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WORD, SYLLABLE, AND SOUND AWARENESS IN LANGUAGE-DISORDERED CHILDREN

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The present investigation evaluated language-disordered children's metalinguistic awareness of words, syllables, and sounds. Subjects were 15 language-disordered children matched for mental age to 15 normally developing children and for language age to another 15 normally developing children. In the first task, children were asked to divide sentences, bisyllabic words, and monosyllabic words into smaller units. In the second task, children were asked several questions designed to assess their word awareness. The language-disordered children performed significantly poorer than both groups of normally developing children in dividing sentences and words. The language-disordered children also did not show the same level of responses to the word-awareness questions as the normally developing children. These findings indicate that language-disordered children's metalinguistic deficit is not limited to difficulty making grammatical judgments. Importantly, these disordered children's lack of word, syllable, and sound awareness places them significantly at risk for future academic difficulties, in particular, learning how to read.

Recently there has been increased interest in the metalinguistic abilities of language-disordered children (Buday, Newhoff, & Perry, 1983; Kamhi & Koenig, in press; Liles, Schulman, & Bartlett, 1977; Perry, Newhoff, & Buday, 1983; van Kleeck, 1984). This interest has been motivated by two factors: (a) the metalinguistic demands of language assessment and intervention procedures, and (b) the crucial role metalinguistic abilities play in learning how to read. Metalinguistic awareness refers to the ability to reflect consciously upon the structural features of language. Metalinguistic judgments involve treating language as an object of thought as opposed to using the language system to comprehend and produce sentences (Tunmer & Bowey, 1984). Studies with normally developing children have generally shown that making explicit, out-of-context metalinguistic judgments is relatively difficult to do compared to comprehending and producing language (Clark, 1978; Hakes, 1982). This is because young children tend to focus on the content of a

message rather than the linguistic form used to convey the message (van Kleeck, 1982). Children are usually not able to make explicit metalinguistic judgments about grammatical form until age 4, and in some cases not until age 7 or 8 (Hakes, 1982).

Considering that it is difficult for the young normally developing child to make explicit metalinguistic judgments, it is somewhat ironic that many assessment and intervention procedures used with language-disordered children require metalinguistic judgments. Concerning assessment procedures, van Kleeck (1984, p. 187) has noted that standardized tests measure language skills by taking them out of an interaction context, thereby requiring that children focus on language in ways that would be inappropriate in a communicative context. In other words, standardized tests often evaluate how children deal with decontextualized uses of language, rather than how they deal with language in functional communicative contexts. Metalinguistic abilities clearly play an

important role in the remediation process when children are asked to make judgments about the accuracy and appropriateness of their speech and language.

Although there is some room for debate concerning the extent to which language assessment and intervention procedures tap metalinguistic abilities, there is no doubt that learning to read depends heavily on sophisticated metalinguistic abilities (Hakes, 1982; Tunmer & Bowey, 1984). Gough (1975) has written that knowledge of the language being read is at the heart of the reading process. This requires the ability to deal explicitly with the structural features of the spoken language. As Tunmer and Bowey (1984, p. 152) note, without the metalinguistic ability to reflect upon language, children would be unable to discover the properties of spoken language that correspond to the written form. Tunmer and Bowey suggest a sequential order of metalinguistic awareness as the child progresses from a beginning to a skilled reader. First comes word awareness, followed by phonological (sound) awareness, form awareness, and pragmatic awareness. Thus, the skilled reader realizes that utterances consist of words, that words consist of sounds, that sentences follow specific syntactic and semantic rules, and that there are rules that govern paragraphs and texts.

The few studies that have examined metalinguistic abilities in language-disordered children have dealt exclusively with grammatical judgment performance. Liles et al. (1977) found that 5-8-year-old language-disordered children had more difficulty identifying and correcting sentences containing syntactic errors than age-matched controls. Liles et al. suggested that the inferior performance of the language-disordered children might have been due to their inferior comprehension abilities. However, Kamhi and Koenig (in press) controlled for mental age and comprehension abilities and still found that 5- and 6-year-old language-disordered children had more difficulty identifying and correcting syntactic errors than their matched controls. Older language-disordered children also appear to have difficulty judging grammatical appropriateness. Newhoff and her colleagues (Buday et al., 1983; Perry et al., 1983) recently reported that 9-14-year-old language-disordered children had more difficulty identifying, revising, and justifying their revisions of morphological errors than language age-matched controls.

