The Effects of Sampling Conditions on Sentence Production in Normal, Reading-Disabled, and Language-Learning-Disabled Children

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This study explored the effects of contextual support, discourse genre, and the listener's knowledge of information on syntactic and phonologic production and fluency. Subjects were language-learning-disabled, reading-disabled, and normal primary school children. Clause structure complexity, fluency, and grammatical and phonemic accuracy tended to be highest when children were discussing absent referents, providing explanations and stories, and giving unshared information. These effects were generally the same across all groups, although some effects were significant for only the language-learning-disabled children. Several explanations for these findings are considered.

KEY WORDS: language-learning disabled, reading disabled, sampling conditions

The language knowledge attributed to a child is influenced by many factors. These factors can be divided into those that are intrinsic to the child and those that are extrinsic to the child. Intrinsic factors include sensory, physical, cognitive, and linguistic maturity and psychosocial and motivational proclivities. The vast body of literature on normal language acquisition addresses how language knowledge and use is influenced by development and maturation of intrinsic, child-based abilities (Lahey, 1988; Owens, 1988).

One extrinsic factor affecting the language knowledge attributed to a child is the way that information about language abilities is obtained. Procedures range from elicited imitation on standardized tests of language—e.g., the Carrow Elicited Language Inventory (Carrow, 1974)—to naturalistic observations and recordings of a child's language (see Lahey, 1988). The language produced during a conversational sample has been shown to be affected by the setting (Scott & Taylor, 1978); topics of conversation (Cazden, 1970); presence or absence of contextual support (Atkins & Cartwright, 1982; Blank, 1975; Lahey, 1988; Longhurst & Grubb, 1974); characteristics of the conversational partner, or listener (Cazden, 1970; Olswang & Carpenter, 1978); discourse function, or genre (Levin, Silverman, & Ford, 1967; McParland & MacKinnon, 1983; Wren, 1985); and informativeness (Campbell & Shriberg, 1982).

Another extrinsic factor affecting the language knowledge attributed to a child is the type of linguistic measure selected. Studies that have investigated sampling factors have typically evaluated measures of syntax (e.g., mean length of utterance and frequency of structural complexity). Other measures, such as fluency and phonemic accuracy, also have been explored, but less often. Very little information is available regarding sampling effects on syntax, phonology, and fluency concurrently. At least three possibilities exist for such effects: (a) The effects would be significant and in the same direction across measures; (b) the effects would be significant for some
measures, but not for others; and (c) the effects would be significant but in different directions (i.e., trade-offs).

Extrinsic and intrinsic factors may interact in affecting the language knowledge attributed to a child. Intrinsic factors (e.g., language ability) may result in different reactions to extrinsic factors (e.g., sampling conditions). Scott and Taylor (1978) examined 3-, 4-, and 5-year-old children and found the older were more influenced by sampling conditions than the younger. Wren (1985) examined sampling effects on the syntactic production of normal and disordered children. She did not find an overall significant interaction between task and group. However, she did report that in some tasks there were no group differences on some linguistic measures and in others the group differences were significant.

The purpose of the present study was to explore the influences of both extrinsic and intrinsic factors on the linguistic knowledge attributed to children. We examined the effects of three sampling conditions on various measures of syntactic and phonological production and fluency. These sampling conditions were (a) contextual support, (b) discourse genre, and (c) the listener's knowledge of the information being provided. To investigate the possible interaction between extrinsic and intrinsic factors, we included three groups of children with varying linguistic abilities. Although the influences of sampling conditions have been addressed before, several questions regarding these effects still remain.

Previous studies exploring contextual support yielded different results regarding its effects. For example, Longhurst and Grubb (1974) found that the absence of props resulted in better linguistic production, whereas Atkins and Cartwright (1982) suggested that the presence of pictures facilitated language production. Both of these studies examined only syntax and did not compare normal to disordered children.

The influences of genre on oral syntactic production have been suggested (e.g., Scott, 1989a), yet most studies have focused upon such effects on written language (Scott, 1988, 1989b). Genre has been shown to significantly affect fluency in oral language (Levin & Silverman, 1967; McParland & MacKinnon, 1983); however, task effects were in the opposite direction from those observed in written syntax. For example, Blair and Crump (1984) found that children's written explanations were more syntactically complex than their descriptions. On the other hand, Levin & Silverman (1967) found that children's oral descriptions were more fluent than their explanations. In the present study we were interested in exploring genre effects on oral language in both normal and disordered children and determining whether these effects would be comparable for measures of fluency and syntactic and phonological production.

