of analyses comparing family member replies following children's well and ill-formed

TABLE 2. *Percentage of family member responses following children's well- or ill-formed speech averaged across families and members*

| | Well-formed | Ill-formed | | | |
Member reply		Syntax	Phonology	P+S	$p <$
Explicit					
Approval	1·46	0·11	0·39	1·12	0·006
Disapproval	0·00	1·37	0·70	0·37	0·027
Non-corrective repetitions					
Exact	5·10	0·47	0·29	0·00	0·009
Contracted	1·01	1·12	0·91	2·08	0·196
Expanded	4·22	0·52	2·58	1·30	0·001
Corrective repetitions					
Recast	0·00	7·67	4·70	3·90	0·002
Contracted	0·00	3·03	0·82	2·42	0·001
Expanded	0·00	6·16	5·45	2·80	0·001
Other					
Topic continue	29·71	28·43	26·37	26·29	0·287
Topic change	19·49	13·61	15·02	17·13	0·002
No response	38·98	37·42	42·50	42·12	0·103

The values represent mean percentage of replies across families and family members.
P+S = Phonological and syntactic error.

383

speech are presented in Table 2. No significant differences were found between well and ill-formed speech for topic continuations suggesting that ill-formed speech did not disrupt the current conversation. Topic changes occurred significantly more following well-formed speech than following single syntax or phonological errors. Family members clearly produced different types of repetitions following well and ill-formed speech. Exact repetitions followed well-formed speech while ill-formed speech was followed by corrective repetitions, with syntax errors receiving significantly more feedback than the other error types. Surprisingly, differences were found between well and ill-formed speech for explicit approval and disapproval, with well-formed speech receiving significantly more approval than utterances that included syntax or phonological errors. Although the overall rate of explicit disapproval was low, utterances containing syntax errors received the most disapproval. This indicates that family members provide explicit as well as implicit feedback regarding the correctness of children's speech.

Corrective repetitions across family members and settings

To investigate corrective repetitions to syntax errors across family members and across settings a (3) family member: mother vs. father vs. sibling × (3) setting: dyad vs. triad vs. tetrad mixed ANOVA was performed on the proportion of all corrective repetitions to syntax errors. For these and subsequent analyses, the three types of corrective repetitions including recasts, contracted repetitions with corrections, and expanded repetitions with corrections were summed to form a general corrective repetition category. The ANOVA yielded a significant main effect for family member $F(2, 293) = 7.62$, $p < 0.01$. No main effect for setting was found suggesting that the triad and tetrad may not differ significantly from the dyad setting in the amount of feedback available to children. The family member × setting interaction was not significant. Table 3 shows the mean percentage of

TABLE 3. *Mean percentage of corrective repetitions to syntax errors by family member and setting*

Member	Setting			Mean
	Dyad	Triad	Tetrad	
Mother	31·18	22·18	18·61	23·99
Father	20·20	25·32	10·11	18·54
Sibling	5·64	5·36	5·71	5·57

384

corrective repetitions to syntax errors produced by mothers, fathers, and siblings in the dyad, triad, and tetrad settings. Scheffé tests conducted on family member responses revealed that mothers and fathers did not differ in the amount of feedback they provided but both mothers and fathers provided significantly more feedback than siblings did.

To further investigate the role of each family member a repeated measures ANOVA was performed on the proportion of all corrective repetitions following syntax errors across the seven family configurations. Although earlier analyses found that the triad and tetrad setting did not differ from the dyad, the current analysis allowed for more precise comparison between specific settings. For example, the mother–child dyad could be directly contrasted with the mother–sibling–child and father–sibling–child triads to determine if differences occurred. Significant differences were seen across the seven family configurations, $F(6, 295) = 3.52$, $p < 0.002$ but when Scheffé corrections were applied to individual comparisons no two configurations were significantly different. The bottom of Table 4 shows the mean percentage of corrective repetitions across the seven family configurations. Overall, children appear to receive the most feedback in the mother–child, father–child, and mother–father–child configurations and the least in the sibling–child dyad, but due to the extreme variability across families, specific configurations did not differ significantly. Next, individual variability across families was addressed.

