6-1993

Narrative Skills in 4-Year-Olds With Normal, Impaired, and Late-Developing Language

Rhea Paul  
Sacred Heart University, paulr4@sacredheart.edu

Rita L. Smith

Follow this and additional works at: http://digitalcommons.sacredheart.edu/speech_fac

Part of the Speech Pathology and Audiology Commons

Recommended Citation
NARRATIVE SKILLS IN 4-YEAR-OLDS WITH NORMAL, IMPAIRED, AND LATE-DEVELOPING LANGUAGE

Two groups of children who were slow in expressive language development (SELD) at age 2 and a matched group of toddlers with normal language were re-evaluated at age 4. Assessment included measures of productive syntactic skills in spontaneous speech and narrative abilities in a standard story retelling task. Four-year-olds who continued to perform below the normal range in sentence structure production scored significantly lower than their normally speaking peers on all measures of narrative skill. Children who were slow to begin talking at age 2 but who, by age 4, had moved into the normal range in basic sentence structure production showed no statistically significant differences, in terms of several of the measures of narrative ability, from either normally speaking 4-year-olds or from the group with persistent delay. The implications of these findings for the management of early language delay and its relation to school learning disability are discussed.

KEY WORDS: narrative; outcome, language delay; language disorder; story telling; emerging literacy

The ability to tell a story involves a number of higher level language and cognitive skills. These include the ability to sequence events, to create a cohesive text through the use of explicit linguistic markers, to use precise vocabulary, to convey ideas without extralinguistic support, to understand cause-effect relationships, and to structure the narration along the lines of universal story schemata that aid the listener in comprehending the tale. Narrative skills are thought to form the bridge between oral language and literacy by providing examples of the extended, decontextualized, cohesive discourse units that children will encounter in written texts (Westby, 1989). Bishop and Edmondson (1987) showed that narrative skill, as measured on a standard story retelling task, was one of the best predictors of school success in language disabled 4-year-olds. Feagans and Appelbaum (1986) found narrative ability to be an important component in predicting academic outcome in primary-grade children with learning disabilities. Thus, the level of achievement in narrative ability at the preschool level could be an important index of risk for future linguistic and academic problems in children with a history of delayed language development.

The Portland Language Development Project (PLDP) has been following a cohort of children identified when they were toddlers as slow in expressive language development (SELD). Several recent studies (Paul, 1991a; Rescorla and Schwartz, 1990; Thal, 1991) indicate that such children are at risk for chronic delays in language acquisition, at least through the preschool period. Small-sample studies of similar children (Scarborough & Dobrich, 1990) suggest that there are also risks for academic learning difficulties in such children, even when they appear to "grow out of" the oral language delays.

The present study makes use of a standard story retelling task to assess narrative skill in 4-year-olds who have a history of slow expressive language development. The intent of the study is to determine whether these 4-year-olds evidence deficits in narrative skills when compared to their peers with normal language histories. Further, the study seeks to determine whether narrative skills in children with a history of SELD differ depending on current language status. That is, some of the SELD 4-year-olds appear to have "caught up" with their peers and are currently showing productive sentence structure abilities that are on par with those of children with normal language histories. Are these "late bloomers" out of the woods in terms of risk for long-term deficits? Because narrative skills are known to be a good predictor of academic readiness, narrative skill in this subgroup of the SELD population can be seen as an index of risk for learning difficulties. If the late bloomers are similar in terms of narrative abilities to those SELD children who continue to evidence basic sentence structure delays, deficits that could affect academic performance may be present for both subgroups of SELD children. That is, even though the late bloomers (LB) may have achieved age-appropriate skills in single-sentence production, they could lack more advanced abilities to structure extended discourse. Such difficulties might make them vulnerable for academic failure, despite the fact that their sentence production abilities would be considered adequate for their age.