The findings from these studies present only a partial picture of language-disordered children's metalinguistic abilities. Moreover, one could argue that language-disordered children can be expected to do more poorly than mental-age matched peers in making grammatical judgments because they have acquired knowledge of grammatical forms later than these children. What remains to be seen is how language-disordered children fare in other metalinguistic domains. Due in part to its relevance to early reading performance, in the present investigation we examined language-disordered children's awareness of words, syllables, and sounds. As noted previously, Tunmer and Bowey (1984) have argued that word awareness is one of the first prerequisites for reading. In order to draw correspondences between written and spoken

language, the child's first task is to realize that one specific spoken word corresponds to one written word (Biemiller, 1970). McNinch (1974) and Evans, Taylor, and Blum (1979) have found that awareness of aural word boundaries is a significant predictor of reading achievement in beginning first graders. Awareness that words consist of distinct syllables and sounds is the next crucial prerequisite for reading. Only with this knowledge can children begin to make the necessary correspondences between graphemes and phonemes.

The purpose of this study, then, was to evaluate language-disordered children's awareness of words, syllables, and sounds. We specifically questioned how these children performed relative to children matched for mental age and language age on tasks designed to assess this awareness.

METHOD

Two experimental procedures were used to evaluate language-disordered children's knowledge of words, syllables, and sounds. In the first procedure, children were asked to divide sentences and words into smaller units. Using this procedure, Fox and Routh (1975) found that 4-year-old children were quite proficient and 3-year-old children succeeded better than half the time in segmenting sentences into words and bisyllabic words into syllables. In the second experimental procedure, children were asked several questions designed to assess their word awareness. In order to be able to pinpoint language-disordered children's level of metalinguistic performance in these areas, control groups matched for mental age and language age were included.

Subjects

Subjects were 30 normally developing and 15 language-disordered children, who ranged in age from 3:0 to 6:0. The language-disordered children were matched to 15 normally developing children on the basis of mental age (MA), as measured by the Columbia Mental Maturity Scale (Burgemeister, Blum, & Lorge, 1972), a test of nonverbal intelligence. The language-disordered children were also matched with 15 different normally developing children on the basis of language age (LA), as measured by the Zimmerman Preschool Language Scale (Zimmerman, Steiner, & Evatt, 1979). The Preschool Language Scale was used because it provided a norm-referenced, language-age score. Each of the subject groups included 8 boys and 7 girls.

The language-disordered children were diagnosed by a certified speech-language pathologist to have a primary language disorder. These diagnoses were supplemented by test scores from the Preschool Language Scale, which indicated that these children's expressive and receptive language abilities were at least 1 year lower than their MA, as measured by the Columbia. These children all

performed within normal age limits on the Columbia. Case histories and other formal testing indicated that the language impairment in these children was not the result of globally depressed intellectual functioning, severe emotional disturbances, hearing loss, or physical defects. All of the disordered children were currently enrolled in a special program for language-disordered children in the local city school system.

The normally developing children were drawn from local day-care programs. None of these children had any previous history of speech, language, or hearing problems, and all performed within normal age limits on the Columbia. Table 1 presents group means for CA, MA, and LA. As can be seen in this table, the mean CA and MA for the language-disordered and MA-matched children were almost identical. The mean LA of the disordered and LA-matched children was also essentially the same.

General Procedures

All of the children were individually tested in a quiet room in their school. Children were first administered the Columbia and/or the Preschool Language Scale. The metalinguistic tasks were then presented. The first task evaluated children's ability to divide sentences into words and words into syllables and/or sounds. The second task evaluated children's word awareness. These tasks are described in detail below.

Sentence and word division task. There were three parts to this task: (a) dividing sentences into words, (b) dividing bisyllabic words into syllables, and (c) dividing monosyllabic words into sounds. The stimuli and procedures used in this task were based on those described in a study by Fox and Routh (1975). However, some of the stimulus sentences and words were simplified to ensure that they were well within the linguistic capabilities of the children in this study. More specifically, the words and sentence structures used in this task were at the 2-3-year-old level (Miller, 1981) or approximately 1 year below the least linguistically advanced children in the study.

The sentences in the sentence division task ranged from two to seven words in length. The sentences were constructed using simple clauses and phrases. The sentences were: (a) *Daddy fell*, (b) *Mommy ran home*, (c) *The cat left*, (d) *Daddy made the boat*, (e) *The baby was happy*, (f) *We saw the big tree*, (f) *The man came to my house*, and (h) *Mommy put the ball in the box*.

Subjects were first asked to repeat the sentences to ensure that they could produce all the words and to ensure that the sentences were within their short-term memory limits. All 45 children were able to repeat these sentences easily. Following this, there was a short training procedure using a string of snap beads as a visual aid and a puppet to model the appropriate response. Using the puppet to demonstrate, the experimenter presented the sample sentence, "Jack and Jill went up the hill," and asked the puppet to say a little bit of the sentence. The puppet said, "Jack and Jill," and the experimenter re-

TABLE 1. Group means and standard deviations for CA, MA, and LA.