Corrective repetitions across families
To investigate negative evidence within each family and determine if all of children received corrective feedback following syntax errors, we calculated the mean percentage of corrective repetitions for each child in each configuration. Table 4 shows the mean percentage of corrective repetitions to syntax errors for each child across the seven family configurations. Although there is considerable variability across families all children received corrective feedback following syntax errors (averaged across families and configurations $M = 17.62$, S.D. $= 8.54$). Interestingly, the child receiving the least feedback to syntax errors (6.31 %) produced significantly more phonological errors than the other children in this study, which may have influenced intelligibility. Families also differed across configurations. Forty-two per cent of the children received the most feedback in the mother–child dyad and 21 % received the most in the father–child dyad, but for some children the triad and tetrad settings provided the most negative evidence. This suggests that studies only investigating the dyad setting may underestimate the feedback available to such children.

385

TABLE 4. *Mean percentage of corrective repetitions to syntax errors across family configurations*

	Configuration							
Subjects	MC	FC	SC	MSC	FSC	MFC	MFSC	Mean
1	50·00	7·00	0·00	6·25	5·00	12·50	24·83	15·08
2	14·00	0·00	10·00	8·25	24·50	20·75	0·00	11·07
3	0·00	0·00	0·00	33·32	0·00	20·72	11·00	9·29
4	35·50	33·50	16·50	30·00	25·00	20·75	17·66	25·58
5	***	28·00	12·50	12·50	8·25	25·00	6·66	15·48
6	12·50	27·98	0·00	50·01	49·50	25·12	8·31	24·76
7	64·03	0·00	16·50	11·52	8·24	30·00	16·50	20·97
8	17·00	0·00	0·00	0·00	0·00	12·50	8·33	6·31
9	40·50	55·00	7·03	18·75	49·00	51·25	8·31	32·83
10	58·00	33·50	0·00	14·50	12·43	18·25	8·33	20·72
11	***	50·00	16·50	25·02	10·00	49·78	6·67	26·33
12	***	47·86	0·00	0·00	0·00	50·03	10·67	15·51
13	26·50	0·00	0·00	23·00	0·00	2·86	8·31	8·99
14	25·04	0·00	0·00	3·50	0·00	5·11	25·00	8·38
Mean	31·18	20·20	5·65	16·54	13·71	24·62	11·47	17·62
S.D.	20·33	21·41	7·22	14·08	17·23	15·81	7·09	8·54

Note. *** = child did not produce any syntax errors in that configuration.
MC = mother–child; FC = father–child; SC = sibling–child; MSC = mother–sibling–child; FSC = father–sibling–child; MFC = mother–father–child; and MFSC = mother–father–sibling–child.

DISCUSSION

The current study examined the linguistic dynamics that children encounter in everyday exchanges with family members. The main goals of this study were to investigate mothers', fathers' and siblings' corrective repetitions to children's errors across family settings and to determine if all children received negative evidence by investigating individual families. In addition this study addressed arguments against the facilitative role of this input such as those proposed by Pinker (1989) including conditions of existence, usefulness and necessity. We found that mothers, fathers, and siblings provide corrective repetitions to children's syntax errors. Although mothers and fathers repeat with corrections significantly more than siblings do, all three family members supply negative evidence regarding the correctness of the child's speech. The mean rate of corrective repetitions in the mother–child and father–child dyads mirror rates reported in previous adult–child research (Hirsh-Pasek *et al.*, 1984; Demetras *et al.*, 1986; Penner, 1987; Bohannon & Stanowicz, 1988; Farrar, 1992). Combined these studies indicate that negative evidence is present and provided by several sources in the environment.

386

We found that corrective repetitions occur in dyad, triad and tetrad settings. These settings did not vary substantially in that amount of feedback provided suggesting consistency across settings. In contrast, when the seven family configurations were investigated differences emerged. Simply the number of family members present may not matter as much as who is present in a configuration. For example, children received more feedback in the mother–father–child triad than in mother–sibling–child and father–sibling–child triads. Interestingly, the combined rate of corrective repetitions provided in the mother–father–child triad did not exceed the feedback provided in mother–child and father–child dyads. Perhaps family members adjust their feedback to accommodate the child's processing capacity and complement the speech of others. Although some previous work examined general linguistic differences between mother–child dyads and mother–sibling–child triads (Barton & Tomasello, 1991), no other study has directly compared corrective repetitions in different family configurations and in this way addressed the usefulness of negative evidence. Our findings indicate that larger settings, such as triad and tetrad settings may provide more feedback than previously believed (Barton & Tomasello, 1991), but differences exist across families.