Thus the study will compare narrative abilities in three groups of 4-year-olds: those with normal language history, those with a history of SELD but currently adequate sentence structure production, and those with SELD and persistent productive language deficits.
Diagnostic group assignments at intake. The subjects included in this report are involved in the Portland Language Development Project (PLDP). The PLDP is a 5-year longitudinal study that follows children who, at age 2, were identified as slow in expressive language development and compares them to normally speaking peers on a variety of linguistic and nonlinguistic measures. SELD subjects were recruited from local pediatric offices and media announcements. Interested parents were asked to fill out a questionnaire indicating the number of words their toddlers produced. 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. Any families that indicated on these questionnaires that they were willing to participate in a longitudinal study of language development were contacted and asked to complete 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), has shown that parent checklist formats are valid and reliable indices of expressive vocabulary size in toddlers.

Using the LDS, children were identified from the pool of interested families as having slow expressive language development (SELD) if parents indicated that the child used fewer than 50 words at 24 to 34 months or did not use any two-word combinations. All children identified as SELD were invited to participate in the study. A normal-language (NL) control group of children was selected from the pool of interested families to match the SELD group in terms of age, socioeconomic status (See Table 1), and sex ratio (both groups were approximately 70% male). Children were invited to join the normal group if parents reported expressive vocabulary sizes of more than 50 words and the use of at least two productive two-word combinations on the LDS (See Paul & Elwood, 1991, for a detailed definition of productivity). Twenty-three of the children identified as SELD completed all aspects of both the intake and the 4-year evaluation and are included in the present report. Twenty-two of the NL subjects met these criteria and are included in this study. Demographic data for the subjects included in this report are given in Table 1.

All subjects had developmental quotients about 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 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 (1991b).

Subjects were seen twice for re-evaluations of language and related skills before they entered kindergarten. The first reassessment occurred between the child’s third and fourth birthdays; the second occurred between the fourth and fifth birthdays. During each of these re-evaluations, families of both SELD and NL children were counseled on methods for stimulating language development in the home. Parents of SELD children were offered the option each time of being referred for intervention. When they came in for the 4-year evaluation, parents were asked whether their children had received any speech-language intervention. Ten (43.5%) of the 23 SELD children had received intervention by that time. The intervention consisted of individual or small group sessions two or three times per week at local speech-language clinics or with private therapists. None of the children was enrolled in intensive, full-time intervention.

Diagnostic group assignment at age 4. The 23 SELD and 22 NL subjects described in the previous section were all seen for re-evaluation between their fourth and fifth birthdays. This reassessment is referred to as the “4-year evaluation” because all the subjects were 4 years old at the time. At that evaluation, three groups were formed on the basis of performance on productive syntax in spontaneous speech, as indexed by the Developmental Sentence Score (DDS) (Lee, 1974). The tenth percentile was used as a cut-off for the normal-language range of syntactic development, following Lee’s guidelines for use of the DSS.

The first group consisted of the children who were identified as having normal language at the intake assessment. All these children scored above the tenth percentile for their age on the DSS. As noted before, this group was labeled the normal language (NL) group. The second diagnostic group was drawn from the 23 children originally identified as SELD. This group of 10 children consisted of those who were identified at age 2 as SELD but who, by age 4, had moved into the normal range (above the tenth percentile) in terms of DSS score. They were referred to as “late bloomers” (LB). Three (30.0%) of these children had received speech-language intervention by the time they came in for their 4-year evaluation. The third group was drawn from the same pool of 23 children originally identified as SELD. However, the 13 children in the third, or expressive language delayed (ELD), group continued to show deficits in expressive syntax and morphology, as indexed by DSS scores below the tenth percentile, at age 4. Seven (53.8%) of
the ELD group had received intervention by the time of their 4-year evaluation. Average age and DSS scores for each of the three diagnostic groups are given in Table 2.

Procedures

At the 4-year evaluation, all subjects passed hearing screening at 20 dB, following guidelines for hearing screening presented by the American Speech-Language-Hearing Association (1985).