Group	CA		MA		LA	
	\bar{x}	SD	\bar{x}	SD	\bar{x}	SD
Language disordered	68.3	7.3	68.2	8.7	50.2	7.6
MA matched	67.0	7.1	68.2	8.7	(67.0) ^a	
LA matched	46.0	8.4	(46.0) ^b		50.3	7.7

Note. MA was extrapolated from children's mental maturity age on the Columbia. *L* was assumed to equal 3 months and *U* 9 months. A child who obtained a score of 6L would thus have an MA of 6:3 or 75 months. LA scores were derived from the Zimmerman Preschool Language Scale.

^aThese children's language age was assumed to be equivalent to their CA. ^bThese children's mental age was assumed to be equivalent to their CA.

plied, "Good, you said just a little bit." The experimenter then snapped off a couple of beads to show that the string of beads became shorter. The puppet was next asked to say a little bit of "Jack and Jill;" the puppet said, "Jack." After this demonstration, the child was given an opportunity to do the task. Sample two-word sentences were provided until the child was able to divide two consecutive sentences successfully. After the child met this criterion, the eight stimulus sentences were presented.

For the actual stimulus sentences, if the child responded with a multiword phrase, the experimenter repeated the phrase back, saying "Tell me a little bit of [phrase]." In this way, the child was encouraged to divide each multiword phrase into separate words before attempting to divide the remainder of the sentence. Sentences were scored for the number of divisions made. The number of possible divisions equaled one less than the number of total words in a sentence. A five-word sentence, such as "We saw the big tree," could thus be divided four times.

The next task required the child to divide bisyllabic words into monosyllabic words and then further divide these monosyllabic words into smaller syllable units or sounds. The eight bisyllabic words used were: *airplane*, *football*, *hotdog*, *pancake*, *doctor*, *monkey*, *pencil*, and *window*. The first four of these words had equal syllable stress (spondaic words), whereas the remaining four words had medial consonant clusters. Every bisyllabic word contained at least one real monosyllabic word (e.g., *pencil* includes the word *pen*).

After the child divided the bisyllabic words into monosyllabic words, the child was then asked to divide one of the monosyllabic words that remained after the bisyllabic word was divided. There were eight monosyllabic words to correspond to the eight bisyllabic words: *plane*, *foot*, *hot*, *cake*, *doc* (*doctor*, *dock*), *key*, *pen*, and *dow* (*window*, *dough*/*doe*). The instructions for the word and syllable division task were similar to those of the sentence division task. The experimenter said,

Now I'm going to say something to you; it will be a word. I want you to say just a little bit of it. If I say "sailboat" you could say "boat." Say just a little bit of *sailboat*. If I say "boat," you could say "boa." Say just a little bit of *boat*.

The child was given another example to make sure the task was understood. The puppets and beads were not needed to aid understanding. Children's responses on these word division tasks were simply scored as plus or minus; either they could divide the words into smaller components or they could not.

Word awareness. The stimulus questions used in this part of the study were derived from a study on children's word knowledge by Papandropoulou and Sinclair (1974). In order to prepare the child for the questions about words, the experimenter said,

Now we're going to do some talking about talking. Right now I'm doing some talking. I'm using words. In our other games we did some talking. We used words. You can do some talking too. Do some talking for the puppet. (The puppet is placed on the child's hand.)

After the child (sometimes with prompting) said a few words to the puppet, the experimenter replied, "Good. You just used some words. Just what is a word?" This question was followed by four more questions about words. All five questions are listed below.

1. What is a word?
2. Say a long word. What makes that a long word? (Why is that a long word?)
3. Say a short word. What makes that a short word?
4. Say a hard word. What makes that a hard word?
5. Say an easy word. What makes that an easy word?