Listener effects were explored from a slightly different perspective than that used in previous studies. Most studies have focused upon the familiarity between the child and the listener (e.g., parent vs. clinician) (e.g., Olswang & Carpenter, 1979) and age differences in the child and the conversational partner (e.g., Wilkinson, Hiebert, & Rembold, 1981). We were interested in determining the effects of the speaker's perceptions regarding the listener's exposure to the information being presented. Children's utterances provided to a listener who had already heard the information (shared) were compared to those provided to a listener for whom the information was new (unshared). Liles (1985) found differences in children's use of cohesive devices when providing unshared and shared information. No studies have examined the effects of listener knowledge on syntax or phonology; however, Campbell and Shriberg (1982) found that comment utterances (new information) were produced with higher phonemic accuracy than were topic utterances (old information). We wondered whether similar effects would be found at the discourse level for measures of syntax and fluency in addition to phonology.

The effects of these three elicitation conditions were explored in three groups of children. One group of children was developing normally, and one group had language-learning disabilities. We wondered whether the responses to sampling conditions by the normal and language-learning-disabled children would be different. A third group of children with reading disabilities and no obvious oral language deficits was included. This third group was of interest because previous studies (e.g., Vogel, 1974; Wiig, LaPointe, & Semel, 1977) have suggested that reading-disabled children often do experience difficulties with oral language production; however, these difficulties are much more subtle. We were interested in how the reading-disabled children's responses to sampling conditions would compare to those of the other two groups.

In summary, the effects of group and sampling conditions on several measures of linguistic production were explored. Measures of both syntactic complexity and grammatical accuracy were included. Additionally, phonemic accuracy and fluency were analyzed. The following research questions were addressed.

1. What are the effects of contextual support, discourse genre, and listener knowledge on children's sentence productions?
2. Are measures of syntactic complexity, grammatical and phonemic accuracy, and fluency similarly affected by elicitation conditions?
3. Do children with varying linguistic abilities respond similarly to elicitation conditions?

Method

Subjects

Subjects were 30 children between the ages of 6:0 and 9:0 (years:months) who attended an elementary school in a rural Arkansas community. Of these children, 10 had deficits in both oral and written language, 10 had deficits only in written language, and 10 were normally developing. Individual subjects were matched for mental age as indicated by the Test of Nonverbal Intelligence (Brown, Sherbenou, & Dollar, 1982) across groups so that differences in mental ages for each triad did not exceed 5 months. Each group consisted of 6 boys and 4 girls. All subjects passed schoolwide screenings for hearing and visual problems. Screening procedures outlined by the Arkansas Department of Education were followed.

The language-learning-disabled children had all been previously diagnosed by a certified speech-language pathologist...
as having a language disorder that was not the result of globally depressed intellectual functioning, emotional disturbances, hearing loss, or physical defects. These children had been enrolled in language therapy for 1 or 2 years. Additionally, each language-learning disabled child had been previously identified by a certified school psychologist as having difficulties in reading severe enough to warrant enrollment in a reading resource classroom. Each child obtained a nonverbal intelligence score within normal limits as indicated by performance on the Test of Nonverbal Intelligence. Each child had a syntax-speaking quotient or a spoken-language quotient at least one standard deviation below the mean score on the Test of Language Development–Primary (Newcomer & Hammill, 1982) and scored at least one standard deviation below the mean on the Word Identification and Passage Comprehension subtests of the Woodcock Reading Mastery Tests (Woodcock, 1973).

The reading-disordered children had no history of clinical speech, oral language, or hearing impairments. Each child had been previously diagnosed by a certified school psychologist as having sufficient difficulty in learning to read as to warrant placement in a reading resource classroom. The reading disorders were not the result of globally depressed intellectual functioning, emotional disturbances, hearing loss, or physical defects. Each child scored at least one standard deviation below the mean on the two subtests of the Woodcock Reading Mastery Tests. Each child obtained a score that was within normal limits on the Test of Nonverbal Intelligence and had a syntax-speaking quotient or spoken-language quotient on the Test of Language Development–Primary within normal limits.

The normally developing children had no history of speech, language, or hearing impairment. Each child scored within normal limits on the Test of Nonverbal Intelligence, the two subtests of the Woodcock Reading Mastery Tests, and the Test of Language Development–Primary.

Group means and standard deviations for test measures and chronological age appear in Table I.