To determine if the results of the current study apply to all of our children or if they are an artifact of averaging across children as has been suggested (Marcus, 1993), we calculated the mean percentage of corrective repetitions to syntax errors for each child across the seven family configurations. Although there was considerable variability across families, all children received negative evidence. The majority of children in the sample received the most feedback in the mother–child and father–child dyads, but some children received more in larger configurations than in dyadic contexts. Studies that only evaluate the mother–child dyad may underestimate the feedback children receive. In addition, if only one setting is investigated, our data suggest that some children will appear to receive no feedback, when negative evidence is provided at comparable rates in other settings. For example, some children in the current study received no feedback in the sibling–child dyad or father–sibling–child triad, but considerable feedback in the mother–child dyad. Considering the variability observed across families and configurations, other researchers are urged to consider these differences and provide more detail of individual participants. In addition, future research would benefit from descriptive information regarding the time children spend in different family configurations. It seems likely that later born children spend more time in larger configurations such as the mother–sibling–child triad and perhaps less time in the mother–child dyad reflected in previous research.

Because little research exists comparing multiple family settings, this descriptive study did not attempt to determine whether negative evidence

387

facilitated syntax. Although Pinker's condition that negative evidence must be used was not addressed in this study, our results in combination with other research allow for future predictions. Prior work investigating mother–child and experimenter–child dyads (Nelson, 1987; Farrar, 1992; Saxton, 1997) found that children are more likely to adopt an adult form following a corrective recast than they are to adopt the same form modelled in positive evidence. Although the current study found that mothers and fathers did not differ in their overall feedback to syntax errors, one must question whether children interpret corrective repetitions from different family members in the same way. If fathers and siblings are less familiar with children's linguistic skills compared to mothers, as has been suggested (Mannle & Tomasello, 1987) children must adjust their language when conversing with fathers and siblings. It is predicted that these differences will influence pragmatic conversational aspects of communication (such as the way that language is interpreted in a given context), rather than the structural-linguistic context (such as the amount of corrective repetitions). Therefore, mothers and fathers may not differ in the amount of feedback they provide to children, but this feedback may be interpreted differently by a child depending on its source. Tomasello, Farrar & Dines (1983) suggest that children are sensitive to listener's familiarity with their language and adjust their speech accordingly. If children see adults' repetitions as indicating whether or not their message was understood (Sokolov & Snow, 1994), less familiar conversational partners, such as fathers and siblings, provide more opportunities for misunderstanding than mothers. Misunderstandings might prompt children to produce more advanced forms to clarify their message (Howe, 1993).

In addition, it seems reasonable to propose that as the number of conversational partners with different familiarity levels varies, differences may be seen in the rate of children's imitations. As noted above, children may be able to adjust their speech to fit their listener's needs, but as the number of speakers increases the child's ability to adjust accordingly may decrease. At the same time, more speakers may provide more opportunities for misunderstanding. It is important to note that although the number of family members present did not negatively influence the amount of feedback provided, it is unclear whether children's imitations of corrected forms would remain consistent across settings. More importantly for most children some configurations, specifically mother–child, father–child, and mother–father–child provided more feedback than other configurations, such as father–sibling–child and mother–father–sibling–child. More feedback may present more opportunities for children to imitate correct forms. It should be noted that the patterns of feedback described above were not consistent across families. Future research should consider how variability of feedback provided might influence the pragmatic conversational aspects of family

388

interactions such as the way children interpret and respond to negative evidence.

The frequency of corrective repetitions found in the mother–child and father–child dyads mirrors rates reported in previous adult–child research (Hirsh-Pasek *et al.*, 1984; Demetras *et al.*, 1986; Penner, 1987; Bohannon & Stanowicz, 1988; Farrar, 1992) but differences existed across families. Most children experienced the lowest levels of feedback in the sibling–child dyad ($M = 5.65\%$) and in the mother–father–sibling–child tetrad ($M = 11.47\%$). If children spend significant amounts of time in these settings rather than in dyad settings, this finding may pose a serious blow to advocates of the negative evidence position. Even though a few models have been proposed to explain how children could learn from low levels of feedback such as through rare event learning (Nelson, 1987), fast mapping (Carey, 1985), or quick incidental learning of words (Rice, 1990), it is unclear whether the frequency reported for some configurations would be enough to facilitate learning.