Spontaneous speech samples were also collected during free-play interactions between mother and child. Each dyad was given the same set of toys and was told to "play with them together as you would at home." Speech samples were recorded on audiotape and transcribed orthographically onto the Systematic Analysis of Language Transcripts (SALT) computer program (Miller & Chapman, 1988). A Developmental Sentence Score (DSS) (Lee, 1974) was also computed for each of these spontaneous speech samples. All the children in the normal-language group continued to score within the normal range (above the tenth percentile) on the DSS. Of the 23 children originally identified as SELD, 10 (43%) had moved into the normal-language range in expressive language development, as indicated by their DSS score at age 4; thus they were assigned to the LB group. The other 13 children (57%) who were identified as SELD at age 2 continued to score below the tenth percentile in terms of expressive language on the DSS 2 years later. These children were assigned to the ELD group.

In addition, all subjects were given The Bus Story Language Test (Renfrew, 1977), a retelling task in which the children are told a story about a "naughty bus," which forms the basis of the narrative analyses. Following Renfrew's procedures, a series of 12 pictures was shown to the child as the examiner told the story. The script for the bus story, which is read to the child by the examiner, appears in the Appendix. Immediately after hearing it, the subjects were asked to look at the pictures again and tell the story back to the examiner. The child's narration was recorded on audiotape, transcribed, and entered into the SALT computer program (Miller and Chapman, 1988).

Narrative Sample Scoring Procedures

Information score. The Bus Story test provides a norm-referenced information score. This score indicates the number of relevant pieces of information the child included in the story, out of a possible total of 54, following Renfrew's criteria. Two points are given for each item that Renfrew designates as "essential"; one point for each item she designates "subsidiary." The total number of points each subject earns on this analysis is the information score.

MLU per T-unit. When the narratives were entered into the SALT program, they were divided into T-units, rather than utterances. A T-unit is defined by Scott (1988) as "a main clause and all subordinate or nonclausal structures attached to or embedded within. All main clauses that begin with coordinating conjunctions and, but, [and] or indicate a new T-unit unless there is a co-referential subject deletion in the second clause" (p. 55). The SALT program automatically calculated the MLU per T-unit.

Cohesive adequacy. Each subject's narration was coded for cohesion using Liles's (1985) criteria for identifying cohesive markers and judging cohesive adequacy. Each cohesive element in a narrative was identified, following Liles's procedures. A judgment of cohesive adequacy was then made for each marker. The cohesive elements were judged as complete, incomplete, or erroneous. Complete ties were those that referred to information outside the T-unit with unambiguous and easily found referents. Incomplete ties were those that required information outside the T-unit, but the information was not present elsewhere in the text. Erroneous ties were those that referred to information in an ambiguous fashion. The total number of cohesive markers in each narrative was computed. The percentage of complete cohesive elements used in a narrative was determined by dividing the number of complete ties by the total number of cohesive markers identified. This was considered the cohesive adequacy score.

Lexical diversity. The SALT program counted the number of different word roots used in each narration. This score was used as a measure of lexical diversity.

Reliability

Ten percent of the spontaneous speech samples were randomly selected and transcribed independently by two trained graduate students who were working as research assistants on the PLDP. A point-to-point percentage of agreement score (McReynolds & Kearns, 1983) was computed for the number of words agreed upon in the transcriptions. The average percentage of agreement on the transcriptions was 91.0%. Reliability of the DSS scoring
on the spontaneous speech samples was computed by having two trained graduate students independently derive a DSS score for another randomly chosen 10% of the spontaneous speech transcripts. Point-to-point reliability of assignment of DSS points was 91.8%.

Two trained graduate students independently rescored 15% of the narrative samples to determine reliability of the narrative analysis procedures. Interrater reliability on the information score was 95.0%. The cohesion adequacy scoring reliability was 95.0%. The number of word roots and MLU per T-unit measures were machine scored, so reliability measures were not considered necessary.

