METALINGUISTIC SKILLS AS PREDICTORS OF EARLY READING ACHIEVEMENT: PRELIMINARY FINDINGS

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ABSTRACT

This paper presents a description of an ongoing research project that is designed to determine the extent to which metalinguistic abilities at the beginning of formal schooling are related to later reading achievement. One hundred and eighteen beginning readers were administered four tests of metalinguistic ability (phonological, lexical, syntactic, semantic), a test of metalinguistic vocabulary and print awareness, the Clay Concepts about Print Test, the Peabody Picture Vocabulary Test and a test of Piagetian cognitive abilities. The Interactive Reading Assessment System was used to monitor the students' subsequent progress in learning to read. Preliminary findings from the study are briefly summarised.

Over the past decade there has been an increasing interest in the relationship between language development and learning to read. Of particular interest is the extent to which problems in reading can be attributed to problems in language. This interest stems in part from an accumulating body of research which indicates that visual discrimination is not the central problem it was once thought to be. Since reading was initially considered to be primarily a visual process, this led naturally to the view that the major problem in learning to read was the failure to discriminate the visual representations of language, the letters and printed words. However, little or no evidence has been obtained which indicates that visual perceptual training transfers positively to growth in reading, or that good and poor readers differ in basic visual information processing skills (Calfee & Drum, 1978; Stanovich, 1982; Vellutino, 1979).

Most educators and researchers now view reading as a derived skill that builds upon spoken language. The reading process is thought to be grafted onto the listening process. Accordingly, reading has been defined as the translation from print to a form of language from which the reader already is able to derive meaning (Venezky, 1976). This suggests that the child's fundamental task in learning to comprehend text is to discover how to map the printed text onto his existing language, a process that requires the ability to deal explicitly with the structural features of spoken language. Two general kinds of language problems may therefore affect reading acquisition: (1) deficiency in oral language knowledge per se, and (2) the inability to bring knowledge of oral language to conscious awareness.

With regard to the former, Gough (1975) has argued that "knowledge of the language being read is at the heart of the reading process, and without that knowledge reading could simply not take place" (p.15). Clearly, children with frank oral language problems such as deficits in speech perception, lexical retrieval, or syntactic/semantic processing will encounter difficulty in learning to read, as their existing language is deficient in one way or another.

Fortunately, for most beginning readers, knowledge of the spoken language is sufficiently well advanced that it does not contribute to difficulties in learning to read. However, the major claim being investigated in the present study is that intuitive oral language knowledge is insufficient to acquire the skills necessary for fluent reading. As indicated above, to discover how to map the printed text on to his existing language, the beginning reader must be able to reflect upon the structural features of spoken language. That is, learning to read requires metalinguistic awareness (Foss & Hakes, 1978; Gough & Hillinger, 1980; Menyuk & Flood, 1981; Tunmer & Bowey, 1980, 1983; Tunmer & Fletcher, 1981).

Metalinguistic awareness is a developmentally distinct kind of linguistic functioning that emerges during middle childhood, the period from approximately four to eight years of age. It refers to the ability to deliberately reflect upon and manipulate the structural features of spoken language, treating the language system itself as an object of thought, as opposed to using the language system to comprehend and produce sentences (Tunmer & Herriman, 1983).

Metalinguistic operations may be distinguished from normal language operations in the type of cognitive processing involved. The former require control processing. For example, the

language user does not normally notice such things as the individual phonemes and words comprising the utterance, the grouping relationships among the constituent words, or whether the utterance is structurally ambiguous or synonymous with another utterance, unless he deliberately thinks about it; that is, unless he invokes control processing to reflect upon the structural features of the utterance. In contrast, normal language processing is automatic. Listeners are characteristically unaware that anything has intervened between their being aware of a speaker's voice and being aware that his message has been understood. Similarly, speakers are aware of what they want to say but not of the structures by which the content of their messages is conveyed.

