

Metalinguistic abilities in language-impaired children

*Alan G. Kamhi, PhD
Department of Audiology and Speech
Pathology
Memphis State University
Memphis, Tennessee*

DURING THE PAST few years, researchers have shown a growing interest in the metalinguistic abilities of children with specific kinds of language impairment. Are these children's metalinguistic deficiencies limited to tasks that require sophisticated linguistic capabilities and judgments about specific grammatical forms? Or do these children have a more pervasive metalinguistic deficit that makes them less sensitive to communicative breakdowns and less able to make appropriate listener adjustments?

These questions may be addressed by relating and interpreting the current story of language-impaired (LI) children's metalinguistic abilities. Consistent with other investigators (e.g., Clark, 1978; van Kleeck, 1984), a broad view of metalinguistic behaviors is taken here. Studies that have examined LI children's metalinguistic abilities in six areas will be considered: (a) repairing communicative breakdowns; (b) making listener adjustments; (c) making judgments of language content

2 and form; (d) analyzing language into linguistic units; (e) understanding and producing rhymes, puns, and riddles; and (f) understanding and producing figurative language.

The six areas are listed in the order in which these metalinguistic abilities generally develop. The literature (e.g., Clark, 1978; Hakes, 1982) suggests that the earliest emerging signs of language awareness occur at about age 2, when children begin to spontaneously repair and monitor the results of their utterances. By about age 4, children become aware of grammatical forms and begin to make judgments about the accuracy and appropriateness of certain utterances. Sometime between the ages of 6 and 8, children become able to reflect on the product of an utterance and make explicit out-of-context judgments about grammatical accuracy and phonological segments. Also at this time, children begin to construct puns and riddles and appreciate various forms of figurative language.

Varying criteria are used to identify LI children. Unless otherwise noted, the following criteria apply in this review: (a) performance at least 1 year or one standard deviation below age level on measures of expressive or receptive language; (b) performance within normal limits (above 85) on a nonverbal test of intelligence; and (c) no indication of severe emotional disturbance or physical or sensory deficits.

REPAIRING COMMUNICATIVE BREAKDOWNS

The ability to repair communicative breakdowns is important for maintaining

and regulating discourse. Smooth-flowing, connected discourse depends on the ability of the speaker and listener to monitor the effectiveness of communicative exchanges. To repair an utterance and monitor its effectiveness requires the ability to focus and reflect on the particular language unit that is being repaired. Speakers must be sensitive to various cues that listeners use to indicate communicative failure and then be able to repeat or modify a particular message when appropriate. The role of the listener is to provide feedback to the speaker about the effectiveness of his or her message (see Fey & Leonard, 1983). Studies that have examined the ability of normal and LI children to make spontaneous repairs, elicited repairs, and clarification requests are considered here.

Spontaneous repairs

Self-initiated spontaneous repairs occur very early in children's speech. Scollon (1976) provides an example of a girl, age 1;7, who changed her pronunciation of the word *shoe* until her mother was able to understand it. Slightly older children have been found to make spontaneous repairs of syntactic, morphological, and lexical errors (Clark & Anderson, 1979). No study has examined the spontaneous repairs of LI children. However, the fact that LI children make a large number of speech-language errors probably makes them less likely to notice an error when it occurs. Moreover, even if an LI child were able to detect and correct his or her speech-language errors, communicative effectiveness would not necessarily be enhanced. Frequent repairs could actually decrease communicative effectiveness.

Clarification requests and elicited repairs (revisions)

Several researchers have examined young normal children's ability to request clarification and respond to clarification requests (Brinton, Fujiki, Loeb, & Winkler, 1986; Gallagher, 1977, 1981; Garvey, 1975). These researchers have focused on children's use and response to contingent queries. In Garvey's (1975) pioneering research with normal children, she found that children as young as age 2; 10 were able to effectively use and respond to contingent queries in conversations with a peer. Gallagher (1977, 1981) confirmed and extended Garvey's findings, concluding that as children get older their responses to queries include more precise specification of the information needed for clarification. The recent study by Brinton, Fujiki, Loeb, and Winkler (1986) evaluates repair strategies in response to requests for clarification in children ranging in age from 2 to 10. They found that older children were more responsive to the clarification requests and 9-year-old children showed a wider range of strategies in providing repairs.