Children's responses to these questions were assigned stage scores based on developmental data obtained by Papandropoulou and Sinclair (1974) on 4-10-year-old children with normal language. Children who did not respond at all were assigned to Stage 0. At the earliest responsive stage (Stage 1), 4-5-year-old children made no distinction between words and things. In response to the question, "What is a word?" the child provided examples of words (e.g., *table*, *chair*, *ball*). Stage 1 was divided into three substages according to the consistency of children's responses to the five stimulus questions. A child in Substage 1A only responded to two or three of the questions and was not able to give examples in response to the question, "What is a word?" In contrast to the children who did not respond at all, children in Substage 1A made some attempt to answer a couple of questions. Children in Substage 1B provided some examples of words in response to the question, "What is a word?" and made some attempt to provide answers to the remaining questions. However, there was no apparent reason for the actual words given in response to the questions about long/short and hard/easy words. For example, one child replied, "stairs" when asked to give a short word, and when asked what made it a short word, he said, "It just is." Children in Substage 1C were not only able to answer all of the questions, but their responses also made some sense. Typical of a child in this stage was one who gave a long sentence when asked to say a long word and produced a short sentence when asked to give a short word. This child said a hard word was *wood* because wood is, of course, hard. His easy word was *ball* because it was easy to say.

According to Papandropoulou and Sinclair (1974), Stage 2 (age 5-7) occurs when children realize that words correspond to reality. They realize that words are used to name something. However, only words tied to reality are words, not articles, conjunctions, and other function words. This stage was divided into two substages. In Substage 2A, children showed some limited knowledge that words were used for talking, but they did not know enough about words to make accurate responses to the other questions. Children in Substage 2B not only knew that words were used for talking but also were able to provide reasonable justification for their responses. Consider one child in Substage 2B who said, "If you talk, it's a long word because it's two words."

In Stage 3, words become detached from reality. Both big words and small words are words. Only two children in the study were in Stage 3. In response to the question "What is a word?" one of these children said, "A word is something in a sentence. A short word is *what* because it only has four letters in it." For a hard word, this child said, "supercalifragilistic." Clearly, this child knew that words were something to be reflected on and analyzed.

Reliability

Children's responses to both tasks were initially scored by the second author. The second author also tabulated the number of sentences and word divisions each child made and assigned stage scores to children's responses in the word awareness task. Each of the other two authors independently listened to the tape recorded data from two children in each group and also tabulated sentence and word divisions and assigned stage levels. Reliability checks were thus made on 12 of the 45 children tested, and total percentage agreement regarding these measures was 85%. Most of the disagreements occurred in tabulating responses and in assigning stages. Disagreements were resolved through discussion among all the authors.

RESULTS

Sentence and Word Division Tasks

The data from this task appear in Tables 2 and 3. As can be seen in Table 2, the MA-matched normally developing children consistently performed better than the language-disordered children. Kruskal Wallis one-way analyses of variance (Siegel, 1956) revealed significant group differences on all three of the division tasks (Sentences: $H = 11.13$, $df = 2$, $p < .01$; Bisyllabic words: $H = 18.97$, $df = 2$, $p < .001$; Monosyllabic words: $H = 19.47$; $df = 2$, $p < .001$). The Mann Whitney U test (Siegel, 1956) indicated that the LA-matched children obtained significantly higher scores than the language-disordered children on all three tasks (Sentences: $U = 71$, $df = 1$, $p < .05$; Bisyllabic words: $U = 53$, $df = 1$, $p < .025$; Monosyllabic words: $U = 59.5$, $df = 1$, $p < .05$).

TABLE 2. Sentence and word divisions including zero entries.

Group	Sentence divisions (26 possible)	Bisyllabic word divisions (8 possible)	Monosyllabic word sound divisions (8 possible)
Language disordered			
\bar{x}	5.9	2.8	0.3
SD	8.1	3.5	0.8
LA matched			
\bar{x}	12.3	5.9	3.3
SD	9.3	3.7	3.3
MA matched			
\bar{x}	18.6	8.0	6.1
SD	6.4	0	3.2

TABLE 3. Sentence and word divisions excluding zero entries.

Group	Sentence divisions (26 possible)	Bisyllabic word divisions (8 possible)	Monosyllabic word sound divisions (8 possible)
Language disordered			
\bar{x}	12.5 (7)	6.0 (7)	2.0 (2)
SD	7.5	2.6	1.4
LA matched			
\bar{x}	16.8 (11)	8.0 (11)	6.1 (8)
SD	6.2	0	1.4
MA matched			
\bar{x}	18.6 (15)	8.0 (15)	7.6 (12)
SD	6.4	0	0.8

Note. The values within parentheses represent the number of children who made at least one correct response.

The individual subject data used to generate the means in Table 2 indicated that a substantial proportion of language-disordered children were unable to make any linguistic divisions. For this reason, group means were recalculated excluding zero data points. We reasoned that perhaps the language-disordered children who were able to make linguistic divisions performed at the same level as normally developing children who could make such divisions. These data appear in Table 3. The figures in parentheses represent the number of children who made at least one correct response. As can be seen in this table, less than half of the language-disordered children could divide sentences and bisyllabic words compared to over 70% of the LA control group and all of the MA control group. Similarly, only 2 language-disordered children (15%) could divide monosyllabic words into smaller units compared to slightly over half of the LA control children and 80% of the MA control children.

