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# Grammatical Morpheme Acquisition in 4-Year-Olds With Normal, Impaired, and Late-Developing Language

## Research Note

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The production of the grammatical morphemes studied by Brown and his colleagues was examined in free speech samples from a cohort of 4-year-olds with a history of slow expressive language development (SELD) and a control group of normal speakers. Results suggest that children with SELD acquire morphemes in an order very similar to that shown in previous acquisition research. Children who were slow to begin talking at age 2 and who continued to evidence delayed expressive language development by age 4 showed mastery of the four earliest acquired grammatical morphemes, as would be expected, based on their MLUs, which fell at Early Stage IV. Four-year-olds with normal language histories produced all but one of the grammatical morphemes with more than 90% accuracy, as would be expected based on their late Stage V MLUs. Children who were slow to acquire expressive language as toddlers, but who "caught up" in terms of sentence length by age 4 did not differ in MLU from their peers with normal language histories. However, they had acquired fewer of the grammatical morphemes. The implications of these findings for understanding the phenomenon of slow expressive language development are discussed.

**KEY WORDS:** morphology, syntax, language disorders

The acquisition of the 14 grammatical morphemes studied by Brown (1973) and his colleagues (Cazden, 1968; deVilliers & deVilliers, 1973) has been of interest to researchers in child language development and disorders for some time. Normative research suggests that children acquire these morphemes in a more or less consistent order, and at predictable language stages; that is, with a specific relationship to mean length of utterance in morphemes (MLU). Lahey, Liebergott, Chesnick, Menyuk, and Adams (1992) have shown that there is a good deal of variability in normally speaking children during the early stages of morpheme acquisition. This variability is considerably reduced, however, by the time children reach 4 years of age and MLUs reach 3.5-4.0, the stage of language development being examined in this study. The normative data suggest that by the time typically developing children have MLUs that exceed 4.5 (usually between 4 and 5 years of age) all the morphemes studied by these researchers will have been acquired.

Researchers in child language disorders have also investigated the acquisition of these morphemes. In general, the research can be summarized by saying that these studies (Ingram, 1972; Johnston & Schery, 1976; Kahn & James, 1983; Leonard, 1989; Leonard, Bortolini, Caselli, McGregor, & Sabbadini, 1992; Steckol & Leonard, 1979; Trantham & Pederson, 1976) find that language impaired (LI) children acquired Brown's 14 morphemes in an order similar to that seen in normal acquisition. However, the LI children frequently needed to reach higher MLU levels before acquiring certain morphemes than did normally developing peers. In general,

morphological learning appeared to be a particularly difficult aspect of linguistic acquisition for children with language impairments (see Leonard, 1989, for review). Dale and Cole (1991) also assert that morphology is the aspect of language that is most closely associated with specific language learning ability, as opposed to general cognitive development.

Paul and Riback (1993) conducted a longitudinal follow-up at ages 3 and 4 of syntactic acquisition in children identified at age 2 as slow in expressive language development (SELD). Their study indicated that a majority of these children continued to show grammatical deficits, as indexed by Developmental Sentence Score (Lee, 1974), at age 3. Of those who did, 40% moved within the normal range of grammatical production by age 4. In addition, Paul and Riback looked at scores on each of the eight DSS categories for SELD children who did and did not achieve age-appropriate overall DSSs at each age. They found that children who were still syntactically delayed at 3 had deficits in a broad range of DSS categories, including pronouns, question words, negative markers, and verb marking and elaboration. For children who continued to score low on DSS by age 4, though, deficits were concentrated in the category of verb marking. These findings suggested that not only the prevalence of delay changed with age in these children. The pattern of syntactic deficit also appeared to be changing. The current study looks in some detail at one aspect of syntactic production in order to draw a more detailed picture of the pattern that emerges at the end of the preschool period in these children. Grammatical morpheme development seemed a likely place to look for persistent deficits both because of the literature suggesting difficulty with these markers in other children with LI and because of the suggestion in Paul and Riback that 4-year-olds with persistent delay were having more trouble marking verbs than they were with other aspects of syntactic production.