Several studies have examined LI children's ability to request clarification and respond to specific clarification requests. Gallagher and Darnton (1978) compared the ability of LI and normal children to respond to the neutral query, *What?* Subjects were 12 LI children, 4 at each of Brown's (1973) developmental language Stages I, II, and III. The mean age of the Stage I LI children was 42 months, compared with 64 months for the Stage III children. Gallagher and Darnton found that the LI children responded to the

What? query as frequently as normal children at the same language level. However, the types of revisions produced by the normal children showed a clear developmental progression from Stage I to Stage III; no such progression was found in the LI children's repairs.

More specifically, the revisions made by Stage I normal children were predominantly phonetic revisions and constituent elaborations, whereas the revisions made by Stage III normal children were predominantly constituent reductions and substitutions. In contrast, LI children across the three stages produced the same relative proportion of the four revision types. For example, all the LI children reduced their response utterances approximately 33 percent of the time. Unlike normal children, Stage I LI children frequently deleted major sentence constituents.

Another important difference involved the use of constituent substitutions. LI children across stages substituted elements significantly less frequently than normal children at Stage I. From these findings, Gallagher and Darnton concluded that LI children are sensitive to the communicative demands of queries but lack the linguistic knowledge (e.g., knowledge of semantic and syntactic equivalencies) to produce more sophisticated revisions.

Findings conflict in the literature regarding LI children's ability to make requests for clarification. Watson (1977, as cited in Fey & Leonard, 1983) reported that LI children made less frequent clarification requests than same-age normal subjects. Similar findings were reported by Brinton and Fujiki (1982), who compared child-child discourse in three dyads

4 of LI children and three dyads of normal children. The children in the six dyads were between the ages of 5;6 and 6;0. The normal children were found to produce three times as many requests for clarification as the LI children. In general, the LI children ignored or responded inappropriately to requests.

Lee, Kamhi, and Nelson (1983) also found deficiencies in LI children's clarification requests. In their study, 10 unintelligible sentences were systematically presented to 15 LI, 15 mental-age-matched, and 15 language-age-matched children. The mean age of the LI children was 5;8. Of the 10 sentences, five were questions (e.g., *Do you like your teachers here?*) and five were instructions or comments (e.g., *Say hello to the puppet, Now we're going to play another game*). Each sentence was produced in an unintelligible manner by reducing the precision of articulatory movements while maintaining the appropriate prosodic characteristics of the sentence. The sentences were presented at designated points in a testing session in which other experimental procedures were carried out.

The data indicated that the LI children made significantly fewer clarification requests than both normal groups. Typically, they did not respond to the failed communicative attempt or responded by nodding their heads without seeming to genuinely understand. Several of the mental-age-matched children found the unintelligible utterances amusing and asked the experimenter why she was talking funny. These findings suggest that LI children probably assume it is their fault when they do not understand something, rather than the fault of the speaker.

The findings suggest that language-impaired children probably assume it is their fault when they do not understand something, rather than the fault of the speaker.

In contrast, Griffin (1979) found no differences in the frequency and types of clarification requests produced by LI children (mean age of 5;4) and an age-matched normal control group. Fey and Leonard (1984) also reported no differences between LI (mean age of 5;4) and same-age normal children's frequency of clarification requests. Both of these groups of children produced more clarification requests to peers and babies than to adults. Interestingly, Fey and Leonard found that the younger normal subjects produced more clarification requests than the LI and older normal children. This finding was attributed to the behavior of one subject, who followed 33 percent of his partner's comments with a clarification request. However, the young normal children also used greater proportions of questions than either of the older groups, particularly when paired with an adult. Finally, Leonard (1986) reported that LI children between the ages of 2;10 and 3;6 actually made more requests for repetition and clarification than their language-age-matched peers. Leonard attributed the greater responsiveness of LI children to their increased age and comprehension abilities.