**Results**

The results on each of the four variables studied were subjected to a one-way analysis of variance at the .05 level of significance. The Tukey method was used to assess the significance of all pair-wise differences. Table 3 gives the means, standards deviations, and ranges of scores on the four measures derived from the analyses of The Bus Story narrative samples for the three groups.

There was a significant difference in scores among the three groups on The Bus Story information score ($F = 5.96; p < .05$). Tukey tests revealed that normal language (NL) subjects included significantly more units of information in their retelling of The Bus Story than did the children with expressive language delay (ELD). The late bloomers (LBs), on the other hand, were not significantly different from either the normal group or the expressive language delayed group ($p < .05$).

There was also a significant difference in terms of mean length of utterance per T-unit ($F = 13.81; p < .05$). Tukey tests indicated that both the NL subjects and the LBs produced significantly more morphemes per T-unit than did the expressive language delayed children ($p < .05$).

The percentage of cohesive adequacy in the narrations for each of the three groups was also significantly different ($F = 5.00; p < .05$). Tukey tests suggested that the normal-language subjects were significantly more likely to link propositions adequately with linguistic markers within the stories than were their expressive language delayed peers. The late bloomers were, again, not significantly different from either of the other two groups ($p < .05$).

A significant difference was also found in the average number of different word roots expressed in the stories ($F = 10.64; p < .05$). Tukey testing revealed that the normal group showed significantly greater lexical diversity than did the expressive language delayed group and that the late bloomers were not significantly different from either of the other two groups ($p < .05$).

**Discussion**

These data suggest, first, that a substantial proportion—in the case of our study, 57% ($n = 13$)—of children with slow expressive language development at age 2 show chronic deficits in expressive syntax and morphology at the sentence level 2 years later. Further, on every measure of narrative skill examined—including measures of cohesion, semantic content, and lexical diversity, which are not directly related to syntax and morphology—children with chronic language delay performed significantly more poorly than their normal language peers. The finding that the ELD group scored lower on all measures of narrative ability strengthens the notion that children with delayed language skills that persist to the late preschool period are at substantial risk for academic difficulties, since narrative skills are known to be related to scholastic success (Bishop & Edmundson, 1987; Feagans & Appelbaum, 1986).

The deficits in narrative skills seen in preschoolers with chronic language delays are not simply secondary to their difficulty in producing grammatical sentences. The number of informational units scored is not affected by grammatical form, for example. It would be possible to produce an adequate number of informational units, even if they were not in fully correct syntactic form. Cohesive adequacy is also achievable in the absence of complete, grammatical, or elaborated sentence structures.

Similarly, lexical diversity is not directly dependent on syntactic skill. Both Paul (1991a) and Whitehurst et al. (1991) reported that expressive vocabulary skills in this population, as measured in a naming format, move into the normal range by age 3, despite the fact that small expressive vocabulary is the presenting complaint at age 2. Moreover, data from our cohort show no differences between normal and SELD groups in terms of receptive vocabulary scores at ages 3 or 4 years (Paul, 1991a; 1992). The deficits that persist past the fourth year of life in children with SELD,
then, are more likely to be in the areas of productive sentence length and complexity, not in the ability to use or comprehend words in citation formats.

These data suggest that the underlying impairment is not semantic but more generally involved with formulation. The deficit manifests itself at the toddler level as a delay in the ability to formulate sounds (Paul & Jennings, 1992) and words. Later, when basic production skills for phonological and lexical units have slowly been acquired, the problem affects the formulation of sentences and extended discourse. Thus the deficit in lexical diversity that appears in the story retelling task would seem to be not attributable to a lack of knowledge of the names of things but, rather, to a reflection of this limitation in formulating language.