### Procedures

Potential subjects were identified by the school speech-language pathologist. Each of these children was seen individually. During the first session, the Test of Nonverbal Intelligence, the two subtests of the Woodcock Reading Mastery Tests, and the Test of Language Development–Primary were administered. Children meeting the criteria described above were seen for a second session and administered the experimental tasks. The second session lasted approximately 45 min.

Experimental procedures were administered and recorded in a quiet room at the subjects’ school. Responses to all tasks were recorded on a Panasonic RX-C45 cassette tape recorder with an Electrovoice Type 631 dynamic microphone. Subjects were seated so that a mouth-to-microphone distance of 8 inches could be comfortably maintained and were instructed to speak at a conversational loudness level.

### Sampling Conditions

Three science experiments taken from Levin et al. (1967) were performed for each subject. For example, a large and a small balloon were shown to each child. The large balloon was filled with helium and the small with air. When the balloons were released the large one rose to the ceiling and the small one fell to the floor. Before each experiment, the subject was asked to describe what he saw. The examiner then performed the experiment and the subject was asked to describe what happened. Next, the subject was asked to explain the results of the experiment. Finally a confederate child was brought into the room and the subject was asked to describe the experiment to the confederate. The three experiments and administration procedures are described in Appendix A.

Additionally, four sequential picture stories were presented to each subject. Each story was approximately 160 words long and contained humorous episodes involving a boy and his dog. Story scripts appear in Appendix B. After two of the stories the subject was asked to retell the story to the experimenter. For one of these stories, the subject was allowed to refer to the sequential pictures. The other story was told from memory with no visual cues given. The other two stories were retold to the same confederate child used during the experiment tasks. The subject was allowed to refer to the picture book for one story, and the other story was told without the presence of pictures. The order of story presentation and listener (i.e., confederate vs. examiner) among subjects was counterbalanced.

The effects of contextual support were examined by comparing subjects’ descriptions of the objects to be used in the experiments (referents present) to their descriptions of what happened during the experiments (referents absent). Additionally, utterances produced when retelling stories without referring to pictures were compared to those produced when referring to pictures. The effects of discourse genre were examined by comparing subjects’ utterances across the

### Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>CA M</th>
<th>MA M</th>
<th>WA M</th>
<th>PC M</th>
<th>SSQ M</th>
<th>SLQ M</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLD</td>
<td>99.2</td>
<td>8.97</td>
<td>84.6</td>
<td>12.5</td>
<td>22.1</td>
<td>20.1</td>
</tr>
<tr>
<td>RD</td>
<td>93.9</td>
<td>7.2</td>
<td>86.0</td>
<td>10.8</td>
<td>11.7</td>
<td>16.1</td>
</tr>
<tr>
<td>Normal</td>
<td>83.6</td>
<td>11.7</td>
<td>83.3</td>
<td>12.3</td>
<td>29.3</td>
<td>35.0</td>
</tr>
</tbody>
</table>

Note. LLD = language-learning disabled; RD = reading disabled
description, explanation, and story tasks. The effects of listener knowledge were examined by comparing utterances spoken to the examiner (shared information) with utterances spoken to the confederate child (unshared information).

**Language Measures**

**Syntax.** Measures used to classify syntactic production appear in Table 2. Clause structure assignment was used as a measure of syntactic complexity. Utterances were classified as simple; simple with compound subject, verb, or object; compound (two independent clauses); right-embedded (object-modifying clause); center-embedded (subject-modifying clause or embedded infinitive); or compound/complex (two independent clauses that also contain at least one embedded verb). These categories and the continuum of complexity were taken from Panagos and Prelock (1982), de Villiers, Tager-Flusberg, and Hakuta (1977), Hamburger and Crain (1982), and Tager-Flusberg (1982). Additionally, length in morphemes and the percentage of grammatical markers correct were calculated for each utterance. Grammatical markers used in this analysis are shown in Table 3. This is the converse of a measure, the grammatical marker error index, used by Kamhi and Johnston (1982) to indicate the proportion of errors a child made producing grammatical markers. In the present study, the measure reflected the proportion of markers used correctly. A related measure, the percentage of morphophonemic markers correct, was used to indicate accuracy of production for bound grammatical markers. Morphophonemic accuracy was considered to represent both grammatical and phonological abilities. Finally, a category (lexical accuracy) was included for other errors of a syntactic nature. Errors in this category included deletion of pronouns; articles, prepositions, and conjunctions that were inappropriate (i.e., not due to ellipsis); and substitution of objective for subjective pronouns.

