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A comparison of verb use in children with SLI and their younger siblings*

MELANIE JONES
GINA CONTI-RAMSDEN } *University of Manchester*

ABSTRACT

The present longitudinal study examined the use of verbs at the early stages of expressive language development by children with specific language impairment (SLI). Three children with SLI and their younger normal language learning siblings were videotaped during mother-child interactions in the home over a 2-year period. At the beginning of the study both the child with SLI and the younger sibling appeared to be in the same stage of expressive language development as measured by mean length of utterance (MLU). Thus, the younger sibling acted as a control for the child with SLI. Results indicate on the one hand no consistent significant difference in the proportion of verb types used by children with SLI and their younger siblings across the developmental period studied. On the other hand, the younger siblings all used significantly greater proportions of verb tokens than their impaired SLI brothers after a particular point in development. Comparison of particular verbs used suggest that children with SLI have difficulties applying the verbs in their lexicon across contexts. The normal younger siblings used a wider variety of verb forms in their constructions containing verbs and they also used similar forms for different verbs which the children with SLI did not do or did so to a lesser extent. The findings are discussed and, in particular, two hypotheses are proposed: an 'SLI critical mass' hypothesis following the work of Marchman & Bates (1994) and an 'Extended Verb-island' hypothesis following the work of Tomasello (1992).

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INTRODUCTION

In the field of specific language impairment (SLI), most of what we know about these children's language difficulties has been derived from cross-sectional studies comparing impaired and non-impaired children matched for language stage, chronological age or mental age. There is a dearth of detailed longitudinal studies documenting the linguistic development of children with SLI. The longitudinal work available refers mainly to children with delayed expressive language known as 'late talkers' (Paul & Alforde 1993, Rescorla & Schwartz 1990). These studies have shown that late talkers acquire grammatical morphemes in a similar order to normal language learning children although, interestingly, late talkers seem to acquire fewer morphemes than their mean length of utterance (MLU) would predict. Similar results have been found in cross-sectional studies of children with SLI, and it is now very well known that verbal grammatical morphemes are particularly challenging for children with SLI (for a review see Leonard 1989).

In terms of lexical development, most of the research has focused solely on the use of nouns by children with SLI (Leonard 1988, Rice 1991). Such studies have found that children with SLI are delayed in using their first words and continue to add new words to their lexicons at a slower rate than normally developing children do. Recent accounts of syntactic and semantic development in normal children learning English have focused our attention on verb use and have emphasized the central role of verbs in language learning. Increasingly, researchers believe that verbs play a particularly important part in language development and use since the conceptual roles specified by verbs (e.g., the giver, the thing given, the receiver, in the case of the verb 'give') may be said to provide a framework for organizing other word class members into appropriate verbal utterances.

Two important complementary developments in the literature on verb learning in normally developing children deserve mention. First, recent research has suggested that the development of verbal morphology may be related to lexical acquisition. Specifically, Marchman & Bates (1994) have suggested that morphosyntactic development is predicted by lexical level, most noticeably once the number of items in the child's vocabulary reaches a 'critical mass'. More specifically, they showed that the critical mass hypothesis was most powerful when applied to verbs, since verb vocabulary size was the strongest and most consistent predictor of morphological development, (e.g., in productive use of past tense morphology). Thus,

the productive use of verb morphology is dependent upon the size of the verb lexicon reaching a 'critical mass'. Indeed, Conti-Ramsden & Jones (in press) in a recent longitudinal study found that children with SLI used fewer verbs than younger normal children of the same expressive language stage. The children with SLI later had difficulties with auxiliary use and verb morphology. The authors suggest that the morphological difficulties of the children with SLI are related to their smaller verb vocabularies. Children with SLI may have not reached a 'critical mass' of verbs which allows them to make morphological generalizations across verbs. Thus, one of the hallmark characteristics of specific language impairment, i.e., problems with grammatical morphology, may well be rooted on earlier lexical difficulties with verbs.

Second, recent work on early verb use suggests that young normal language learning children have a grammatical category of noun long before they develop a grammatical category of verb (Olguin & Tomasello 1993, Tomasello 1992, Tomasello & Olguin 1993). Furthermore, Tomasello (1992) proposes that in early grammatical development normal children undergo a 'Verb-island' period of development. According to this view, children start producing multi-word utterances without any knowledge of syntagmatic categories such as 'Agent' or 'Patient' but gradually build verb-specific categories such as 'kisser' and 'thing kissed' on the basis of their experience with particular verbs. Thus, children's early verbs are initially individual islands of organization. With further experience in development, children learn more about verbs but they do so on a verb-by-verb basis. Children learn about arguments of verbs and morphosyntactic markers in this way and are only able to use verb-general rules once they have enough experience to have derived a grammatical, paradigmatic category of verb.