Taken together, the data indicate that LI children have the ability to produce

clarification requests. The two studies in which LI children performed more poorly than normal peers contained somewhat contrived situations. In the Brinton and Fujiki (1982) study, LI children were paired together and compared with same-age normal dyads. The relatively low frequency of clarification requests in the LI dyads probably reflects the nature of the dyads rather than the ability of the individual LI children to request clarification. The Lee, Kamhi, and Nelson (1983) study also presented a fairly atypical situation in which the authority figure, the experimenter, produced unintelligible, unreliable information.

STYLISTIC VARIATIONS: ADJUSTING TO THE LISTENER

Making adjustments in response to varying characteristics of listeners is considered a metalinguistic skill because form manipulations are involved. Some researchers question, however, whether all spontaneous listener adjustments truly reflect language awareness (van Kleeck, 1984). Van Kleeck notes that many of children's early listener adjustments are not conscious or deliberate. Children's language awareness necessarily increases as they become able to make listener adjustments as well as consciously judge the appropriateness of these modifications.

The ability to adjust speech in response to listener characteristics has been well documented in 3- and 4-year-olds. Shatz and Gelman (1973), for example, found that 4-year-olds were able to modify the length and complexity of their language according to the age of their listeners (2-year-olds, age peers, and adults). LI

children also appear able to make adjustments in their speech. Fey and Leonard (1984) found that, with the exception of two general measures of syntactic ability (mean length of utterance and mean pre-verb length) and use of internal state questions, LI children made the same adjustments in their speech to toddlers, peers, and adults as same-age normal children. For example, both groups used higher ratios of speaker-to-partner utterances with increasingly younger partners.

Anderson (1977) reported that 4- to 7-year-old normal children could role play the voices and vary linguistic content for a father, mother, baby, and for a physician, nurse, and child patient. For example, the children talked about business issues in assuming the father's role and family care issues in assuming the mother's role. Messick and Newhoff (1979) compared the ability of young school-age LI (mean age of 6;0) and normal-language children to produce and assign request types in role playing situations involving a mother, father, adult female, girl, and baby. No differences were found in the variation of request forms produced by the LI and normal children. Both groups most often used "desire statements," such as *I want* ——. However, the requests made by LI children contained more syntactic and phonological errors than the requests made by the normal controls. In addition, LI children experienced considerable difficulty assigning request types (e.g., direct imperatives, need statements, *please*, and conditional forms) to specific listener roles.

Lee, Kamhi, and Nelson (1983) also examined the ability of LI children to assign specific utterances to listener roles.

6 Children were asked to decide whether a particular sentence would most likely be said by a father, mother, or child. One set of utterances varied in its semantic content (e.g., *It's time to watch the football game, Come and help me fix my bike*). An adult male recorded these sentences. For the other set of sentences, an adult male, adult female, and child were recorded reading semantically neutral sentences. Subjects made few errors identifying male, female, and child voices. The LI children, however, made significantly more errors assigning listener roles based on semantic cues than the language-age and mental-age-matched controls. The LI children were clearly influenced by the vocal characteristics of the sentences, often choosing the father role because an adult male recorded the sentences.

LI children appear sensitive to the stylistic variations required in speaking to younger children, peers, and adults. However, they have difficulty using syntactic and semantic information to assign request types and utterances to appropriate listener roles. These difficulties seem to derive from the primary linguistic deficits that characterize LI children.