The relationship between normal language processing and metalinguistic operations can be expressed in terms of a psychological model of sentence comprehension (Tunmer & Herriman, 1983). This gives rise to a definition of metalinguistic awareness in information processing terms as the ability to invoke control processing to perform mental operations on the products of the mental mechanisms involved in sentence comprehension. It also provides the basis for classifying the various manifestations of metalinguistic awareness. Four broad categories emerge -- phonological, word, form, and pragmatic awareness. Phonological and word awareness refer to the subunits of spoken language (the phonemes and words), form awareness to the structural representation of the linguistic meaning associated with an utterance, and pragmatic awareness to the relationships that obtain among sets of interrelated propositions.

Research on child language development indicates that middle childhood is the occasion for the emergence of a wide variety of linguistic skills with the properties of metalinguistic abilities (see Tunmer, Pratt & Herriman, 1983, for a review of available research). Examples of such emerging metalinguistic abilities for each of the major types of awareness are given below:

1. Phonological awareness -- segmentation of words into their constituent phonemes, recognition of rhyme, blending of phonemic units, phoneme deletion, phoneme substitution, appreciation of puns.
2. Word awareness -- segmentation of sentences or phrases into words, separation of words from their referents, appreciation of jokes involving lexical ambiguity, matching words with other words, recognition of synonyms and antonyms, word substitution.
3. Form awareness -- judgment of semantic and grammatical well formedness of strings, detection of structural ambiguity in sentences, recognition of synonymy relationships, correction of word order violations, completion of sentences with missing words.
4. Pragmatic awareness -- detection of inconsistencies between sentences, recognition of message inadequacy, understanding of communication failures, awareness of macrostructures.

The development of these abilities is thought to be related to a more general change in information processing capabilities that occurs during this period, the development of metacognition (Flavell, 1981; Tunmer & Herriman, 1983). Metacognition refers to the individual's knowledge concerning his own thought processes and involves the ability to perform mental operations on the products of other mental operations; that is, it involves "cognition about cognition". Recent research reviewed by Flavell (1981) indicates that middle childhood is the period during which the child becomes increasingly aware of how he can control his intellectual processes in a wide range of situations and tasks, including those requiring metalinguistic skills, such as reading acquisition, and reversible operations, such as standard Piagetian tasks.

The claim that the development of metalinguistic abilities in children is central to learning to read raises three important research questions:

1. What is the nature of the relationship between the child's emerging metalinguistic abilities and learning to read?
2. To what extent can the development of these abilities be facilitated by training?
3. Does such training transfer positively to reading?

The present study is concerned with the first question. Although research clearly indicates that each of the four general types of metalinguistic ability is significantly related to reading achievement, the exact nature of the relationship between metalinguistic abilities and the acquisition of reading skills is not known (see Tunmer & Bowey, 1983, for a review of available research).

Tunmer and Bowey (1980, 1983) have proposed a theoretical model of reading acquisition that describes the specific role that metalinguistic abilities play in the reading acquisition process. The model assumes that learning to read involves the acquisition of several component skills and that metalinguistic abilities are essential in the development of those cognitive processes that are necessary to sustain rapid fluent reading. An empirical consequence of this model is that the relative importance of the four general types of metalinguistic ability described above varies according to the stage of development the child has reached and the particular subskills he has acquired in progressing from a beginning to a skilled reader. That is, the model predicts that the four types of metalinguistic ability differentially contribute to variability in reading achievement as a function of stage of reading development. In the early stages, where the focus is primarily on the acquisition of decoding skills, phonological and word awareness are predicted to be more important. However, as the child progresses to more advanced stages where the emphasis shifts more toward comprehension of text, form and pragmatic awareness are predicted to be more important.

Research Design

During the first term of the school year, 118 first grade students were administered four tests of metalinguistic ability (designed to measure levels of phonological, lexical, syntactic and pragmatic awareness); a test of metalinguistic vocabulary and print awareness; the Clay Concepts about Print Test; the Peabody Picture Vocabulary Test and a test of cognitive abilities based on Piagetian concepts.