The critical mass hypothesis and the Verb-island hypothesis both point to the gradual, developmental way in which children learn the necessary information to construct the grammar of their native tongue. In the case of lexical verb learning, the critical mass hypothesis provides us with a model where there is continuity in lexical and morphological development. In the verb-island model there is continuity in lexical and grammatical development.

Let us return to the well known fact that grammatical morphemes are particularly challenging for children with SLI. For example, Leonard (1989) showed that some aspects of grammar (e.g., the past tense inflection -ed for regular verbs, the third person singular inflection -s, the copula) are more difficult for children with SLI to learn and use

than other aspects (e.g., plural -s and progressive -ing). These findings for the past tense -ed have been replicated by Leonard (1994) and Moore & Johnston (1993). Furthermore, Rice and her colleagues have suggested that children with SLI have particular problems with verb agreement (Rice 1994, Rice & Oetting 1993) and finiteness marking on the verb (Rice & Wexler 1996, Rice, Wexler & Cleave 1995). Given what we know about the continuity between lexical and morpho-syntactic/grammatical development, the question then arises, are SLI children's later difficulties with verb morphology rooted in earlier lexical difficulties?

Accordingly the aim of the present study was to examine the lexical development of three children with SLI with a particular focus on verbs. The investigation involved observations over a two-year period and comparisons of the children with SLI with their younger normal language learning siblings who were at similar stages of expressive language use.

METHOD

Procedures for the identification of families

The families involved in this longitudinal study were part of a larger project investigating the language development of children with specific language impairment (SLI), and of their younger non-impaired siblings (Conti-Ramsden & Dykins 1991, Conti-Ramsden, Hutcheson & Grove 1995). Families were informed of the research project through the speech and language therapy services in the north-west of England, and asked if they would be willing for the research workers to visit them and discuss their possible involvement in more detail. During an initial visit, the research project was explained and parents were given the opportunity to opt for a longer longitudinal involvement of approximately two years. In addition, the researchers collected language samples by an audio-recording from the child with SLI and, in a separate session, from the younger sibling. The first 50 child utterances were transcribed from the recordings in order to ascertain the mean length of utterance (MLU) of the children using Brown's (1973) criteria, with the modifications suggested by Miller (1981). Three families agreed to participate in the longitudinal phase of the project. The children with SLI are named Colin, Andrew and Mark and the younger siblings are named Chris, Nina and Adam.

Characteristics of the children

The characteristics of the children at the beginning of the study are

TABLE 1. *Characteristics of the children at the beginning of the study*

	CA	Sample MLU	Performance IQ	PLS-AC	ACQ	TROG age equiv. (%)	BPVS age equiv. (%)
Colin (SLI)	5;8	1.45	89	5;4	91	4;9 (20%)	4;7 (22%)
Chris (Sib)	2;2	1.28	91	2;4	131	N/A	N/A
Andrew (SLI)	5;3	1.77	115	5;6	105	5;0 (40%)	4;4 (26%)
Nina (Sib)	1;11	1.45	101	2;7	131	N/A	N/A
Mark (SLI)	3;9	1.28	105	3;10	103	N/A	2;8 (18%)
Adam (Sib)	1;11	1.51	96	2;0	104	N/A	N/A

Key. CA = Chronological age
SLI = Child with specific language impairment
Sib = Younger sibling
MLU = Mean length of utterance
IQ = Inteligence quotient
PLS-AC = Preschool language scale Auditory comprehension
ASQ = Auditory comprehension quotient
Age equiv = Age equivalent
N/A = not applicable, too young for test floor
BPVS = British picture vocabulary scale

presented in Table 1 in terms of age and psychometric results. It can be seen that the subjects with SLI were three expressively impaired children, all male, with severe problems (as can be seen from the discrepancy between their age and their MLU obtained on the language sample). The three children performed within one standard deviation of the mean in the Leiter International Performance Scale which provided a measure of IQ. In addition, they were tested in a number of comprehension measures. As previous research suggests (Conti-Ramsden, Donlan & Grove 1992), the children with SLI had varying comprehension profiles with below average vocabulary comprehension (as measured by the British Picture Vocabulary Scale BPVS; 18–26 percentile rank), poor comprehension of grammar (as measured by the TROG; 20–40 percentile rank), but better overall auditory comprehension abilities (as measured by the Preschool Language Scale). The younger siblings were two males and one female who ranged in age from 1;11 to 2;2 at the beginning of the study. The three siblings performed within one standard deviation of the mean in the measure of IQ. They also had expressive language and auditory comprehension skills well within normal limits. The siblings were too young to be tested for comprehension of grammar (TROG) or vocabulary comprehension (BPVS).

In addition, all six children had adequate hearing sensitivity as determined by pure-tone audiometry screening bilaterally at 500, 1K,

2K Hz at 25 dB (equivalent to pure tone thresholds of 25 dB HL; American National Standards Institute 1989). The three children with SLI had eventful birth histories, all three being anoxic at birth. Developmental histories ascertained by a questionnaire to parents revealed that all developmental language milestones were delayed in the three children with SLI. In addition, motor milestones (sitting and walking) appeared delayed for Colin and Andrew.