JUDGMENTS OF LANGUAGE CONTENT AND FORM

The literature suggests that normal children cannot make explicit, out-of-context judgments about linguistic form until age 4 and, in some cases, not until ages 7 or 8 (e.g., Hakes, 1980, 1982; Smith & Tager-Flusberg, 1982). Several studies have examined the ability of LI children to judge language form and content. Liles, Shulman, and Bartlett (1977) compared

the ability of 5- to 8-year-old LI and normal children to judge and correct sentences containing syntactic, lexical, and word-order errors. The children were matched for age and receptive vocabulary. The normal group was able to identify significantly more syntactic and word-order errors than the LI children. The LI children also had considerable difficulty correcting the errors they identified, in particular, syntactic errors. Liles and her colleagues suggest that the poor performance of the LI children might be due to inferior comprehension abilities.

To test this possibility, Kamhi and Koenig (1985) asked LI and normal children to identify and correct 28 sentences containing syntactic (e.g., *Yesterday he play ball*), semantic (e.g., *Yesterday he played table*), and phonological (e.g., *John has two tig cars*) errors. The LI and normal subjects ranged in age from 4;0 to 7;2. The two groups demonstrated comparable mental age levels and receptive language abilities. Consistent with the findings from the Liles, Shulman, and Bartlett (1977) study, the LI children again had considerable difficulty identifying and correcting syntactic errors. However, the LI children performed as well as the normal children in identifying and correcting semantic and phonological errors. The LI children's metacognitive abilities were apparently sufficient for making out-of-context judgments about semantic appropriateness. Neither group had much success correcting phonological errors. Controlling for mental age and language comprehension thus eliminated the nonsyntactic, between-group differences found in the Liles, Shulman, and Bartlett (1977) study.

Several studies corroborate these findings. Newhoff and her colleagues (Buday, Newhoff, & Perry, 1983; Perry, Newhoff, & Buday, 1983) found that 9- to 14-year-old LI children had more difficulty than a language-age-matched control group in identifying, revising, and justifying their revisions of morphological errors. Dunton, Fujiki, and Brinton (1984) report that LI children in the first, second, and third grades were much less capable of recognizing and correcting syntactically anomalous sentences than their normal age-matched peers.

The data leave little doubt that LI children have considerable difficulty identifying and correcting syntactic errors. When mental age and receptive language age are controlled, there are no differences in the ability of LI and normal children to identify and revise semantic errors. As Kamhi and Koenig (1985) conclude, LI children not only have difficulty acquiring various linguistic forms, but they also have difficulty reflecting on these forms after they have been acquired.

ANALYZING LANGUAGE INTO LINGUISTIC UNITS

Most of the research that has examined children's ability to reflect on particular language units has been done in connection with reading (see Clark, 1978). While there is some controversy about the role of metalinguistic abilities in acquiring oral language abilities, there is general agreement that sophisticated metalinguistic abilities are required in learning to read (e.g., Hakes, 1982; Tunmer & Bowey,

1984). The skilled reader must realize that utterances consist of words, that words consist of sounds, that sentences follow specific syntactic and semantic rules, and that additional rules govern paragraphs and texts (Tunmer & Bowey, 1984).

Two recent studies (Kamhi, Lee, & Nelson, 1985; Kamhi & Catts, 1986) examined the ability of LI children to analyze language into linguistic units. Kamhi, Lee, and Nelson (1985) investigated LI children's awareness of words, syllables, and sounds in two experimental procedures. The subjects used in this study were the same as those used by Lee, Kamhi, and Nelson (1983). In the first procedure, adapted from Fox and Routh (1975), children were asked to divide sentences into words and words into smaller syllable and sound units. The LI children performed significantly more poorly than mental-age and language-age control subjects in dividing sentences and words into smaller units. More than half of the LI children could not divide even one sentence or bisyllabic word into a smaller unit, and only two could divide a monosyllabic word. In the second procedure, adapted from Papandropoulou and Sinclair (1974), children's word awareness was investigated by asking them questions about words (e.g., *What is a word? Say a long/short, hard/easy word*). Children's responses to these questions were assigned stage scores. Significant differences were found between the stage scores of the LI subjects and mental-age control group, but not between stage scores of the LI subjects and the language-age control group.