The purpose of the present study was to look at the acquisition of grammatical morphemes in three groups of 4-year-olds: (a) those with normal language acquisition, (b) those with chronic language impairment, (c) those with a history of slow expressive language development as toddlers, but currently normal MLUs, whom we call "late bloomers." The intent of the study was to determine:

1. whether the children with chronic language impairment, who were identified on the basis of small expressive vocabularies as toddlers, followed a pattern of morphological acquisition similar to that reported in the literature for other LI children.
2. whether the "late bloomers" (LBs) were achieving normally in terms of their morphological development, as their age-appropriate MLUs would predict. If the LBs had fully "caught up" with their peers with normal language history, then one would expect morphological acquisition for this group to be on par with MLU and with morphological usage in peers with normal language histories. However, if the LBs were showing some residual effects of their slow start in language acquisition, then one might expect morphological development to be somewhat less advanced than MLU would ordinarily imply. Such a finding would suggest that the LBs, like their counterparts with chronic language deficits, were showing some asynchronies in language acquisition

that could be construed as signs that they had not completely overcome their late start. Such a finding would have implications for prognosis of early language delay, as well as for intervention decision-making for young children with slow expressive language development (SELD).

## Method

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### Subjects

**Diagnostic group assignments at intake.** The subjects included in this report are involved in the Portland Language Development Project (PLDP). Subjects in the PLDP were recruited through local pediatric offices and media advertisements. The PLDP is a 5-year longitudinal study following children who, at age 2, were identified on the basis of small expressive vocabularies as slow in expressive language development (SELD). Rescorla (1989) and Fischel, Whitehurst, Caulfield, and DeBaryshe (1989) have shown that parent report of expressive vocabulary size in toddlers is an excellent index of language status. Vocabulary size was assessed with Rescorla's (1989) *Language Development Survey* (LDS), a questionnaire containing both a checklist of 300 of the most common words in children's early vocabularies and a space on which to record the child's three longest sentences. Rescorla (1989), as well as Reznick and Goldsmith (1989) and Dale, Bates, Reznick, and Morisset (1989), have shown that parent checklist formats are valid and reliable indices of expressive vocabulary size in toddlers.

Children were identified as SELD if parents indicated on the LDS that the child used fewer than 50 words at 20 to 34 months of age. This criterion was chosen to select the lower end of the normal distribution of language development. Nelson (1973) has shown that the majority of middle-class children produce more than 50 different words by 20 months of age. Dale, Bates, Reznick, and Morisset (1989) reported that average expressive vocabulary size at 20 months for a large sample of children geographically and socioeconomically similar to this one is 155 words, with a standard deviation of 87. Thus an expressive vocabulary size of 50 words at 20 months falls more than one standard deviation below the norm in their sample.

Thirty-four subjects with SELD completed all aspects of both the intake and the 4-year evaluation and are included in the present report. A normal-language (NL) contrast group was selected to match the SELD group in terms of age, sex ratio, and socioeconomic status. Children were invited to join the normal group if parents reported expressive vocabulary sizes of more than 50 words on the LDS. Twenty-three children identified as NL completed all aspects of both the intake and the 4-year evaluation and are included in the present report. Demographic data for the subjects included in this study are given in Table 1.

All subjects had developmental quotients above 85 on the Bayley Scales of Infant Development (Bayley, 1969). Further, the groups were comparable in terms of number of nonverbal items passed on the Bayley (14.2 [*SD* 4.7] for the SELDs; 15.5 [*SD* 3.5] for the NLs). All passed speech reception screenings in a sound field at 25 dB, using visually

TABLE 1. Summary of demographic data at intake.

| Group  | <i>n</i> | Mean age (mon.) | Age range (mon.) | % males | SES* |
|--------|----------|-----------------|------------------|---------|------|
| Normal | 23       | 27.0            | 21-34            | 57      | 2.52 |
| SELD   | 34       | 25.8            | 20-33            | 74      | 2.73 |

\*Based on Myers and Bean's (1968) adaptation of Hollingshead's four-factor scale of socioeconomic status (SES), on a scale of 1 to 5, with 1 being the highest.

reinforced audiometry, and all were screened for any history or evidence of neurological or neuromotor deficits or autism. Detailed demographic data and linguistic profiles on this cohort are presented in Paul (1991).