All six children spoke English in monolingual homes and came from intact (two-parent) families. In all three families, the mothers remained at home as housewives while the fathers went out to work; all the parents had secondary education. All children with SLI were receiving speech therapy in a clinic or were enrolled in language-based classrooms for children with SLI (called 'language units' in England).

Video recordings

The video recording sessions lasted approximately 15–20 minutes and were conducted in the homes of the families using the play materials available there (e.g., jigsaws, Fisher-Price toys, books, Lego, models, etc.). In order to keep the parents as unconcerned as possible about the nature of their own speech, they were told that the research was primarily about the children's communicative development. The instructions given to the parents were 'play as you normally do'. The three families participated in a number of dyadic interactions including mother, father and sibling. The present paper mainly concerns the mother-child play interactions although some father-child interactions were occasionally also used.

All the children were videotaped every six weeks, but illness and cancellations meant that video samples were, on average, once every 3 months over a 15-month period. A further sample was taken after approximately 10–16 months, completing a 2-year observation period. In the present study we examined 7 sessions over the 2-year period for each of the three families. As the aim of the study was to examine the development of expressive language (in particular the early stages of verb use), MLU in words was thought to be a better indication of expressive language than MLU in morphemes. Table 2 presents MLU values for all children in each of the seven sessions. With the exception of Colin and Chris, the child with SLI and their younger siblings had different MLU gains throughout the observation period.

Transcription

The first 10 minutes of each of the seven mother-child sessions were transcribed for analysis. This was thought to be appropriate, given that

TABLE 2. *MLU in words per session*

Session no.	1	2	3	4	5	6	7
Colin	1.2	1.4	1.5	1.6	1.9	1.6	2.5
Chris	1.2	1.3	1.5	1.7	1.8	1.8	2.7
Andrew	2.6	2.0	2.4	3.1	2.4	2.9	2.3
Nina	1.7	1.7	1.7	1.9	2.0	2.1	2.9
Mark	1.2	1.7	2.5	3.1	2.6	3.8	2.3
Adam	1.7	1.5	1.8	2.3	2.1	2.2	3.3

the video camera was turned on when the participants had settled and were playing. The transcriptions contained information about verbal and nonverbal interactions, and the context in which these events occurred. This was carried out in accordance with the guidelines produced by the Codes for Human Analysis of Transcripts (CHAT) which is part of the Child Language Data Exchange system (CHILDES; MacWhinney 1995). The computerized transcripts were then compared with the original videotaped data by an independent transcriber in order to verify their accuracy. This process resulted in 97.0% inter-transcriber reliability. Any disagreements concerning the transcription were resolved by re-examination until consensus was reached. The data from the present study are available in the CHILDES database.

The number of child utterances was noted for each MLU point for each child. We were able to include in the analysis 100 child utterances for each of the seven sessions for each child. Transcripts from the father-child interaction sessions (carried out on the same day) were used in some cases to supplement those mother-child sessions containing too few child utterances.

CHILDES and data analyses

CHILDES and the relevant CLAN programmes were used for the data analyses. In addition to the MLU programme, the FREQ and KWAL programmes were also used. The FREQ programme was used to compute a frequency count of the codes inserted in the coding line of the analysed transcripts, and also for specific word counts. The KWAL programme was used to extract key words or codes and their context (i.e., look at the use of a particular verb by a child). Thus, KWAL was employed to look at particular uses of a particular verb by the children.

TABLE 3. *Percentage of lexical verb types and tokens used per session (with frequencies in parenthesis)*

Session no.	1	2	3	4	5	6	7
Lexical Verb Types							
Colin	5.5 (3)	7.3 (4)	16.4 (12)	13.3 (10)	9.8 (10)	4.4 (3)	7.6 (3)
Chris	5.9 (2)	12.0 (6)	7.9 (6)	17.3 (14)	21.0 (16)	23.7 (18)	12.4 (13)
Andrew	10.0 (7)	10.0 (7)	9.6 (7)	14.9 (11)	16.1 (10)	16.8 (18)	13.2 (12)
Nina	8.0 (4)	6.9 (4)	11.3 (7)	19.2 (15)	16.3 (14)	15.9 (14)	19.8 (22)
Mark	6.3 (4)	16.4 (10)	17.6 (13)	21.2 (24)	18.0 (11)	16.2 (22)	10.4 (14)
Adam	16.3 (8)	17.3 (13)	20.0 (14)	18.4 (20)	20.7 (19)	18.9 (15)	22.6 (28)
Lexical Verb Tokens							
Colin	2.6 (3)	2.8 (5)	8.3 (13)	6.2 (10)	4.3 (9)	1.8 (6)	3.1 (12)
Chris	4.1 (5)	4.8 (6)	6.1 (9)	10.4 (19)	11.6 (21)	15.8 (28)	12.4 (34)
Andrew	6.1 (16)	4.9 (10)	5.4 (13)	7.9 (25)	6.3 (15)	10.9 (32)	10.6 (24)
Nina	3.5 (6)	3.5 (6)	5.9 (10)	11.3 (22)	10.7 (22)	11.2 (24)	13.1 (38)
Mark	4.1 (5)	15.1 (26)	10.8 (27)	12.2 (38)	14.3 (36)	11.2 (42)	9.1 (21)
Adam	7.8 (13)	11.4 (17)	18.2 (32)	15.7 (36)	12.9 (27)	12.9 (28)	17.5 (57)