Kamhi and Catts (1986) looked more specifically at 6- to 8-year-old LI chil-

dren's awareness of phonological units. The LI children were matched on mental age to reading-impaired and normally developing children. The reading-impaired children had no history of speech-language problems and performed within normal age limits on the Test of Language Development-Primary (Newcomer & Hammill, 1982). Several tasks were administered to measure phonological awareness. In one task (elision), children were asked to say what word remained when the first or last letter was removed (e.g., (s)tar, car(d)). In another task (segmentation), children were asked to tap the number of sounds they heard in a nonsense word. The sentence and word division task was also included. Somewhat surprisingly, the LI children performed significantly more poorly than the normal control subjects on only the sentence division task. None of the children did particularly well on the elision or segmentation tasks. One possible reason for the relatively comparable performance of the LI and normal children was that the LI children were, on the average, 10 months older than the normal controls. The poor performance of the normal children on the elision and segmentation tasks makes it difficult to draw strong conclusions from these data. It is encouraging, however, that the LI children performed no worse than normal and reading-impaired children on measures of phonological awareness.

RHYMES, PUNS, AND RIDDLES

Practicing, appreciating, and playing with language as well as making up

rhymes, puns, and riddles clearly reflect the ability to use language in noncommunicative ways (Clark, 1978). However, whether or not these language behaviors are metalinguistic in nature is open to question. Hakes (1982), for example, has argued that a child can produce words that rhyme, "knowing that they sound

The spontaneous production of rhymes indicates that children enjoy playing with sound sequences; however, such play does not necessarily reflect explicit knowledge of phonological segments.

similar but not knowing *how* they sound similar" (p. 190). The spontaneous production of rhymes indicates that children enjoy playing with sound sequences; however, such play does not necessarily reflect explicit knowledge of phonological segments.

There has been no systematic investigation of LI children's early sound play or later ability to understand puns and riddles. Anecdotal and clinical reports indicate that some LI children are less verbal than normally developing children. These children probably do not practice and play with language to the same extent as normal children. Most LI children probably experience considerable difficulty understanding and using puns and riddles because sophisticated linguistic knowledge is required to understand and produce these language forms.

FIGURATIVE LANGUAGE

Children's ability to understand and produce figurative language also involves some degree of metalinguistic competence. An individual who is able to use language in nonliteral ways demonstrates an awareness that language is an arbitrary, conventional code. The variety of figurative language most often discussed is metaphor. A metaphor relates two words or phrases (a *topic* and a *vehicle*) through a common dimension, the ground (Billow, 1977).

As with children's early sound play, Hakes (1982) questions whether children's earliest metaphors actually require metalinguistic abilities. Hakes reports the example of a 15-month-old child calling the moon a *ball*. Although the metaphoric nature of such overextensions has been pointed out in the literature (e.g., Nelson, Rescorla, Gruendel, & Benedict, 1978), no evidence suggests that the child appreciates the metaphoric nature of these overextensions. At some point, however, children come to realize the differences between literal and figurative speech. When children are able to deliberately stretch language to evoke new associations and images, and fully appreciate these associations and images, metalinguistic abilities are clearly being tapped.

Not surprisingly, LI children experience difficulty producing and understanding metaphor. Nippold and Fey (1983) reported that preadolescent children with a history of language impairment (mean age of 10;7) had difficulty explaining the meanings of metaphoric sentences. These findings are corroborated

by Lee and Kamhi (1985), who reported that LI children (mean age of 10;0) performed more poorly than mean-age-matched normal and reading-impaired children in comprehending and producing metaphors.