**Phonology.** Variables representing phonological production also are shown in Table 2. The percentage of phonemes correct (PPC) was calculated for each utterance. This measure is similar to the percentage of consonants correct used by Shriberg and Kwiatkowski (1982) and indicates the number of adult target phonemes used correctly by the child. Because unintelligible words were not included in the calculation of a PPC, each utterance was assigned a percentage of unintelligible words.

**Fluency.** Hesitation phenomena were categorized and counted. Categories, which were taken from Levin and Silverman (1965), appear as Appendix C. The ratio between the number of hesitations and the number of words in each utterance was calculated and used to represent fluency of production.

**Reliability**

Sentence productions were transcribed by author Masterson in standard English orthography and using broad phonetic transcription. Hesitation phenomena were included. Masterson assigned each sentence a category for clause structure. Additionally, data from 1 randomly selected subject from each group were independently transcribed by a graduate student in speech-language pathology. Word-by-word percentage of agreement for broad phonetic transcription and assignment of hesitation phenomena to disfluency categories ranged between 95% and 99% for all experimental measures. A second graduate student in speech-language pathology assigned clause structure categories to data from 1 randomly selected subject from each group. Percentage of agreement for clause structure assignment was 98%.

**Results**

Frequencies of utterances falling into each of the six categories of clause structure type for each elicitation condition were tabulated for each group. A log-linear analysis (Knoke & Burke, 1980) was used to analyze the relationships among clause structure complexity, each elicitation condition, and group. Multivariate analyses of variance (MANOVAs) (Tabachnick & Fidell, 1989) were used to examine the effects of each elicitation condition and group on linguistic production and fluency. Significant MANOVA results were followed up with appropriate analyses of variance (ANOVAs) and post hoc measures. Results regarding each of the three elicitation conditions are shown below. Significant group differences across conditions are then presented.

**Contextual Support**

**Clause structure.** Two-way interactions were the highest level to reach significance (LR $\chi^2 = 129.88$, df = 42, $p < .001$) in the log-linear analysis involving contextual support. This indicated that interrelationships between contextual support and linguistic complexity were the same for all groups. The relationship between contextual support and clause structure ($\chi^2 = 44.10$, df = 5, $p < .001$) was significant.

Table 4 shows the percentages of occurrence of the various clause structures during situations in which referents were present or absent. Though simple sentences were the type used most frequently in both situations, they were used
slightly more often when referents were present. The occurrence of compound sentences, both with and without embedded structures, was higher when referents were absent.

**Grammatical accuracy.** Contextual support significantly affected both percentage of lexical errors ($F = 7.13, df = 1, 1717, p < .01$) and percentage of morphophonemic errors ($F = 3.98, df = 2, 993, p < .01$). Follow-up analyses revealed that utterances produced when referents were absent contained fewer errors in lexical adjustment than did those produced when referents were present.1 Utterances produced when referents were present contained fewer morphophonemic errors than those produced when referents were absent.

**Phonemic accuracy.** The effect of contextual support on the measures of phonological accuracy was not significant.

**Fluency.** Contextual support had a significant effect on disfluency ($F = 10.97, df = 1, 1717, p < .001$). Utterances produced when referents were present were more disfluent than utterances produced in the absence of referents.

### Discourse Genre

**Clause structure.** The log-linear analysis of interactions among group, discourse genre, and clause structure indicated two-way interactions to be the highest level reaching significance ($LR \chi^2 = 259, df = 42, p < .001$). Once again, group differences were not present, as evidenced by a lack of significant three-way interactions. A significant relationship was present between genre and clause structure ($\chi^2 = 127.87, df = 10, p < .001$).

Percentage occurrences for the levels of clause structure complexity appear in Table 5. Simple sentences were the most frequently occurring clause structure type in all tasks. However, simple sentences were relatively more likely to occur in descriptions than in stories. The utterances used during stories were more evenly distributed across clause structure types than those used during the other two tasks. The use of embedded structures (right-embedded, center-embedded, and embedded structures in conjunction with compound sentences) was most prevalent during the story task.

**Grammatical accuracy.** The effect of genre was significant for total morphemes ($F = 94.4, df = 2, 1699, p < .001$) and percentage of lexical errors ($F = 3.71, df = 2, 1699, p < .05$). A significant interaction was present between the effects of genre and group on percentage of morphophonemic markers correct ($F = 3.46, df = 4, 975, p < .01$). Follow-up analyses indicated that utterances used for telling stories were significantly longer than those used for explanations. Both stories and explanations yielded significantly longer utterances than descriptions. Explanations and stories contained fewer lexical errors than did descriptions. Language-learning-disabled children made fewer morphophonemic errors in the description task than they did in the story task. Genre did not result in significant differences in morphophonemic accuracy for the reading-disabled and normal children (see Table 6).