RESULTS

Verb use: general lexical analysis

For this analysis, the children's utterances were coded in order to identify those containing lexical verbs, auxiliaries and copulas. In this section the results of the general lexical analysis with particular focus on the use of lexical verbs are presented.

General measures used included children's total number of verbal utterances, children's total number of words (all tokens), and children's total number of different words (all types) which are presented in Appendix A. More specific percentage and frequency measures of verb use included lexical verb types and lexical verb tokens per session, and these are presented in Table 3. Visual inspection of the data revealed no clear developmental patterns for use of verb types across dyads. Chris, the younger sibling of Colin, used more verb types for sessions 4, 5, 6 and 7. Nina, the younger sibling of Andrew, used more verb types for sessions 3, 4, and 7, while Adam, the younger sibling of Mark, appeared to use proportionally more verbs types for all sessions except session 4. There appeared to be a clearer developmental pattern for verb token use, with siblings using more verb tokens in the later sessions. Chris used proportionally more verb tokens than Colin, his sibling with SLI, for sessions 1, 2 , 4, 5, 6, and 7. Nina used proportionally more verb tokens than Andrew for sessions 4, 5, 6, and 7, and Adam used proportionally more verb tokens than Mark for sessions 6 and 7.

TABLE 4. *Cumulative lexical verb types: percentages, frequencies (in parenthesis) and 95% confidence intervals*

Session no.	1	2	3	4	5	6	7
Colin	5.5 (3)	6.4 (7)	9.8 (18)	10.1 (26)	9.4 (32)	8.6 (35)	7.9 (41)
	0–11.7	1.8–11.0	5.6–14.0	6.5–13.7	6.4–12.4	6.0–11.2	5.5–10.3
Chris	5.9 (2)	9.5 (8)	7.5 (12)	9.1 (22)	9.8 (31)	10.2 (40)	9.6 (48)
	0–13.9	3.1–11.7	3.3–11.7	5.5–12.7	6.4–13.2	7.2–13.2	7.0–12.2
Andrew	10.0 (7)	8.6 (12)	8.0 (17)	7.7 (32)	8.3 (29)	8.4 (38)	8.1 (44)
	2.8–17.2	4.0–13.2	4.2–11.8	4.5–10.9	5.3–11.4	5.8–11.0	5.7–10.5
Nina	8.0 (4)	5.6 (6)	5.9 (10)	8.9 (22)	9.3 (31)	8.8 (37)	8.8 (47)
	0.4–15.6	1.2–10.0	1.9–9.5	5.3–12.5	6.1–12.5	6.0–11.6	6.4–11.3
Mark	6.3 (4)	5.4 (13)	5.1 (20)	11.9 (37)	11.6 (43)	10.6 (54)	9.9 (64)
	0.1–12.5	1.4–9.4	1.9–8.3	8.3–15.5	8.2–15.0	8.0–13.2	7.5–12.3
Adam	16.3 (8)	16.1 (20)	14.4 (28)	12.5 (38)	11.7 (46)	11.4 (54)	11.4 (68)
	5.7–26.9	9.5–22.7	9.4–19.4	6.1–18.9	8.5–14.9	8.2–14.6	8.8–14.0

Note. Percentages were calculated using the cumulative total output of types as denominator.

In order to investigate possible patterns in the data in more detail, cumulative use of lexical verb types and lexical verb tokens was examined. The examination included looking at percentage and frequency data. In addition, 95% confidence intervals for the percentage data were calculated in order to allow for statistical comparisons across the SLI-sibling dyads. Cases in which the mean of one member of the dyad lay outside the 95% confidence interval of the other member of the dyad were deemed to show a statistically significant difference.

Verb use: cumulative use of lexical verb types

Table 4 presents the data on cumulative verb types used across time for each member of the three dyads. There were no significant differences in lexical verb types used by Colin and Christopher nor by Andrew and Nina. Mark and Adam exhibited a different pattern: Adam, the normal sibling, used a significantly greater percentage of verbs in sessions 1, 2 and 3, but this difference disappeared by session 4. An examination of the frequency data suggest that the size of the verb lexicons of the children with SLI and their siblings were quite similar by the end of the study (41 vs. 48, 44 vs. 46, and 64 vs. 68).