Although the current study provided information on the frequency of negative evidence available in different family settings, it was not the intent of the author to emphasize this point, but rather to provide baseline information in an area not well researched. For negative evidence to be considered relevant to accounts of language acquisition, it is probably more useful to focus on how corrective repetitions may facilitate syntax rather than on how often they occur. Along those lines many possibilities have been proposed. Corrective repetitions involve elements of the child's utterance (Bohannon & Stanowicz, 1989), they add correct lexical items (Sokolov, 1991), they provide contrasts between the child's speech and the adult's speech which may lead to rejection of erroneous forms (Howe, 1993; Saxton, 1997). They provide opportunities for children to recognize when their message is misunderstood which may facilitate use of advanced forms (Howe, 1993). At the same time, these possibilities all assume that feedback occurs under naturalistic circumstances (i.e. everyday exchanges with family members) but prior to the current research, few studies supported this conclusion beyond the mother–child dyad. It is hoped that the current findings prompt other researchers to consider the variability that exists between families and across different family settings when proposing explanations of how negative evidence facilitates syntax. In addition, the current study presented data on individual families that is rarely seen in the literature but is vital to addressing the argument that not all children receive this input. All children investigated received some evidence regarding the correctness of their speech. As long as researchers present group data without considering individual differences, the question of whether negative evidence is necessary for syntax acquisition will remain unanswered.

The current study replicated the findings of negative evidence in children's everyday exchanges with family members. Previous research in this area

389

focused on corrective repetitions in the parent–child dyad (Hirsh-Pasek *et al*., 1984; Demetras *et al*., 1986; Bohannon & Stanowicz, 1988; Farrar, 1992) and in the sibling–child dyad (Strapp, 1993). Combined these studies indicate that children receive evidence from multiple sources in the environment. As lack of evidence served as strong support for theories based on innate principles (Pinker, 1989; Hyams, 1992) we urge researchers to reevaluate the 'no negative evidence' position. Considering that most children grow up in polyadic situations (Lieven, 1994) future research must extend beyond the idealistic mother–child dyad and empirically evaluate the linguistic and pragmatic aspects of syntax acquisition within and across families.

REFERENCES

Barton, M. E. & Tomasello, M. (1991). Joint attention and conversation in mother–infant–sibling triads. *Child Development* **62**, 517–29.
Barton, M. E. & Tomasello, M. (1994). The rest of the family: the role of fathers and siblings in early language development. In C. Gallaway & B. J. Richards (eds), *Input and interaction in language acquisition* (109–34). Cambridge: C.U.P.
Berman, R. (1985). The acquisition of Hebrew. In D. I. Slobin (ed.), *The crosslinguistic study of language acquisition*: Vol. I. Hillsdale, NJ: Erlbaum.
Bohannon, J. N., MacWhinney, B. & Snow, C. (1991). No negative evidence revisited: beyond learnability or who has to prove what to whom. *Developmental Psychology* **26**, 221–6.
Bohannon, J. N. & Stanowicz, L. (1988). The issue of negative evidence: adult responses to children's language errors. *Developmental Psychology* **24**, 684–9.
Bohannon, J. N. & Stanowicz, L. (1989). Bi-directional effects of repetition in conversation: a synthesis within a cognitive model. In K. Nelson & G. Speidal (eds), *The many faces of imitation in language learning*. New York: Springer Verlag.
Brown, R. (1973). *A first language: the early stages*. Cambridge, MA: Harvard University Press.
Brown, R. & Hanlon, C. (1970). Derivational complexity and order of acquisition in child speech. In J. Hayes (ed.), *Cognition and the development of language* (11–55). New York: Wiley.
Carey, S. (1985). *Conceptual change in childhood*. Cambridge, MA: MIT Press.
Clancy, P. (1989). Form and function in the acquisition of Korean wh-questions. *Journal of Child Language* **16**, 323–47.
Demetras, M. J., Post, K. N. & Snow, C. E. (1986). Feedback to first language learners: the role of repetitions and clarification questions. *Journal of Child Language* **13**, 275–92.
Erbaugh, M. S. (1992). The acquisition of Mandarin. In D. I. Slobin (ed.), *The crosslinguistic study of language acquisition*: Vol. III. Hillsdale, NJ: Erlbaum.
Farrar, M. J. (1990). Discourse and the acquisition of grammatical morphemes. *Journal of Child Language* **17**, 607–24.
Farrar, M. J. (1992). Negative evidence and grammatical morpheme acquisition. *Developmental Psychology* **28**, 91–9.
Golinkoff, R. M. & Ames, G. (1979). A comparison of fathers' and mothers' speech with their young children. *Child Development* **50**, 28–32.
Gordon, P. (1991). Learnability and feedback. *Developmental Psychology* **26**, 217–20.
Hirsh-Pasek, K., Treiman, R. & Schneiderman, M. (1984). Brown and Hanlon revisited: mothers' sensitivity to ungrammatical forms. *Journal of Child Language* **11**, 81–8.
Howe, C. J. (1993). *Language learning: a special case for developmental psychology*. Hillsdale, NJ: Erlbaum.
Hyams, N. (1992). A reanalysis of null subjects in child language. In J. Weissenborn, J.