**Phonemic accuracy.** Analysis of the effects of group, discourse genre, and linguistic complexity on phonological accuracy indicated a significant main effect for genre on percentage of phonemes correct ($F = 4.55, df = 2, 1699, p < .01$). However, post hoc analyses (Scheffe, $p < .05$) did not confirm significant differences.

**Fluency.** Neither the main effect for discourse genre nor any interaction involving genre was significant on fluency.

### Listener’s Knowledge of the Topic

**Clause structure.** The log-linear analysis of interactions among group, listener knowledge, and clause structure again indicated two-way interactions to be the highest level reaching significance ($LR \chi^2 = 92.94, df = 33, p < .001$). Once again, three-way interactions were not significant, indicating that the group variable did not affect the pattern of relationships among listener knowledge and linguistic complexity. A significant relationship was present between listener knowledge and clause structure ($\chi^2 = 12.54, df = 5, p < .05$).

Examination of the percentages for clause structure type (Table 7) according to listener knowledge indicated that speakers used more simple sentences when providing information already known to the listener. Compound sentences

### Table 3. Grammatical markers.

<table>
<thead>
<tr>
<th>Noun markers</th>
<th>Verb markers</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possessive</td>
<td>Copula</td>
<td>Infinitive</td>
</tr>
<tr>
<td>Plural</td>
<td>Auxiliary</td>
<td>Adverb (-ly)</td>
</tr>
<tr>
<td>Irregular plural</td>
<td>Progressive (-ing)</td>
<td>Adjective (-er, -est)</td>
</tr>
<tr>
<td>Third-person present</td>
<td>Past-tense regular</td>
<td>Relative pronoun (that, who, which)</td>
</tr>
<tr>
<td>Past-tense irregular</td>
<td>Past participle</td>
<td></td>
</tr>
<tr>
<td>Past participle</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 4. Percentage of total utterances classified by clause structure type for presence of referents.

<table>
<thead>
<tr>
<th>References</th>
<th>SMP</th>
<th>CSVO</th>
<th>CMP</th>
<th>RE</th>
<th>CE</th>
<th>C/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>53</td>
<td>13</td>
<td>14</td>
<td>10</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Absent</td>
<td>48</td>
<td>8</td>
<td>26</td>
<td>8</td>
<td>1</td>
<td>9</td>
</tr>
</tbody>
</table>

Note. SMP = simple, unembedded; CSVO = compound subject, verb, or object; CMP = compound; RE = right-embedded; CE = center-embedded; C/C = compound with embedded structure(s).

1Specific means used for all follow-up analyses are available from author Masterson upon request.
with and without embedded structures appeared more often in novel information.

**Grammatical accuracy.** Analyses indicated a significant interaction between listener knowledge and group on morphophonemic accuracy \((F = 3.99, \text{df} = 2, 993, p < .01)\) and significant effects of listener knowledge on total morphemes \((F = 6.03, \text{df} = 1, 1717, p < .01)\). Additionally, there was a significant interaction between listener knowledge and clause structure for percentage of lexical errors \((F = 2.35, \text{df} = 2, 1717, p < .05)\). Follow-up procedures indicated that language-learning-disabled children produced shared information with fewer morphophonemic errors than they did unshared information. No differences were present for the reading-disabled and normal children. Sentences used when providing unshared information were longer than those for shared information. When simple sentences were examined, unshared information was given with fewer lexical errors than shared information. No differences in lexical errors were present between unshared and shared information for compound and complex sentences.

**Phonemic accuracy.** Analyses indicated a significant main effect for listener knowledge and group on the percentage of unintelligible words \((F = 6.55, \text{df} = 2, 1717, p < .01)\) and a significant interaction between listener knowledge and group on percentage of phonemes correct \((F = 3.85, \text{df} = 2, 1717, p < .05)\). Shared information contained more unintelligible words than did unshared information. Further, the percentage of phonemes correct was lower for shared information than for unshared information for language-learning-disabled children. Listener knowledge did not affect percentage of phonemes correct in reading-disabled and normal children (see Table 8).