Verb use: cumulative use of lexical verb tokens

These data are presented in Table 5 and in graphical form in Figures 1,

TABLE 5. *Cumulative lexical verb tokens: percentages, frequencies (in parenthesis) and 95% confidence intervals*

Session no.	1	2	3	4	5	6	7
Colin	2.6 (3)	3.1 (8)	5.2 (21)	5.5 (31)	5.3 (40)	5.0 (46)	4.9 (58)
	0–5.6	0.9–5.3	3.0–7.4	3.5–7.5	3.7–6.9	3.6–6.4	3.7–6.1
Chris	4.1 (5)	4.4 (11)	5.1 (20)	6.7 (39)	7.9 (60)	9.4 (88)	10.0 (122)
	0.5–7.7	1.8–7.0	2.9–7.3	4.7–9.7	5.9–9.9	7.4–11.4	8.3–11.7
Andrew	6.1 (16)	5.6 (26)	5.4 (38)	6.2 (63)	6.2 (78)	7.1 (110)	7.5 (134)
	3.1–9.1	3.6–7.6	3.7–7.1	4.7–7.7	4.7–7.6	5.8–8.4	6.3–8.8
Nina	3.5 (6)	3.5 (12)	4.3 (22)	6.3 (44)	7.3 (66)	8.0 (90)	9.1 (128)
	0.7–6.3	1.5–5.5	2.5–6.1	4.5–8.1	5.5–9.1	6.4–9.6	7.6–10.6
Mark	4.1 (5)	10.5 (31)	10.6 (58)	11.2 (96)	11.9 (132)	11.7 (174)	11.4 (195)
	0.5–7.7	6.9–14.1	8.0–13.2	9.0–13.4	9.9–13.9	10.1–13.3	9.8–13.0
Adam	7.8 (13)	9.5 (30)	12.6 (62)	13.6 (98)	13.5 (125)	13.4 (153)	14.3 (210)
	3.8–11.8	6.1–12.9	9.6–15.6	10.6–16.2	11.3–15.7	11.4–15.4	12.5–16.1

Note. Percentages were calculated using the cumulative total output of tokens as denominator.