**Diagnostic group assignment at age four.** The 34 SELD and 23 NL subjects described in the previous section were all seen for reevaluation between their fourth and fifth birthdays. At that evaluation, the following three groups were formed on the basis of intake diagnosis and performance on productive syntax in spontaneous speech, as indexed by Mean Length of Utterance (MLU) in morphemes (Brown, 1973; Miller, 1981):

1. The NL group consisted of children who were identified as functioning within the normal range at the intake assessment. All these children scored within one standard deviation of their age group's mean (Miller, 1981) for MLU at age 4.

2. A second group was drawn from the 34 children originally identified as SELD. Fifteen who were identified at age 2 as SELD but who, by age 4, had moved within the normal range (Miller, 1981) in terms of MLU constitute this group. They are referred to as the "late bloomers" (LB).

3. The third group was drawn from the same pool of 34 children originally identified as SELD. The 19 children in this expressive language delayed (ELD) group continued to show deficits in expressive syntax, as indexed by MLUs more than one standard deviation below the mean for their age (Miller, 1981), at age 4.

Average age and MLUs for each of the three diagnostic groups formed at the 4-year evaluation are given in Table 2.

### Procedures

At the 4-year evaluation, a certified audiologist administered pure tone hearing screenings at 500, 1000, 2000, and 4000 Hz at 20 dB, following ASHA (1985) guidelines, to all subjects. A Maico model 24B audiometer calibrated to ANSI (1969) standards was used. All subjects included in the study being reported here passed these screenings. Spontaneous speech samples were collected during free play interactions

TABLE 2. Group placement based on MLU at age 4.

| Group | <i>n</i> | Mean age (yrs.) | Age range (yrs.:mon.) | Mean MLU and (SD) |
|-------|----------|-----------------|-----------------------|-------------------|
| NL    | 23       | 4.1             | 4:0-4:10              | 4.37 (0.61)       |
| LB    | 15       | 4.1             | 4:0-4:2               | 4.44 (1.59)       |
| ELD   | 19       | 4.3             | 4:0-4:11              | 3.13 (0.55)       |

TABLE 3. Percentage of usage of 13 grammatical morphemes by three groups of 4-year-old children.

|                                 | Normal ( <i>n</i> = 23) | LB ( <i>n</i> = 15) | ELD ( <i>n</i> = 19) |
|---------------------------------|-------------------------|---------------------|----------------------|
| Present progressive -ing        | 100                     | 99                  | 97                   |
| in                              | 95                      | 97                  | 92                   |
| Regular plural -s               | 99                      | 95                  | 91                   |
| on                              | 98                      | 100                 | 100                  |
| Possessive -s                   | 91                      | 100                 | 83                   |
| Articles: a                     | 95                      | 91                  | 87                   |
| the                             | 97                      | 92                  | 88                   |
| Regular past -ed                | 100                     | 98                  | 86                   |
| Regular third person singular   | 94                      | 77                  | 80                   |
| Irregular third person singular | 93                      | 88                  | 43                   |
| Contractible copula             | 96                      | 92                  | 83                   |
| Uncontractible copula           | 95                      | 94                  | 86                   |
| Uncontractible auxiliary be     | 93                      | 87                  | 69                   |
| Contractible auxiliary be       | 88                      | 84                  | 69                   |