**Fluency.** The influence of listener knowledge on fluency was not significant.

### Discussion

The results of this study indicate that the language knowledge attributed to children is affected by extrinsic factors. Variation in sampling conditions resulted in differences in both linguistic complexity and accuracy. The effects of sampling conditions were similar for some linguistic measures and different for other measures. Although the groups generally responded similarly to sampling conditions, there were a few exceptions, indicating a slight relationship between extrinsic and intrinsic factors. The first section of the discussion will focus on the influence of the various sampling conditions. The next sections will address the findings re-

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**TABLE 5. Percentage of total utterances classified by clause structure type for each discourse genre.**

<table>
<thead>
<tr>
<th>Discourse genre</th>
<th>SMP</th>
<th>CSVO</th>
<th>CMP</th>
<th>RE</th>
<th>CE</th>
<th>C/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>57</td>
<td>9</td>
<td>25</td>
<td>5</td>
<td>0.8</td>
<td>3</td>
</tr>
<tr>
<td>Explanation</td>
<td>52</td>
<td>4</td>
<td>30</td>
<td>6</td>
<td>0.6</td>
<td>8</td>
</tr>
<tr>
<td>Story</td>
<td>45</td>
<td>13</td>
<td>14</td>
<td>13</td>
<td>3.0</td>
<td>13</td>
</tr>
</tbody>
</table>

*Note.* SMP = simple, unembedded; CSVO = compound subject, verb, or object; CMP = compound; RE = right-embedded; CE = center-embedded; C/C = compound with embedded structure(s).

**TABLE 7. Percentage of total utterances classified by clause structure type for listener's knowledge of the information being provided.**

<table>
<thead>
<tr>
<th>Information type</th>
<th>SMP</th>
<th>CSVO</th>
<th>CMP</th>
<th>RE</th>
<th>CE</th>
<th>C/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shared</td>
<td>53</td>
<td>11</td>
<td>19</td>
<td>9</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Unshared</td>
<td>47</td>
<td>9</td>
<td>23</td>
<td>9</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

*Note.* SMP = simple, unembedded; CSVO = compound subject, verb, or object; CMP = compound; RE = right-embedded; CE = center-embedded; C/C = compound with embedded structure(s).

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any significant effects of group differences on the relationships between the elicitation conditions and clause structure. If group differences had been present, then the analysis would have indicated a significant three-way interaction, consisting of group, an elicitation condition, and linguistic complexity. A lack of any three-way interactions indicated that the effects of the various elicitation conditions on clause structure were consistent for the three groups of children.

The group variable did, however, enter into significant interactions with the elicitation conditions for effects on some of the indicators of linguistic accuracy. First, the interaction between discourse genre and group significantly affected morphophonemic production \((F = 3.46, \text{df} = 4, 975, p < .01)\). Follow-up analyses (Table 6) indicated that language-learning-disabled children made fewer morphophonemic errors during descriptions than during story-telling activities. The accuracy of morphophonemic production did not vary across discourse genres for the reading-disabled and normal children.

Second, the interaction between listener knowledge and group significantly affected the percentage of phonemes produced correctly \((F = 3.85, \text{df} = 2, 1717, p < .05)\) and the percentage of morphophonemic markers produced correctly \((F = 3.99, \text{df} = 2, 993, p < .01)\). Language-learning-disabled children made fewer phonological errors when they were supplying unshared information as compared to shared. No difference in phonological accuracy between unshared and shared information was present for the reading-disabled and normal children (Table 8). The opposite effect was true for the production of morphophonemic markers by language-learning-disabled children. They produced fewer morphophonemic errors when supplying shared information than when supplying unshared, no differences were present for the reading-disabled and normal children.

### Group Differences

As stated above, the log-linear analyses did not indicate...
various elicitation conditions. For example, stories tended to
ences in the types of grammatical markers required in the
garding morphophonemic accuracy were related to differ-
and phonemic accuracy, and fluency all increased in con-
Linguistic Measures
require more regular past-tense morphemes and contracted
auxiliaries, forms that were especially problematic for the
language-learning-disabled subjects. Descriptions, on the
other hand, typically involved the use of copulas, which were
produced correctly more often by the language-learning-
disabled children. It should be noted that in addition to the
interactions among sampling conditions and linguistic meas-
tures, there may also have been interactions among the
linguistic measures themselves. The notion of “trade-off”
effects among linguistic components (e.g., decreases in
syntactic complexity and/or accuracy accompanying in-
creases in phonological complexity and/or accuracy) has
been discussed by several authors (Panagos & Prelock,
1982; Camarata & Schwartz, 1985). It is possible that the
effects seen on our measures of linguistic accuracy were
related more to clause structure complexity than to the
sampling conditions themselves. The types of linguistic inter-
relationships present in the data have been discussed else-
where (Masterson & Kamhi, 1986).