INTERPRETING THE FINDINGS

The findings concerning LI children's metalinguistic abilities are somewhat predictable. LI children tend to show higher levels of performance on metalinguistic tasks that do not require sophisticated linguistic abilities or explicit judgments about language form. LI children and normal control subjects exhibit the same frequency of response to queries, produce the same types of clarification requests, and make appropriate adjustments to various listener roles. But, LI children do not perform as well as normal children in (a) producing linguistically sophisticated revision types, (b) using syntactic and semantic information to assign request types and utterances to appropriate listener roles, (c) identifying and correcting syntactically anomalous sentences, and (d) comprehending and producing figurative language. The data were somewhat equivocal concerning the ability of LI children to make phonological judgments and divide words into phonological units.

Although LI children's metalinguistic profile is predictable, it is not necessarily easy to explain. One issue concerns the relationship between primary linguistic abilities and metalinguistic abilities. As van Kleeck (1982) notes, "Clearly metalinguistic skill requires *some* primary language competence, if only because the

10 child must have *something* to reflect upon" (p. 256). However, the level of primary language competence that is necessary to make a particular metalinguistic judgment is open to question.

The linguistic deficits that characterize LI children account for some of the data. The difficulty they experience in producing sophisticated revision types, assigning request types to appropriate listener roles, and comprehending or producing metaphors is best attributed to linguistic deficiencies. The linguistic deficit, however, does not account for the difficulty these children have in making explicit judgments about language form. The LI children were generally able to comprehend and produce the syntactic forms they had difficulty judging (e.g., Kamhi & Koenig, 1985). However, the ability to comprehend or produce a form by no means ensures that a child will be able to make a judgment about the appropriate use of the form. As indicated earlier, normal children are at least 4 years old, and sometimes older, when they begin to make explicit judgments about language form.

Why, then, do LI children have more difficulty than normal children in making judgments about syntactic forms, even after these forms have been acquired? Kamhi and Koenig (1985) raised the possibility that LI children's representations of syntactic forms might not be as well established or as stable as those of normal children. LI children may be considered to have "fuzzy" representations of certain syntactic forms. One possible reason for this is that LI children have less time to establish representations of syntactic forms because they acquire these forms later than normal children. Several studies

(e.g., Johnston & Kamhi, 1984; Johnston & Schery, 1976) show that LI children experience difficulty acquiring grammatical forms such as auxiliaries, inflections, pronouns, and conjunctions. Not coincidentally, these are the language forms that are the most difficult to represent because they are often not clearly tied to meaningful (physical) referents. Consider the difference in representing a lexical item, such as *dog*, and a syntactic form, such as the third person singular *-s* inflection. The lexical item *dog* can be associated with a physical referent, whereas the *-s* inflection cannot.

This interpretation is consistent with evidence that LI children also have difficulty encoding nonlinguistic information that places heavy demands on their representational processes (Johnston & Weismer, 1983; Kamhi, 1981; Savich, 1984). These studies show that LI children perform more poorly than normal children on anticipatory imagery tasks that require sophisticated manipulations of symbolic representations. The claim, then, is that LI children will have difficulty reflecting on and manipulating the same kinds of information and knowledge that they have difficulty encoding and learning. In other words, LI children's metalinguistic deficiencies are more likely to be the result of difficulties getting information into the system (encoding problems) than difficulties getting information out of the system (retrieval problems).

• • •

Cazden (1976) writes, "It is an important aspect of our unique capacities as human beings that we can not only act, but reflect back on our actions; not only

learn and use language, but treat it as an object of analysis and observation in its own right" (p. 603). Measures of metalinguistic performance thus provide some indication of a child's general metacognitive ability to reflect on actions and behaviors. It is somewhat discouraging, though not surprising, to find that LI children not only have difficulty acquiring various linguistic forms, but also have difficulty reflecting on these forms once they are

acquired. On the other hand, it is encouraging to find that LI children's metalinguistic difficulties are generally limited to tasks that demand sophisticated linguistic capabilities or judgments about syntactic and, possibly, phonological forms. LI children thus do not seem to have a general or pervasive metalinguistic deficit. This news is particularly good for those whose job it is to teach these children what language is all about.