between mother and child. Each dyad was given a dollhouse, toy garage, cars, people, and furniture, and were told to "play with them together as you would at home." Fifteen-minute speech samples were recorded on audiotape and transcribed orthographically onto the Systematic Analysis of Language Transcripts (SALT) computer program (Miller & Chapman, 1988), using the program's conventions for denoting bound morphemes and their obligatory contexts. The SALT program automatically computed MLU for each transcript. The program also listed each subject's use of 13 of the 14 grammatical morphemes, as well as the obligatory contexts present on each transcript for each of these 13. Percentage of use of these morphemes in obligatory context for each transcript was computed from the lists generated by the SALT program. The program was not able to identify instances or obligatory contexts for irregular past tense verbs, so this morpheme was excluded from the analysis.

**Reliability.** The reliability of the transcription of the audiotapes into the SALT program was evaluated by having a second transcriber independently retranscribe a randomly selected 10% of the speech samples collected at the 4-year evaluation. Reliability was established by comparing two transcriptions of these samples word by word and computing the percentage of words in agreement divided by the total number of words transcribed (McReynolds & Kearns, 1983). The reliability of transcription was 97%. The transcriptions entered into the SALT program were also checked by a second research assistant for accuracy of morpheme codes, to ensure that all bound morphemes were appropriately coded. If the checker found an error, it was verified against the audiorecording of the speech sample and then corrected in the data file.

### Results

To compute the percentage of correct usage in obligatory context of the 13 morphemes studied, the data were pooled across all subjects within each diagnostic group. Table 3 gives the percentage of occurrence of each of the 13 morphemes summed across subjects in each diagnostic group. Using Brown's (1973) criteria of greater than 90%

**TABLE 4. Normative data (based on Brown [1973] and Miller [1981]) on age, stage, and MLU level at which morphemes are typically acquired, compared with morpheme acquisition in three diagnostic groups.**

| Morpheme                           | Brown's Stage | MLU range | Age range | Acquired by |            |             |
|------------------------------------|---------------|-----------|-----------|-------------|------------|-------------|
|                                    |               |           |           | NL (4.37)*  | LB (4.44)* | ELD (3.13)* |
| -ing                               | II            | 2.0-2.5   | 12-26     | X**         | X          | X           |
| plural                             | II            | 2.0-2.5   | 12-26     | X           | X          | X           |
| in                                 | II            | 2.0-2.5   | 12-26     | X           | X          | X           |
| on                                 | III           | 2.5-3.0   | 27-30     | X           | X          | X           |
| possessive                         | III           | 2.5-3.0   | 27-30     | X           | X          | -***        |
| reg. past                          | V             | 3.75-4.5  | 41-46     | X           | X          | -           |
| reg. 3rd person singular           | V             | 3.75-4.5  | 41-46     | X           | -          | -           |
| contractible copula                | V             | 3.75-4.5  | 41-46     | X           | X          | -           |
| contractible auxiliary <i>be</i>   | V+            | 4.5+      | 46+       | -           | -          | -           |
| uncontractible copula              | V+            | 4.5+      | 46+       | X           | X          | -           |
| uncontractible auxiliary <i>be</i> | V+            | 4.5+      | 46+       | X           | -          | -           |
| irreg. 3rd person singular         | V+            | 4.5+      | 46+       | X           | -          | -           |

\*average MLU for diagnostic group.

\*\*X indicates  $\geq 90\%$  correct usage.

\*\*\* - indicates  $< 90\%$  correct usage.

usage in obligatory context for terming a morpheme *acquired*, it can be seen that the group with normal language history had acquired all morphemes scored except the contractible auxiliary. The late bloomers (LB) group had acquired all but four morphemes. These four were the regular and irregular third person singular and both forms of the auxiliary *be*. The children with expressive language delay had only acquired the present progressive *-ing*, the prepositions *in* and *on*, and the plural *-s*. The morphemes acquired by each group, using Brown's criteria, are listed in Table 4.