Sampling Effects
Sentences tended to be more complex and/or accurate
when children were discussing absent referents, providing
explanations and stories, and giving unshared information.
These conditions have in common a decrease in the amount
of shared information between the speaker and the listener.
For example, with the provision of contextual support, the
speaker and the listener had access to the same information
so the listener could see the items being discussed or the
pictures representing the story being told. Consequently, the
speaker may not have felt the need to provide as much
descriptive information or make explicit the relationships
among characters and their responses to events in the
stories. Liles (1985) offers similar explanations for her find-
ings regarding the use of cohesive devices.

The results regarding the effects of listener knowledge also
support the association between decreases in shared infor-
mation and increases in linguistic complexity and accuracy.
Because the examiner was always the listener when the
subject was providing shared information and a child was
always the listener for unshared information, one might argue
that these effects resulted from the age differences of the
listeners rather than from differences in their knowledge of
the information being given. However, studies (e.g., Wilkin-
son et al., 1981) that have compared children’s speech to
adults with their speech to children have found that it is the
speech to adults that tends to be less complex. In our study,
subjects’ utterances were less complex and more disfluent
when speaking with the adult examiner. The fact that sen-
tence complexity still increased for unshared information,
even though the listener was a peer, seems to offer even
stronger support for the notion that the differences were due
to the speaker’s perceptions of the communicative value of
the message.

Linguistic Measures
Generally, measures of syntactic complexity, grammatical
and phonemic accuracy, and fluency all increased in con-
texts involving decreases in shared information. Morphopho-
nemic and grammatical accuracy, however, were affected
differently by sampling conditions. Perhaps the results re-
garding morphophonemic accuracy were related to differ-
ences in the types of grammatical markers required in the
various elicitation conditions. For example, stories tended to

<table>
<thead>
<tr>
<th>Information type</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Language-disabled</td>
</tr>
<tr>
<td>Shared (%)</td>
<td>92</td>
</tr>
<tr>
<td>Unshared (%)</td>
<td>94</td>
</tr>
</tbody>
</table>

The three groups of children included in this study gener-
ally responded in a similar fashion to the sampling conditions.
Sampling effects seen in normal children were present in
both the reading-disabled children and the language-learn-
ing-disabled children. These findings support those of Skar-
akis and Greenfield (1982) and Campbell and Shriberg
(1982) and suggest that language-learning-disabled children
are just as sensitive to the communicative value of their
discourse as are normal children. In fact, the effects of
listener knowledge and discourse genre on phonological and
morphophonemic production reached significance only for
the language-learning-disabled group and not for the other
two.

Clinical Implications
The results of this study have several implications for
clinical practice. The first, and perhaps most obvious, is that
clinicians should be aware of the communicative significance
involved in the activities they use to elicit language samples.
If one goal of language sampling is to determine a child’s
competence regarding the use of advanced sentence struc-
tures, then the child must be provided with tasks that will
increase the probability of the use of such structures. For
example, we found that the absence of pictures and props
resulted in the use of more compound sentence structures.
This is particularly interesting, given that clinicians often
provide pictures for children to discuss or have them talk
about objects that are present in an effort to reduce memory
load and thereby obtain optimal language production. Our
findings suggest that such procedures may in fact have the
opposite effect and result in the use of less complex linguistic
structures. It is important to consider that this effect was seen
in primary school-age children. The discussion of absent
referents may not pose a significant demand for children with
cognitive abilities at this level. Consequently, the influence
of the degree of shared information between speaker and
listener could take precedence. At an earlier stage of development, however, the absence of contextual support may involve more significant cognitive demands (e.g., memory requirements, etc.) and actually interfere with the use of optimal language structures. Future research is needed regarding developmental influences on the effects of contextual support.

The results from this study also indicate that sampling conditions may affect various aspects of linguistic production in different ways. For example, lexical accuracy and fluency increased in the absence of contextual support, while grammatical accuracy decreased in the absence of contextual support. These findings suggest that a variety of sampling conditions should be used to evaluate different aspects of language. The use of a single sampling condition may overestimate a child’s abilities in one area and at the same time underestimate his or her abilities in a second area.