Goodluck & T. Roeper (eds). *Theoretical issues in language acquisition : continuity and change in development*. Hillsdale, NJ : Erlbaum.

Lampert, M. D. & Erwin-Tripp, S. M. (1993). Structured coding for the study of language and social interaction. In J. A. Edwards & M. D. Lampert (eds), *Talking data : transcription and coding in discourse research*. Hillsdale, NJ : Erlbaum.

Lieven, E. V. M. (1994). Crosslinguistic and cross-cultural aspects of language addressed to children. In C. Gallaway & B. J. Richards (eds.), *Input and interaction in language acquisition*. Cambridge : C.U.P.

Mannle, S. & Tomasello, M. (1987). Fathers, siblings and the bridge hypotheses. In K. E. Nelson and A. van Kleeck (eds), *Children's language* : Vol. VI. Hillsdale, NJ : Erlbaum.

Marcus, G. E. (1993). Negative evidence in language acquisition. *Cognition* **46**, 53–85.

Markman, E. M. (1992). Constraints on word learning : speculations about their nature, origins, and domain specificity. In M. R. Gunnar & M. P. Maratsos (eds), *Minnesota Symposium on Child Psychology* : Vol. 25. Hillsdale, NJ : Erlbaum.

Nelson, K. E. (1987). Some observations from the perspective of the rare event cognitive comparison theory of syntax acquisition. In K. E. Nelson & A. van Kleeck (eds), *Children's language* : Vol. VI. Hillsdale, NJ : Erlbaum.

Nelson, K. E. (1991). On differentiated language learning models and differentiated interventions. In N. Krasnegor, D. Rumbaugh & R. Schiefelbusch (eds), *Language acquisition : biological and behavioural determinants*. Hillsdale, NJ : Erlbaum.

Penner, S. G. (1987). Parental responses to grammatical and ungrammatical child utterances. *Child Development* **58**, 376–384.

Pinker, S. (1989). *Learnability and cognition : The acquisition of argument structures*. Cambridge, MA : MIT Press.

Post, K. N. (1995). Negative evidence in the language learning environment of laterborns in a rural Florida community. In K. E. Nelson & Z. Reger (eds), *Children's language* ; Vol. 8. Hillsdale, NJ : Erlbaum.

Rice, M. L. (1990). Preschooler's QUIL : quick incidental learning of words. In G. Conti-Ramsden & C. Snow (eds), *Children's language* : Vol. 7. Hillsdale, NJ : Erlbaum.

Rondal, J. A. (1985). *Adult–child interaction and the process of language acquisition*. New York : Prager.

Saxton, M. (1997). The contrast theory of negative input. *Journal of Child Language* **24**, 139–61.

Shriberg, L. D. & Kent, R. D. (1982). *Clinical phonetics*. New York : John Wiley & Sons.

Shriberg, L. D., Kwiatkowski, J. & Hoffman, K. (1984). A procedure for phonetic transcription by consensus. *Journal of Speech and Hearing Research* **27**, 456–65.

Sokolov, J. L. (1991, April). *A reverse analysis of implicit negative evidence : exact, expanded and reduced parental imitations*. Paper presented at Biennial Meeting of the Society for Research in Child Development, Seattle, WA.

Sokolov, J. L. & Snow, C. E. (1994). The changing role of negative evidence theories of language development. In C. Gallaway & B. J. Richards (eds), *Input and interaction in language acquisition*. Cambridge : C.U.P.

Strapp, C. M. (1993). *The development of syntax in toddlers : the role of older sibling's linguistic input*. Unpublished masters thesis. University of Nevada, Reno.

Tomasello, M., Farrar, M. J. & Dines, J. (1983). Young children's speech revisions for a familiar and an unfamiliar adult. *Journal of Speech and Hearing Research* **27**, 359–63.

Tomasello, M. & Mannle, S. (1985). Pragmatics of sibling speech to one-year-olds. *Child Development* **56**, 911–917.

Wellen, C. J. (1985). Effects of older sibling on the language young children hear and produce. *Journal of Speech and Hearing Research* **50**, 84–99.