Since the ELD group had a significantly lower average MLU than either of the two other groups, it would be expected that they would have acquired fewer grammatical morphemes. The question of interest would be whether their morpheme usage was commensurate with what would be expected for their MLU level. To examine this question, Table 4 also presents the stage assignments given by Miller (1981) for each of the grammatical morphemes.

By looking at the average MLUs for each diagnostic group given in Table 4, it can be seen that the normal group, with a mean MLU of 4.37 (*SD* 0.61) would be expected to have acquired all Stage V and some Stage V+ morphemes. As the list in Table 4 shows, this is the case. All morphemes except the Stage V+ contractible auxiliary *be* (which is near acquisition at 88% correct) have been acquired.

The LB group had an MLU comparable to that of the children with normal language history, with an average of 4.44 (*SD* 1.59). This would lead to the expectation, again, that all Stage V and some Stage V+ morphemes would have been acquired. However, the LB subjects did not meet acquisition criteria for the Stage V regular third person singular. They had also acquired fewer of the Stage V+

morphemes than were acquired by their peers with normal language histories and comparable MLUs.

The ELD group had an average MLU of 3.13 (*SD* 0.55). This would suggest that they would have acquired all the Stage II and III morphemes. However, they had not acquired the possessive marker. As would be expected, given their MLU, no morphemes above Stage III had been mastered.

## Discussion

These data suggest that children with normal, impaired, and late-developing language are acquiring grammatical morphemes in a similar order. In general, acquisition of grammatical morphemes is related to MLU, in the manner predicted by normative data (Miller, 1981). However, both groups of children with a history of slow expressive language development, the LBs and the ELDs, have acquired slightly fewer of the grammatical morphemes than their MLU would predict. These data support the position of Leonard (1989) that grammatical morphemes present special difficulties for children with language disorders. This difficulty is apparent even when MLU—which is to some extent a reflection of morpheme usage—is taken into account.

Further, the data suggest that even for children like our LBs, who appear to have "grown out of" their overall language delay, grammatical morphemes still cause problems. This finding implies that LBs may not be entirely "out of the woods" in terms of their language development. They may retain residual deficits in grammatical morpheme acquisition—and perhaps in other areas as well—even when their MLUs move within the normal range.

The results of this study suggest that children who present as "late talkers" as toddlers are at substantial risk for expressive language deficits that persist at least until age 4. Fifty-four percent of children identified as slow in expressive language development at age 2 had MLUs that were significantly lower than normal at age 4. The grammatical morpheme development of these children with ELD was also impaired, over and above what would be expected on the basis of MLU. These findings add strength to the argument that early expressive language delay can be identified in toddlers and that such children are at some risk for persistent language deficits, at least through the preschool years.

For children who appeared to "outgrow" their slow start in language acquisition and moved within the normal range of MLU by age 4, grammatical morpheme development was still somewhat delayed, relative to the usage seen in peers with comparable MLUs but normal acquisition histories. These findings raise the possibility that even children who appear to outgrow early language delay may retain some deficits. They suggest, to us, that even though arguments against early intervention are often made on the basis that many late-talking toddlers will outgrow their delays, some deficits may be retained through the preschool period even in children who appear to experience this growth. These deficits may simply be remnants of the early slow start that will themselves eventually be outgrown. Alternatively, though, they may be signals of a language processing system that continues to operate at a lower than normal level of efficiency. The choice between these alternative explanations remains a matter of speculation, although Dale and Cole's (1991) findings that morphological development is the best index of specific language learning capacity tends to support the latter view. In any case, the results of this report indicate that both ELD and LB children demonstrate some shortcomings in language acquisition in the late preschool period. Such findings suggest the need for research on the chronic effects of such persistent deficits, particularly their effect on the development of higher-level language skills required for academic success. Research on the efficacy of intervention that addresses these deficits in the preschool period, and its preventive function for warding off school-related difficulties, is also needed.