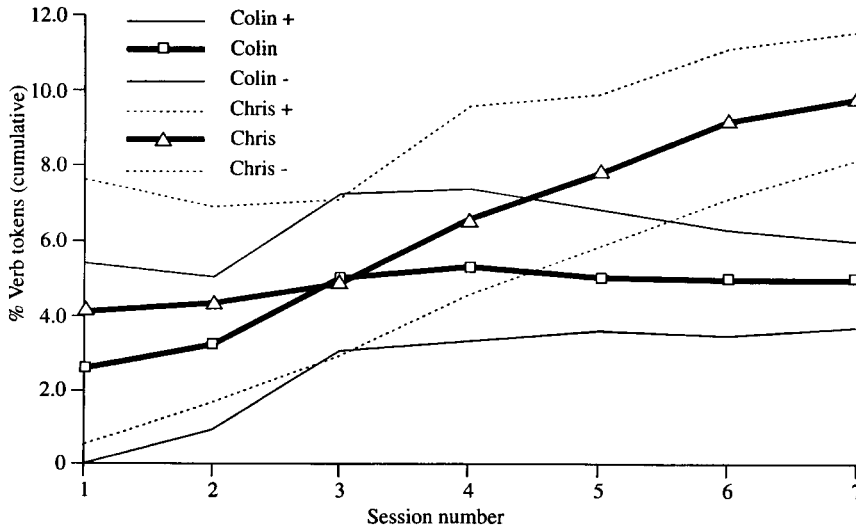

Fig. 1. Comparison of Colin and Chris cumulative verb token use

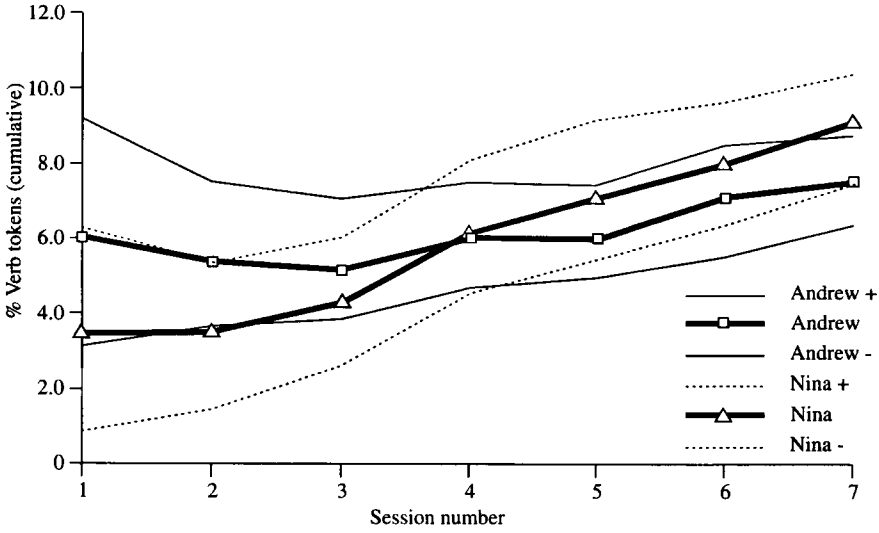

Fig. 2. Comparison of Andrew and Nina cumulative verb token use

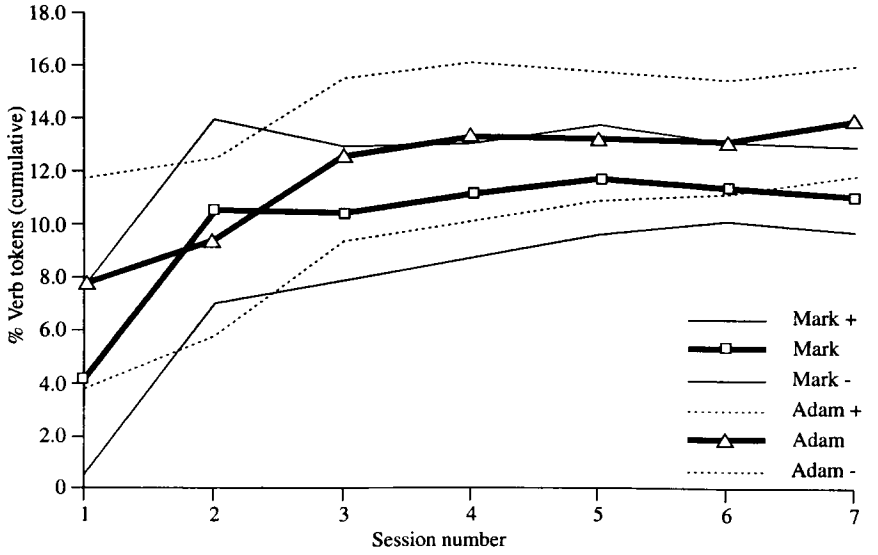

Fig. 3. Comparison of Mark and Adam cumulative verb token use

TABLE 6. *Proportion (and frequency in parenthesis) of verb forms used by children on those sessions where younger sibling used significantly more verb tokens than the child with SLI*

	Bare stems	Aux. + verb	Present progressive -ing	Past participle -n	Irregular past	Third person -s	Past tense -ed	Total verbs used
Colin	63 (17)	4 (1)	7 (2)	–	22 (16)	4 (1)	–	27
Chris	64 (53)	10 (8)	11 (9)	5 (4)	6 (5)	1 (1)	4 (3)	82
Andrew	63 (3)	13 (3)	17 (4)	–	8 (2)	–	–	24
Nina	26 (10)	26 (10)	8 (3)	3 (1)	5 (2)	3 (1)	–	38
Mark	44 (28)	27 (17)	6 (4)	16 (1)	18 (11)	–	3 (2)	63
Adam	45 (38)	29 (25)	9 (8)	–	6 (5)	8 (7)	2 (2)	85

Note. For Colin and Chris, total based on sessions 5, 6 and 7.
For Andrew and Nina, total based on session 7.
For Mark and Adam, total based on sessions 5 and 7.

2 and 3. The figures present the means in bold and the 95% confidence intervals in lighter lines, represented in the key with the name of the child with an added + or – sign. There is an interesting and consistent finding for all three dyads. It is clear that, after a particular point, normally developing siblings consistently used a significantly greater percentage of verb tokens than their older impaired brothers. Two different developmental patterns were observed. In the case of Colin and Chris (Fig. 1) , the children appeared to be working with a similar number of verb tokens until session 5 when Chris overtook Colin, the child with SLI. A similar pattern is observed in Fig. 3 for Mark and Adam when Adam overtook Mark in session 6. In the case of Andrew and Nina, Nina, the younger sibling, used significantly less verb tokens for the early session 2, had a similar number for sessions 3, 4, 5 and 6, and by the last sessions significantly surpassed Andrew, her brother with SLI. In summary, it is clear that for all three dyads there was a point in development where the younger normal siblings started using the verbs that they knew proportionally more often than children with SLI did.

Verb use: examining children with SLI's difficulty using verbs

Table 6 presents data on the forms of the verbs used by the children based on those sessions where it was found that the sibling used significantly more verb tokens than the child with SLI. It appears that all children used similar proportions of bare stems. The normal

language learning siblings all used more constructions which contained auxiliary + verb. In addition, Adam and Nina used third person singular -s, while Mark and Andrew their brothers with SLI did not. Furthermore, Chris used past tense -ed, while Colin did not. Thus, it appears that the normal younger siblings were using a wider variety of verb forms in their constructions containing verbs than the children with SLI were.