With the exception of the ceiling values obtained by both groups of children with normal language for the bisyllabic words, the MA-matched normal group again obtained the highest scores, followed by the LA-matched group, and the language-disordered group. However, the exclusion of children with zero scores eliminated the significant group differences in the sentence and bisyllabic word division tasks (Kruskal Wallis, $p > .10$). There remained a significant group difference in children's

ability to divide monosyllabic words ($H = 19.39$, $df = 2$, $p < .001$). As before, the LA-matched children performed significantly better on this task than the language-disordered children.

Word Awareness

The data that reflect children's word awareness appear in Table 4. Children's responses to the five questions evaluating word awareness were assigned stage scores according to the procedures described earlier. A glance at the distribution of scores in Table 4 reveals that most children performed somewhere in Stage 1. However, only 1 language-disordered child obtained a stage score above 1B compared to 6 of the LA-matched children and 8 of the MA-matched children. A Kruskal Wallis one-way analysis of variance revealed significant group differences in the distribution of stage scores ($H = 9.58$, $df = 2$, $p < .01$). This significant difference reflected the superior performance of the MA group. The difference between the language-disordered and MA-matched children was not significant at the .05 level (Mann Whitney $U = 89$, $p > .10$).

DISCUSSION

The findings from the sentence and word division tasks were clear-cut. Not only did the language-disordered children perform more poorly on this task than MA-matched peers, but they also performed more poorly on this task than LA-matched controls. More than half of the language-disordered children could not divide even one sentence or bisyllabic word into a smaller unit. Even after the group means were recalculated without the zero scores, the language-disordered children still obtained lower mean values for all three division tasks. The language-disordered children had particular difficulty dividing monosyllabic words into smaller sound units.

Not surprisingly, the MA-matched control group performed better than the LA-matched and language-disordered children on all three division tasks. The superior performance of the older group was most evident, however, in their responses to the word awareness question. Six of these children showed rather sophisticated knowledge of words as evidenced by their Stage 2 and Stage 3 performance. The distribution of stage scores favored the LA-matched children over the language-disordered children; however, the difference between these two groups did not reach significance.

The findings from this study suggest that language-disordered children's metalinguistic deficit is not limited to

TABLE 4. Distribution of word awareness state scores.

Group	Stages						
	0	1A	1B	1C	2A	2B	3
Language disordered	2	4	8	1	0	0	0
LA matched	4	1	4	4	1	1	0
MA matched	1	2	4	2	1	3	2

difficulty in making grammatical judgments. These children also have difficulty segmenting sentences and words into smaller units. What factors account for these children's metalinguistic difficulties? In a previous paper, Kamhi and Koenig (in press) raised several possible explanations for language-disordered children's difficulty in making grammatical judgments. These included (a) deficient primary linguistic competence, (b) the inability to treat language out of its normal communicative context, (c) limited awareness of discrete linguistic elements, and (d) difficulty accessing and retrieving linguistic knowledge. After weighing these alternative explanations, Kamhi and Koenig concluded that the most likely explanation for the language-disordered children's poor syntactic judgment abilities was that they had difficulty accessing syntactic information. The results of the present investigation indicate that language-disordered children also have limited awareness of the discrete linguistic elements, as measured by the word, syllable, and sound awareness tasks in this study. Thus, not only may language-disordered children have difficulty accessing already acquired language knowledge, but it appears that they also have considerable difficulty acquiring knowledge about the linguistic elements that comprise sentences and words.

It is somewhat discouraging to find that 5-6-year-old language-disordered children's awareness of words, syllables, and sounds is not on a par even with that of 3-4-year-old normally developing children. These disordered children's lack of word, syllable, and sound awareness placed them significantly at risk for future academic difficulties, in particular, learning how to read. Whereas it has been known for many years that young language-disordered children are significantly at risk for future academic problems (e.g., Aram, Ekelman, & Nation, 1984; Aram & Nation, 1980), the specific reasons for these academic difficulties have only begun to be explored. It has always seemed too simplistic to argue that the language deficit itself is totally responsible for all of the academic difficulties of these children. The inability of language-disordered children to reflect consciously on language forms, even after these forms have been acquired, provides one compelling reason for these children's future academic difficulties. This suggests that clinical objectives for older preschool and young school-aged language-disordered children should include not only the usual comprehension, production, and conversational objectives, but metalinguistic objectives as well, in particular, those that target word, syllable, and sound awareness.

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