The deficits seen in narrative skills in the expressive language delayed group, then, are not just an outcome of their poor syntax and morphology. These data suggest that their expressive delay involves difficulties beyond the production of grammatical sentences. The narrative deficits reported here indicate that ELD children also have trouble encoding, organizing, and linking propositions and in retrieving precise and diverse words from their lexicons. These difficulties in formulation, organization, and retrieval are precisely the characteristics that are often identified with the learning-disabled child of school age (Johnson & Myklebust 1967; Roth & Spekman, 1989; Westby, Maggart, & Van Dongan, 1984; Wiig & Semel, 1980). They seem to be present in preschool expressive language delayed children when they are engaged in the story retelling format. This group of children with a history of slow language development that persists to the late preschool period, then, would appear to be at a significant risk for academic difficulty, both because of the known association between preschool language disorders and academic failure (Casts & Kamhi, 1986; Maxwell & Wallach, 1984; Weiner, 1985) and because of the strong predictive value of narrative skill (Bishop & Edmundson, 1987; Feagans & Appelbaum, 1988), particularly in influencing academic outcomes.

Why should the narrative skills discussed here have consequences for school achievement? Westby (1989), as well as Roth and Spekman (1989), has discussed this issue in detail. Narratives are less contextualized than conversation and, as such, resemble the decontextualized language demands of the classroom and its written material. Story telling requires a macro-structure that organizes the discourse unit, unlike conversation, which moves from topic to topic under more locally negotiated conditions. The ability to adhere to such a macro-structure is also demanded by the school discourse situation. Narrative production demands more presuppositional judgments than does conversation, where feedback from the listener makes such judgments less crucial. Finally, narration requires conscious decisions about the most effective way to relate the tale, a metalinguistic skill similar to those needed for producing and processing written texts. Thus narrative tasks would seem to be an ideal naturalistic index for assessing these higher level language skills and thereby making predictions about academic achievement in young children.

The late bloomers in this study, who were slow to acquire expressive language as toddlers, but who appeared to have “caught up” in sentence structure skill by age 4, were not significantly different from the NL youngsters on any of the measures of narrative ability. In line with their age-appropriate DSS scores, they produced significantly longer utterances, as measured by MLU per T-unit, than their ELD peers. It is interesting to note, though, that in terms of number of informational units expressed, adequacy of cohesive ties, and lexical diversity, the LBs are not significantly better than the ELD group. Inspection of the distribution of means on these measures shows that the scores of late bloomers are midway between those of the other two groups. It may be that the “catching up” process is still going on for the late bloomers and that they will eventually score significantly better than the ELD group on all these measures, as their peers with a history of normal language development do. Their better sentence structure abilities may indicate that their developmental lag is being overcome more quickly than that of the ELD group. Or, their underlying formulation difficulty may have been less severe to begin with. In either case, if this catching up process is complete by the time these children finish their kindergarten year, then they would not be expected to be at risk for academic problems, despite their slow start in learning to talk as toddlers.