Finally, our results have implications for the types and sequence of activities used in therapy. In a recent presentation, Prutting (1989) stated that we often do things in reverse in the clinical situation. Therapy programs typically have children using target forms first in highly structured situations. Only later, after the child has reached a certain level of mastery, are structures used in “real” conversation. Such an approach may actually violate a child’s developing knowledge regarding pragmatic determinants of the use of various sentence structures. Prutting suggested that clinicians write goals in terms of the discourse function (i.e., providing explanations, telling stories, etc.) they wish a client to achieve and then target the clause structures or grammatical markers that are necessary to perform that function. Our results support Prutting’s suggestion. A child’s use of clause structures and grammatical markers should not be divorced from the speaking conditions in which they naturally occur.

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References
Prutting, C. (1989). Discourse as a multilevel process. Short course presented at the Mid-South Conference on Communication Disorders, Memphis, TN.
Story A: The Dog Trainer

The little boy wanted to teach his dog how to fetch, or go get, the stick. He showed the dog the stick and the dog wagged his tail. He then threw the stick and the dog watched him. The little boy told the dog to go get the stick. The dog didn’t seem to understand. He sat and pointed his leg and wagged his tail. The little boy became angry and yelled at the dog, saying “Go get the stick. Fetch!” The dog still didn’t seem to know what to do and looked very sad. The boy decided to show his dog what he wanted so he went to get the stick. When the dog saw that the little boy was going to pick up the stick, he suddenly ran to get it himself. He ran so fast that he knocked the boy down. The little boy just sat on the ground watching his silly dog play with the stick.

Story B: Dressing Up

The little boy decided to dress up in a funny costume. He put on some crazy hair, a funny nose, some scary teeth, and a silly mustache. Then he found an old hat and an old cape to put on. He looked very different. He decided to play a joke on his dog. He walked up to the dog and yelled, “Boo!” The dog was very scared. He didn’t know it was the little boy, his friend. He thought it might be a monster. He started to growl and then began chasing and biting the monster. That really surprised the little boy. He tried to run away from the dog and as he ran the pieces of his costume fell off. Then the dog saw that it wasn’t a monster at all—it was the little boy, his friend. He was so happy that he jumped on the little boy and started licking him on the face.

Story C: Baking a Cake

The little boy wanted to eat some cake. He looked in a cookbook and thought about the delicious cake he was going to make. He put eggs, flour, milk into a bowl. He used the measuring cup to measure exactly what you saw happen with the balloons (discs, liquids). Then we will see if she can guess why it happened.

For the second experiment, Steps 1 and 4 remained the same. Step 2 was changed to “Pick up this one, then this one. How did they feel?” Step 3 was changed to “Why do you think they felt that way?”

Story D: The Wading Pool

The little boy wanted to play in the water. He got his pool and filled it with air while his dog watched him. The little boy then filled the pool...
with water and the dog watched happily. Suddenly the dog jumped in
the pool to go swimming. The little boy didn’t want his dog in his pool
so he splashed him with water and told him to get out. The dog was
very scared and ran away when the boy splashed him with the water.
The dog’s feelings were hurt because he wanted to play in the water,
too. The boy started playing in the pool with his boat. The dog came
sneaking up behind him very quietly. Suddenly he bit a hole in the
pool, causing all of the water to run out. The boy sat on the wet
ground very surprised. The dog thought that the boy shouldn’t get to
play in the water since he had not let his dog play in the water.

Appendix C

Hesitation Phenomena$^{1}$

1. Interjections/parenthetical remarks: These included noises such
as “uh”, “er”, and “um” and parenthetical remarks such as “I mean”
and “you know.”
2. Sentence changes:
   a. Phonemic changes: Changes in sounds within a word (e.g.,
      “the dog, uh, the dog”).
   b. Lexical changes: Changes in word selection (e.g., They went—
      they ran down the street.”).
   c. Phrase changes: Changes in phrase use (e.g., “He’s going, I
      mean the boy and his dog are going.”).
3. Sentence incompletion: Incompletions that occurred after a
phrase, word, or in the middle of a sentence (e.g., “Susan fell asleep
when—and it was dark in there.”).
4. Repetitions: Repetitions of whole phrases, words, and parts of
words (“She is the g-g-girl you’re looking for.”).
5. Prolongations: The prolongation of any continuous phoneme
(e.g., “Sssssusie is going to town.”).
6. Unfilled pauses: Short pauses referred to pauses less than 2 s in
length and long pauses referred to those longer than 2 s.

$^{1}$Taken from Levin and Silverman (1965)