In order to investigate further the SLI children's difficulty in applying verbs they know, we examined all verbs which were used by all six children at least once during the observational period. These verbs were: do, get, go, look, make, put and want. Appendix B contains all the constructions used by the children involving these verbs. It is evident from an examination of Appendix B that a developmental analysis of the types of constructions and contexts in which these verbs were used was not possible, given the limited number of utterances available for examination. Nonetheless, we were able to investigate what forms of the verbs the children used, and this information is summarized in Table 7. We found that the normal language learning siblings always used the same number or more forms of a particular verb than their older brothers with SLI. This was the case for all dyads and for all verbs with only one exception where Adam used less forms of 'make' than Mark, the child with SLI. Thus, it appears that children with SLI not only have difficulty using verbs as often as normal language learning children of a similar language stage do, but they also have difficulty using the verbs in a variety of forms, hence in a variety of linguistic contexts.

In addition, Table 7 shows that the siblings used similar forms for different verbs while the children with SLI did not, or did so to a lesser extent. If we look at Colin and Chris, Colin had no instances of using the same form with more than one verb (bare stem forms are not relevant to this analysis). Chris, on the other hand, used the past participle in 'gone' and 'done' and the auxiliary 'can' in 'can do' and 'can't get'. Similarly, Andrew had no instances of using the same form with more than one verb, while Nina used: the present progressive -ing in 'doing', 'going', 'making', and 'putting'; the past participle in 'done' and 'gone'; and finally constructions using 'want to' and 'got to'. In the case of Mark and Adam, Mark, the SLI child, did use the same forms with different verbs. Mark used the auxiliary 'can' in 'can do', 'can go' and 'can make'; he used the auxiliary 'do' in 'don't put' and 'don't want'; and he used the present progressive -ing in 'going' and 'making'. Adam, the younger sibling, showed evidence of a wider use of similar forms across verbs than his older brother with SLI. Adam

TABLE 7. *Forms of lexical verbs used by the children (based on verbs used by all six children)*

	Do	Get	Go	Look	Make	Put	Want
Colin	do can't do	got	go	look	make	put	want
Chris	do done can do	get can't get got	go won't go going is going goes gone	look	make	put put it	want want to
Andrew	do doing	get got	go gone	look	make	put put it	want want to
Nina	do doing done	got got to	go gone going	look	making	put put it can put 'm putting	want want to
Mark	do can't do might do done doed	get got 've got 'll get	go can go 'm going 's going	look	make can make making 'm making	put don't put	want don't want want to
Adam	do can('t) do I'll do Done doing did	get got got to 've ('nt) got 'm getting	go can't go must go don't go doesn't go going 's going goes gone	look looks looking	make making	put put it can't put shall put putting 'm putting	want didn't want want to

used the auxiliary 'can' in 'can't do', 'can't go', and 'can't put'; the auxiliary 'do' in 'don't go' and 'didn't want'; the present progressive -ing in 'doing', 'getting', 'going', 'looking', 'making', and 'putting'; the third person singular -s in 'looks' and 'goes'; and the past participle in 'done' and 'gone'. Thus, the present data suggest that children with SLI are not able to generalize the knowledge they have across verbs to the same extent that their younger normal siblings of a similar language stage can do.

DISCUSSION

The present study obtained some thought-provoking results. Based on the observational period studied, children with SLI appear to be developing their verb lexicons at a similar rate to that of their younger normal language learning siblings. The cumulative total of verb types data revealed that the sizes of the lexicons of the children with SLI and of their siblings were quite similar. This finding was not consistent with other reports in the literature. Fletcher & Peters (1994) found that children with SLI used fewer verb types than their age-matched peers. In this study we used siblings of a similar language stage as controls and not age-peers which may have accounted for the discrepancy in the findings. Conti-Ramsden & Jones (in press) also found that children with SLI used fewer verb types than normal language learning children of the same MLU level. They compared three children with SLI to 75 normal language learning children. It may be the case that the use of a younger sibling as control may have brought about similarities in verb types used between the children being compared. It may also be the case that siblings of children with SLI may themselves be slower than normal children with non-impaired siblings. Finally, the limitations of the small sample used may have not allowed for detection of differences between child with SLI and sibling. Nonetheless, although this finding was not predicted a priori based on what we know from the literature, it provided us in effect with another variable in which the two members of the SLI-sibling dyad were matched. Thus, not only were the children from the same family and at similar stages of expressive language use, but they also had verb lexicons of similar sizes. Such a context made the next set of results of particular interest.