Each of the four tests of metalinguistic ability was similar to ones reported elsewhere (Tunmer & Nesdale, 1982; Tunmer, Bowey & Grieve, 1983; Pratt, Tunmer & Bowey, in press; Tunmer, Nesdale & Pratt, 1983). The test of phonological awareness was presented in the form of a "tapping game" in which the children were asked to tap out the number of segmented phonemes in one-, two-, or three-phoneme nonsense syllables spoken by the experimenter. A similar procedure was used to assess word awareness. In this case, however, the children were presented with the task of segmenting two- and three-word meaningful phrases into their constituent words. To assess syntactic awareness the children were asked to "unscramble" three- and four-word sentences containing word-order violations that rendered the original sentences meaningless. Pragmatic awareness was examined by presenting children with a task in which they were read short passages (three sentences in length) and asked to judge whether the sentences were inconsistent with one another.

The metalinguistic vocabulary and print awareness test was developed by the project group to test childrens familiarity with the vocabulary of print, e.g., 'word', 'sentence', 'letter' etc. Two versions of the Clay Concepts about Print Test were used: "Sand", was administered in the beginning of the school year and "Stones" at the end. The Peabody Picture Vocabulary Test was used to get estimates of the childs verbal knowledge level by measuring hearing vocabulary. Since the children were generally not readers this scale was deemed to be suitable for them. A test developed by Arlin was used to measure cognitive abilities based on the standard Piagetian tasks of classification, seriation and conservation.

At the end of the year, the group was retested using the Interactive Reading Assessment System (IRAS). This test developed by Calfee and Calfee (1977) is an individually administered diagnostic test designed for research applications. The skills tested are those generally accepted as necessary for success in skilled reading, with particular focus on decoding, fluency and comprehension. As well three of the metalinguistic tests were re-administered; those being the pragmatic, syntactic and phonology tests. The Clay "Stones" test was also administered. The children, who are presently in their second year of schooling, will be re-tested on their reading achievement at the end of the school year.

Results

The data obtained from the study are presently in the process of being checked for accuracy of scoring and their psychometric and distributional properties. Preliminary correlational analyses of the data indicate that there are significant positive relationships among the various tests of metalinguistic and cognitive development, and that these skills are differentially related to the component skills of reading (see Tables I, II, and III). Further analyses will involve the use of regression analyses to examine more closely the relationships among the variables of interest.

	1	2	3	4	5	6
1. Cognitive						
2. Clay (Sand)	.5337**					
3. Peabody	.4570**	.3637**				
4. Phonology 1	.3863**	.3730**	.1186			
5. Word 1	.2087*	.1618	-.0206	.1853		
6. Syntax 1	.5962**	.3899**	.3485**	.4269**	.1092	
7. Inconsistency 1	.3264**	.3585**	.1982	.2730**	.0395	.5000**

* = $p < .01$
** = $p < .001$

Table 1: Correlations between predictor variables from tests given at beginning of first grade (n=118)

	1	2	3	4	5	6
1. Decoding						
2. Comprehension	.6100**					
3. Fluency	.7405**	.8562**				
4. Clay (Stone)	.5425**	.5070**	.5596**			
5. Phonology 2	.3514**	.3153**	.3378**	.3439**		
6. Syntax 2	.3567**	.3849**	.3600**	.4521**	.4478**	
7. Inconsistency 2	.1346	.1566	.1660	.2874*	.2347*	.3613**

* = p < .01
** = p < .001

Table 2: Correlations between scores on reading skill tests (from IRAS), metalinguistic skills tests and Clay test ("Stones") given at end of first grade (n=108)

	Cognitive	Phonology	Word	Syntax	Inconsistency
Decoding	.3757**	.2532*	.0270	.3204**	.2121
Fluency	.4667**	.3226**	.1948	.3970**	.2640*
Comprehension	.4684**	.3744**	.1890	.3933**	.2715*
Clay (Stones)	.6136**	.3486**	.1068	.5328**	.4454**

* p < .01
** p < .001

Table 3: Correlations between scores on cognitive and metalinguistic tests administered at beginning of year and reading related scores at end of year

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