There is also an alternative possibility. The failure of the LBs to exceed ELD counterparts in narrative skills at the late preschool level could suggest that these skills, and other higher level language abilities as well, may continue to operate somewhat less efficiently for LB children for some time. If the LB group’s higher level language skills do not catch up by primary school age, they, too, may continue to be at risk for academic difficulty. The findings of not-quite normal narrative skills in the LB group suggest that there are some lingering effects of the delays in productive language that they manifested as toddlers. Whether these subtle effects will have consequences for school achievement remains a matter of speculation at this point. Of course, temperamental, motivational, and environmental factors could play a role in determining how problematic any decrement in the efficiency of higher level language capacity will be in the early school years.
Could intervention play a role? This question is certainly worth addressing, both in terms of its impact on preventing learning disorders when delivered at school age and in terms of its effect on recovery from early language delay during the preschool years. Regarding recovery from early delay, the present study tracked intervention history in the subjects, but did not systematically manipulate it. As a result, data from this cohort cannot legitimately be used to answer questions about the role of intervention in recovery for this population. We saw that the proportion of 4-year-olds with chronic language deficits who had received treatment was twice that of the children who moved into the normal range by age 4. This might be taken to suggest that intervention was not very effective in helping preschoolers overcome early delays, because fewer children in the LB group received it, yet more advanced above the tenth percentile in syntactic performance. We would caution that this is an erroneous inference to draw, though. Inspection of language levels at ages 2 and 3 in our cohort suggest that what determined whether a child received intervention during the early preschool period was the severity of the original delay (Paul, 1992). That is, children who received intervention were those with the most extensive deficits to begin with. Since subjects who received treatment had more severe delays at the outset, it is not surprising that those delays might persist in some of the children, resulting in their being placed in the ELD group. Our data suggest, then, that for preschoolers intervention is allocated, as it should be, on a triage basis, with more serious disorders receiving attention and milder ones left to be outgrown. The role of intervention in outcome for early language disorders should, of course, be studied on a more systematic basis, taking baseline levels of performance, as well as factors such as the intensity, scope, and targets of the intervention, into account.

What about the role of preventive intervention? Could treatment at late preschool or early school age be effective in staving off academic consequences of slow expressive language development for either ELD or LB children? This, too, is currently a matter of speculation, and one that deserves systematic investigation. If preventive intervention for children with such histories is initiated, though, this study suggests that it should contain more than traditional sentence-level management procedures. In addition, it should include a narrative component in order to facilitate the integration of emerging language skills and lay the basis for meeting the linguistic demands of the school-age period.

One clear implication of these data, though, concerns assessment. Narrative tasks seem to be particularly sensitive instruments for tapping higher level language skills. Stories are easily elicited from older preschool children and can be analyzed on a variety of levels. Narrative assessment would seem to be an important instrument to consider when evaluating risk for language and learning disorders in older preschoolers.

In summary, children with a history of low expressive language development that persists to the late preschool period appear to be at risk for academic difficulty not only because of their delayed sentence structure abilities, but also because of their deficits in the higher level language skills tapped by a narrative task. Children considered late bloomers in this study, despite their age-appropriate syntactic production, are not significantly more proficient at these skills than are their peers with persistent grammatical deficits. These findings suggest that both groups of children with a history of SELD may be at some risk for academic difficulties.

This study also supports the use of narrative tasks as sensitive indicators of higher level language skill, even in children whose basic syntactic production appears to be intact. Narrative assessment in a story retelling format offers a rich source of information about the complex language abilities of young children. Further, narrative assessment is naturalistic and easily elicited in a standard format, such as that offered by The Bus Story. These advantages make narrative evaluation an important aspect to consider in any detailed evaluation of communicative competence for older preschool and school-age children.

### TABLE 1. Subject group description: Intake.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>M age in months (and SD)</th>
<th>Mean SES[*]</th>
<th>M LDS vocabulary size (and SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SELD</td>
<td>23</td>
<td>25.3 (4.1)</td>
<td>2.8</td>
<td>27.7 (24.7)</td>
</tr>
<tr>
<td>NL</td>
<td>22</td>
<td>25.1 (4.6)</td>
<td>2.7</td>
<td>194.1 (83.3)</td>
</tr>
</tbody>
</table>

[*] Socioeconomic status was computed from Myers and Bean's (1968) adaptation of the Hollingshead Four Factor Scale of...
Social Position, where 1 is the highest socioeconomic level and 5 is the lowest. The SES for this cohort is essentially middle class.