We found a significant difference in the proportion of times the verbs were used. In all three cases, there was a point in development when the younger siblings consistently used the verbs they knew more often than their older brothers with SLI. Perhaps this point is illustrated best by Colin who used verbs only half as often as his sibling Chris, even though he had almost the same number of verbs available; also, Nina started the observational period using proportionally less verb tokens than her brother with SLI only to surpass him significantly by session 7. These results suggest that children with SLI have difficulty applying the verbs in their lexicons across contexts. Specifically, we found that the younger siblings used more auxiliary + verb constructions and also use more inflections such as third person singular -s and past tense -ed. We also found that, overall, younger siblings used more verb forms

with the verbs they know than their older brothers with SLI. Finally, we found that younger siblings used the same forms with different verbs, suggesting some level of generalization across verbs, while children with SLI did not do this, or did so to a lesser extent.

How can we explain SLI children's difficulties in using verbs? We are confronted with the fact that normally developing siblings used the verbs they know more widely than their older brothers with SLI, although their verb lexicons were not dissimilar in size. Although this finding is novel as far as verb use is concerned, we have been aware for a number of years that children with SLI use a number of linguistic features less frequently than normal children of the same language stage (Leonard 1979, 1995). No cohesive explanation has emerged for this phenomenon except consideration of performance factors (e.g., length of utterance) which are not applicable in this study. We thus propose two complementary hypotheses to account for our findings. First, we suggest that children with SLI have difficulties extracting patterns from linguistic information. Thus, although the children with SLI had reached – albeit more slowly – what Marchman & Bates (1994) would refer to as a similar 'critical mass' in their verb learning compared to their siblings, they were not making the types of generalizations their siblings were making, especially in terms of verb morphology. We therefore propose that children with SLI require a larger verb vocabulary than normal language learning children do in order to reach an 'SLI critical mass'. We would also suggest in line with the argument made by Marchman & Bates (1994) that SLI children's later morphological and grammatical difficulties may well be rooted in their earlier lexical difficulties with verbs.

Second, children with SLI not only have difficulties extracting patterns from linguistic information but they also have difficulties in making generalizations. Even when a pattern may be evident, children with SLI will be slow at applying this knowledge as they are conservative learners. They are slower than younger normal children of the same language stage. Furthermore, if we recall that children with SLI are older and frequently have better comprehension of language and more language experience than the normal younger children they are compared with, we begin to understand the magnitude of their difficulties. In terms of the present study, we propose that the children with SLI are experiencing an 'Extended Verb-Island Period of Development' (Tomasello 1992). The children with SLI in this study had not yet formed a grammatical category of verb when they used verbs in their early multiword speech. The knowledge the children with SLI had was verb specific and what they were able to use with a

particular verb was not readily generalized across verbs. This was particularly the case for Colin and Andrew. Mark was able to make some generalizations but again, compared with his sibling, he was behind. Therefore what we observe in children with SLI is a protracted period of development with particular aspects of language, in this case verbs, being more obviously delayed and problematic for these children.

Why do verbs present a particular problem for children with SLI? First, it is important to acknowledge that there appears to be a noun-verb sequence in normal language learning. Large studies of vocabulary composition such as those carried by Bates and her colleagues (Bates, Marchman, Thal, Fenson, Dale, Reznick, Reilly & Hartung 1994, Caselli, Bates, Casadio, Fenson, Fenson, Sanderl & Weir 1995) have made it clear that nouns are learned before verbs, at least for English- and Italian-speaking children (but see Gopnik & Choi 1990, 1995, and Tardiff (in press) for possible counter-arguments when working with Korean and Mandarin). Nouns are easier to learn because they refer to object-reference concepts (e.g., persons, things) which more consistently map on to the perceptual-conceptual structure of the world (Gentner 1982). Conversely, verbs refer to relational concepts (e.g., activities, changes of state, instrument, causal relations) which show more variability in how they map on to the world; what Tomasello (1992) calls the 'packaging' problem. Furthermore, verbs often represent events which involve a structure and the specification of particular conceptual roles: who does what to whom. In this sense, and particularly in English, verbs provide a framework for organizing other word class members into appropriate linguistic expressions. Thus, on the one hand, verb use can be seen as a catalyst for early grammatical development as the verbal information provides a conceptual frame which 'begs to be completed into a sentence' (Tomasello 1992). On the other hand, it may be the very amount of information provided in the complex, relational nature of verbs which may hinder their use by children with SLI.

To conclude, a few words of caution. The results of the present investigation involved a small number of families and as such should be considered exploratory in nature. Nevertheless, the observation of these families provided us with a natural experiment in which the development of a language-impaired versus non-impaired child could be observed within the same familial context. In addition, all the children were at the early stages of expressive language use and each SLI-sibling dyad had verb lexicons similar in size. Such a design is methodologically powerful for comparing similarities and differences

between typical and atypical language learners. However, comparisons involving a small number of sessions (in this case 7 sessions) need to be interpreted cautiously. This is particularly important in the case of no differences found, as there may simply not have been enough occasions for a particular statistical difference to be evident. We therefore think the results of this project raise rather than confirm two particularly interesting possible hypotheses. Future longitudinal research in this area involving larger samples which afford more detailed linguistic analyses is certainly warranted.

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