REFERENCES

- Andersen, E. (1977). Young children's knowledge of role-related speech differences: A mommy is not a daddy is not a baby. *Papers and Reports on Child Language Development*, 13, 83-90.
- Billow, R. (1977). Metaphor: A review of the psychological literature. *Psychological Bulletin*, 84, 81-92.
- Brinton, B., & Fujiki, M. (1982). A comparison of request-response sequences in the discourse of normal and language-disordered children. *Journal of Speech and Hearing Disorders*, 47, 57-62.
- Brinton, B., Fujiki, M., Loeb, D., & Winkler, E. (1986). Development of conversational repair strategies in response to requests for clarification. *Journal of Speech and Hearing Research*, 29, 75-82.
- Brown, R. (1973). *A first language: The early stages*. Cambridge, MA: Harvard University Press.
- Buday, E., Newhoff, M., & Perry, B. (1983, November). *Metalinguistic ability in normal and language disordered children*. Paper presented at the meeting of the American Speech-Language-Hearing Association, Cincinnati.
- Cazden, C. (1976). Play with language and meta-linguistic awareness. In J. Bruner, A. Jolly, & K. Sylva (Eds.), *Play: Its role in development and evolution*. New York: Basic Books.
- Clark, E. (1978). Awareness of language: Some evidence from what children say and do. In A. Sinclair, R. Jarvella, & W. Levelt (Eds.), *The child's conception of language*. New York: Springer-Verlag.
- Clark, E., & Anderson, E. (1979). Spontaneous repairs: Awareness in the process of acquiring language. *Papers and Reports in Child Language Development*, 16, 1-12.
- Dunton, S., Fujiki, M., & Brinton, B. (1984, November). *Metalinguistic judgment skills in normal and language-disordered children*. Paper presented at the meeting of the American Speech-Language-Hearing Association, San Francisco.
- Fey, M., & Leonard, L. (1983). Pragmatic skills of children with specific language impairment. In T. Gallagher & C. Prutting, (Eds.), *Pragmatic assessment and intervention issues in language*. San Diego, CA: College-Hill Press.
- Fey, M., & Leonard, L. (1984). Partner age as a variable in the conversational performance of specifically language-impaired and normal-language children. *Journal of Speech and Hearing Research*, 27, 413-424.
- Fox, B., & Routh, D. (1975). Analyzing spoken language into words, syllables, and sounds. *Journal of Psycholinguistic Research*, 4, 331-342.
- Gallagher, T. (1977). Revision behaviors in the speech of normal children developing language. *Journal of Speech and Hearing Research*, 20, 303-318.
- Gallagher, T. (1981). Contingent query sequences within adult-child discourse. *Journal of Child Language*, 8, 51-62.
- Gallagher, T., & Darnton, T. (1978). Conversational aspects of the speech of language-disordered children: Revision behaviors. *Journal of Speech and Hearing Research*, 21, 118-136.
- Garvey, C. (1975). Requests and responses in children's speech. *Journal of Child Language*, 2, 41-63.
- Griffin, S. (1979). *Requests for clarification made by normal and language-impaired children*. Unpublished master's thesis, Emerson College.
- Hakes, D. (1980). *The development of metalinguistic abilities in children*. New York: Springer-Verlag.
- Hakes, D. (1982). The development of metalinguistic abilities: What develops? In S. Kuczaj (Ed.), *Language development: Language, thought, and culture* (Vol. 2). Hillsdale, NJ: Erlbaum.
- Johnston, J., & Kamhi, A. (1984). The same can be less:

- Syntactic and semantic aspects of the utterances of language-impaired children. *Merrill-Palmer Quarterly*, 30, 65-85.
- Johnston, J., & Schery, T. (1976). The use of grammatical morphemes by children with communication disorders. In D. Morehead & A. Morehead (Eds.), *Normal and deficient child language*. Baltimore: University Park Press.
- Johnston, J., & Weismer, S. (1983). Mental rotation abilities in language-disordered children. *Journal of Speech and Hearing Research*, 26, 397-404.
- Kamhi, A. (1981). Nonlinguistic symbolic and conceptual abilities in language-impaired children. *Journal of Speech and Hearing Research*, 24, 446-453.
- Kamhi, A., & Catts, H. (1986). Towards an understanding of developmental language and reading disorders. *Journal of Speech and Hearing Disorders*, 51, 337-348.
- Kamhi, A., & Koenig, L. (1985). Metalinguistic awareness in language-disordered children. *Language, Speech, and Hearing Services in Schools*, 16, 199-210.
- Kamhi, A., Lee, R., & Nelson, L. (1985). Word, syllable, and sound awareness in language-disordered children. *Journal of Speech and Hearing Disorders*, 50, 207-212.
- Lee, R., & Kamhi, A. (1985, November). *Verbal metaphor performance in learning disabled children*. Paper presented at the meeting of the American Speech-Language-Hearing Association, Washington, DC.
- Lee, R., Kamhi, A., & Nelson, L. (1983, November). *Communicative sensitivity in language-impaired children*. Paper presented at the meeting of the American Speech-Language-Hearing Association, Cincinnati.
- Leonard, L. (1986). Conversational replies of children with specific language impairment. *Journal of Speech and Hearing Research*, 29, 114-119.
- Liles, B., Shulman, M., & Bartlett, S. (1977). Judgments of grammaticality in normal and language-disordered children. *Journal of Speech and Hearing Disorders*, 42, 199-210.
- Messick, C., & Newhoff, M. (1979, November). *Request form: Does the language-impaired child consider the listener?* Paper presented at the meeting of the American Speech-Language-Hearing Association, Atlanta.
- Nelson, K., Rescorla, L., Gruendel, J., & Benedict, H. (1978). Early lexicons: What do they mean? *Child Development*, 49, 960-968.
- Newcomer, P., & Hammill, D. (1982). *Test of Language Development-Primary*. Austin, TX: Pro-Ed.
- Nippold, M., & Fey, S. (1983). Metaphoric understanding in preadolescents having a history of language acquisition difficulties. *Language, Speech, and Hearing Services in Schools*, 14, 171-181.
- Papandropoulou, I., & Sinclair, H. (1974). What is a word? Experimental study of children's ideas on grammar. *Human Development*, 17, 241-258.
- Perry, B., Newhoff, M., & Buday, E. (1983, November). *Normal and language disordered children's metalinguistic awareness of the -s morpheme*. Paper presented at the meeting the American Speech-Language-Hearing Association, Cincinnati.
- Savich, P. (1984). Anticipatory imagery abilities in normal and language-disabled children. *Journal of Speech and Hearing Research*, 27, 494-502.
- Scollon, R. (1976). *Conversations with a one year old: A case study of the developmental foundations of syntax*. Honolulu: University of Hawaii Press.
- Shatz, M., & Gelman, R. (1973). The development of communication skills: Modifications in the speech of young children as a function of the listener. *Monographs of the Society for Research in Child Development*, 38(5, Serial No. 152).
- Smith, C., & Tager-Flusberg, H. (1982). Metalinguistic awareness and language development. *Journal of Experimental Child Psychology*, 34, 449-468.
- Tunmer, W., & Bowey, J. (1984). Metalinguistic awareness and reading acquisition. In W. Tunmer, C. Pratt, & M. Herriman (Eds.), *Metalinguistic awareness in children: Theory, research, and implications*. New York: Springer-Verlag.
- van Kleeck, A. (1982). The emergence of linguistic awareness: A cognitive framework. *Merrill-Palmer Quarterly*, 28, 237-265.
- van Kleeck, A. (1984). Metalinguistic skills: Cutting across spoken and written language and problem-solving abilities. In G. Wallach & K. Butler (Eds.), *Language learning disabilities in school-age children*. Baltimore: Williams & Wilkins.