**TABLE 2. Group description: Age 4.**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>M age in months (and SD)</th>
<th>Age range</th>
<th>M DSS[*] (and SD)</th>
<th>Range of DSS scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal language</td>
<td>22</td>
<td>50.6 (2.5)</td>
<td>48-59</td>
<td>7.3 (1.1)</td>
<td>5.7[+] - 10.4</td>
</tr>
<tr>
<td>Late bloomers</td>
<td>10</td>
<td>50.6 (2.8)</td>
<td>48-59</td>
<td>7.3 (0.7)</td>
<td>6.4 - 8.2</td>
</tr>
<tr>
<td>Expressive language delay</td>
<td>13</td>
<td>52.5 (3.0)</td>
<td>48-59</td>
<td>4.1 (1.2)</td>
<td>2.4 - 5.7[+]</td>
</tr>
</tbody>
</table>

[*] The 50th percentile score for the DSS for 48 mos. is 7.3; for 54 mos. it is 8.0. Thus the means for the both the NL and LB groups were near the 50th percentile on this measure. The 10th percentile score for 48 mos. is 5.7; for 54 mos. it is 6.0. Thus the mean for the ELD group was well below the tenth percentile.

[+] There was an overlap on DSS scores because one child in the NL group scored 5.7 at age 48 mos., which is at the tenth percentile for that age, and one child in the ELD group scored 5.7 at age 54 mos., which is below the tenth percentile for that age.

**TABLE 3. Mean, (standard deviation), and [range] scores derived from narrative analyses for three diagnostic groups.**

<table>
<thead>
<tr>
<th>Narrative analyses</th>
<th>NL</th>
<th>LB</th>
<th>ELD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information score</td>
<td>22.3 (8.8)</td>
<td>21.0 (5.3)</td>
<td>14.5 (7.6)</td>
</tr>
<tr>
<td></td>
<td>[11.0-39.0]</td>
<td>[12.0-29.0]</td>
<td>[3.0-27.0]</td>
</tr>
<tr>
<td>MLU per T-unit</td>
<td>7.36 (1.45)</td>
<td>7.11 (1.13)</td>
<td>4.85 (1.53)</td>
</tr>
<tr>
<td></td>
<td>[4.50-9.40]</td>
<td>[5.36-8.54]</td>
<td>[1.11-7.18]</td>
</tr>
<tr>
<td>% complete cohesive ties</td>
<td>51.8 (22.5)</td>
<td>46.3 (20.7)</td>
<td>26.8 (22.8)</td>
</tr>
<tr>
<td></td>
<td>[1.0-84.0]</td>
<td>[8.0-70.0]</td>
<td>[11.0-88.0]</td>
</tr>
<tr>
<td># different word roots</td>
<td>57.1 (11.6)</td>
<td>48.8 (9.7)</td>
<td>37.8 (14.2)</td>
</tr>
<tr>
<td></td>
<td>[33.0-74.0]</td>
<td>[33.0-65.0]</td>
<td>[11.0-60.0]</td>
</tr>
</tbody>
</table>

**References**


McReynolds, L., & Kearns, K. Single subject experimental designs in communication disorders. Austin, TX: Pro-Ed.


Appendix

Script(*) for The Bus Story Language Test (Renfrew, 1977)

1. Once upon a time there was a very naughty bus.
2. While his driver was trying to mend him
3. he decided to run away.
4. He ran along the road beside a train. They made
   funny faces at each other and raced each other.
5. But the bus had to go on alone, because the train
   went into a tunnel.
6. He hurried into the city where he met a policeman who blew his whistle and shouted, "Stop, bus!"
7. But he paid no attention and ran on into the country.
8. He said, "I'm tired of going on the road." So he jumped over a fence.
9. He met a cow who said, "Moo, I can't believe my eyes!"
10. The bus raced down the hill. As soon as he saw there was water at the bottom, he tried to stop.
11. But he didn't know how to put on his brakes. So he fell in the pond with a splash and stuck in the mud.
12. When his driver found where he was, he telephoned for a crane to pull him out and put him back on the road again.

(*) Numbers relate to corresponding pictures.

~~~~~~~~

By Rhea Paul Portland State University Portland, OR and Rita L. Smith North Clackamas Public Schools North Clackamas, OR