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## References

- American National Standards Institute.** (1969). *Specifications for audiometers* (S3.6-1969). New York: ANSI.
- ASHA.** (1985). Guidelines for identification audiometry. *Asha*, 27, 49–52.
- Bayley, R.** (1969). *Scales of infant development*. New York: Psychological Corporation.
- Brown, R.** (1973). *A first language: The early stages*. Cambridge, MA: Harvard University Press.
- Cazden, C.** (1968). The acquisition of noun and verb inflections. *Child Development*, 39, 433–448.
- Cole, K., & Dale, P.** (1991). What's normal? Specific language impairment in an individual differences perspective. *Language, Speech and Hearing Services in Schools*, 22, 80–83.
- Dale, P., Bates, E., Reznick, S., & Morisset, C.** (1989). The validity of a parent report instrument of child language at 20 months. *Journal of Child Language*, 16, 239–250.
- deVilliers, J. G., & deVilliers, P. A.** (1973). A cross sectional study of the acquisition of grammatical morphemes in child speech. *Journal of Psycholinguistic Research*, 2, 267–278.
- Fischel, J., Whitehurst, G., Caulfield, M., & DeBaryshe, B.** (1989). Language growth in children with expressive language delay. *Pediatrics*, 82, 218–227.
- Ingram, D.** (1972). The acquisition of the English verbal auxiliary and copula in normal and linguistically deviant children. *Papers and Reports on Child Language Development*, 4, 79–92.
- Johnston, J., & Schery, T.** (1976). The use of grammatical morphemes by children with communicative disorders. In D. Morehead & A. Morehead (Eds.), *Normal and deficient child language* (pp. 239–258). Baltimore, MD: University Park Press.
- Kahn, L., & James, S.** (1983). Grammatical morpheme development in three language disordered children. *Journal of Childhood Communication Disorders*, 6, 85–100.
- Lahey, M., Liebergott, J., Chesnick, M., Menyuk, P., & Adams, J.** (1992). Variability in children's use of grammatical morphemes. *Applied Psycholinguistics*, 13, 373–398.
- Lee, L.** (1974). *Developmental sentence analysis*. Evanston, IL: Northwestern University Press.
- Leonard, L. B.** (1989). Language learnability and specific language impairment in children. *Applied Psycholinguistics*, 10, 179–202.
- Leonard, L., Bortolini, U., Caselli, M., McGregor, K., & Sabbadini, L.** (1992). Morphological deficits in children with specific language impairment: The status of features in the underlying grammar. *Language Acquisition*, 2, 151–180.
- McReynolds, L., & Kearns, K.** (1983). *Single subject experimental designs in communication disorders*. Austin, TX: PRO-ED.
- Miller, J.** (1981). *Assessing language production in children: Experimental procedures*. Austin, TX: PRO-ED.
- Miller, J., & Chapman, R.** (1988). *Systematic analysis of language transcripts: User's manual*. Madison: University of Wisconsin.
- Myers, J., & Bean, L.** (1968). *A decade later: A follow-up of social class and mental illness*. New York: Wiley.
- Nelson, K.** (1973). Structure and strategy in learning to talk. *Monographs of the Society for Research in Child Development*, 38 (Serial No. 143).
- Paul, R.** (1991). Profiles of toddlers with slow expressive language development. *Topics in Language Disorders*, 11, 1–14.
- Paul, R., & Ribback, M.** (May, 1993). *Sentence structure development in late talkers*. Paper presented at the Symposium for Research in Child Language Disorders. University of Wisconsin, Madison.
- Rescorla, L.** (1989). The language development survey: A screening tool for delayed language in toddlers. *Journal of Speech and Hearing Disorders*, 54, 587–597.
- Reznick, S., & Goldsmith, L.** (1989). A multiple form word production checklist for assessing early language. *Journal of Child Language*, 16, 91–100.
- Steckol, K. F., & Leonard, L. B.** (1979). The use of grammatical morphemes by normal and language-impaired children. *Journal of Communication Disorders*, 12, 291–301.
- Tranham, C., & Pederson, J.** (1976). *Normal language development*. Baltimore, MD: Williams & Wilkins.

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