THE RELATIONSHIP BETWEEN FIRST GRADE CHILDREN'S
READING ACHIEVEMENT AND THEIR PERFORMANCE
ON SELECTED METALINGUISTIC TASKS

by

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Objectives

The purpose of this study was first to conceptualize specific metalinguistic abilities related to reading acquisition and to provide a conceptually defensible rationale for the measurement of those abilities by a battery of tests. A second major purpose was to gather empirical data concerning the relationship of the defined metalinguistic abilities and reading achievement in a group of first grade children. A third purpose was to examine the influence of gender on reading achievement and performance on metalinguistic tasks.

Procedure

A Test of Metalinguistic Awareness (TOMA) was developed and administered to 113 first grade subjects in March, 1981. In April, 1981, all subjects were administered the reading subtests of the Stanford Achievement Test Primary I. Factor analysis was used to determine the underlying factor structure of the TOMA. Multiple regression analyses were used to examine the relationships of the subtests of the TOMA to reading achievement.

Results

Factor analysis revealed a two factor structure for the TOMA interpreted as a Function factor and a Structure factor. The Function factor was discovered to account for the greatest amount of the variance in reading achievement ($R^2 = 0.24$).
Multiple regression analysis indicated that the entire TOMA accounted for about 31 percent of the variance in reading achievement and that TOMA Subtest 5 (Awareness of the language of instruction) alone accounted for 20 percent.

There were no significant differences in reading achievement or metalinguistic awareness as a function of gender.

Conclusions

It was concluded by the experimenter that metalinguistic awareness as measured by the TOMA is a significant though limited predictor of reading achievement in grade one pupils similar in character to those used in the study. It was further concluded that awareness of functional aspects of language may be more important to reading acquisition and achievement than is awareness of structural aspects of language.

The study concludes with a discussion of its limitations and suggestions for further research are presented.
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CHAPTER I

THE PROBLEM

Introduction

In most of our traffic with words we look through the substance to the meaning; the corporeal quality of the spoken word is paid very scant attention in bare, ordinary discourse, and properly so. (Britton, 1970, p. 78)

Although we properly pay scant attention to the "corporeal quality" of words in ordinary discourse and in fluent reading, there are notable exceptions to this usual, transparent use of language. There are situations in "our traffic with words" when we must be able to make language opaque and pay very close attention to its "corporeal quality". Primary among these situations may be that of learning to read for, in learning to read, the child is often involved in a conscious process of thinking about language and in dealing with it explicitly as an object of thought.

The ability to focus attention upon the form of language in and of itself, rather than merely as the vehicle by which meaning is conveyed, is variously known as linguistic awareness, metalinguistic knowledge, or metalinguistic awareness (Ryan, 1980). Metalinguistic awareness is not to be conceived as a
unitary concept; rather it is possible to consider various levels of metalinguistic awareness from the minimal level of spontaneous repair of one's own speech to articulate explanations of rules or the deviations from those rules (Clark, 1978).

In recent years, a number of investigators have suggested that it may be helpful and possibly even necessary for children to possess certain metalinguistic abilities prior to learning to read (e.g., Mattingly, 1972, 1979; Downing, 1979; Donaldson, 1978; Johns, 1980). This view is based on a conceptualization which views speaking and listening as primary linguistic activities while reading is regarded as a secondary and rather special sort of activity that relies critically upon the reader's awareness of those primary activities. Thus metalinguistic awareness is seen as a special kind of language performance which makes special cognitive demands and which may be helpful to the child in the acquisition of the derived, secondary processes of reading and writing.

**Purpose Of The Study**

The purpose of the present study is to attempt to define those metalinguistic abilities which seem conceptually most necessary to the acquisition of reading, and to explore the actual relationship between young children's ability to read and these supposed metalinguistic abilities. The specific formulation of the research questions will follow a review of literature pertinent to the larger question of the general relationship between metalinguistic awareness and early reading.
achievement.

The review of literature will draw on several fields of study which have contributed to the conceptualization of the investigation: (1) aspects of linguistic pragmatics (the theory of language use); (2) views on the relationship between speech and print; and (3) research on metalinguistic awareness per se. Each topic will be explored followed by the presentation of an integrating conceptual framework based, in part, on Vygotsky's (1962) theory of language development, Downing's (1979) cognitive clarity theory, and on a hierarchy of metalinguistic skills suggested by Clark (1978) and Ryan (1980).

Review Of Selected Literature

1. **Language structure versus language functions: Awareness of the uses of language.** The development of metalinguistic awareness in children can properly be viewed as an aspect of language development in general (Dale, 1976; deVilliers & deVilliers, 1978; Levelt et al., 1978). Theoreticians and researchers such as Bruner (1975, 1978), Halliday (1970, 1973), and Dore (1977) as well as linguist-educators such as Cazden (1970) and Tough (1977) place a great emphasis on the distinction between the **structure** of language and the **use** of language. They argue that the critical issue in language development is in pragmatic development rather than in structural linguistic development. Bruner (1975) has the following to say about the issue of structure vs. function in language:

   *It has become increasingly customary in the past*
several decades to consider language as a code, a set of rules by which grammatical utterances are produced and in terms of which they are comprehended in order to extract their meaning. So, whilst we have in the past decades learned much about the STRUCTURE of language, we have perhaps overlooked important considerations about its FUNCTIONS. Our oversight has, I think, turned our attention away from how language is used. And since the uses of language are, I believe, crucial to the understanding of how language is acquired, how it is INITIALLY used, the study of language acquisition has been distorted. (p. 1)

Dore (1977) and Halliday (1973) agree with Bruner that the concept of function in language has not received sufficient attention in language acquisition studies. According to Halliday, children know intuitively what language is because they come to know what it does. He described language development as a process whereby children gradually "learn how to mean". Their attempts to construct meaning are characterized by making their language express meaning. Before children enter school they have made many demands on their language and have met with considerable success in using it for their own purposes. Thus children bring to school their knowledge of the ways language can be used and considerable experience in using it.

Joan Tough, building on the work of Halliday (1970, 1973), Bernstein, (1971, 1973) and others, has conducted research which clearly shows, however, that not all children use language for the same purposes (Tough, 1977). Her longitudinal study of the language development of children from age three to seven, included 24 each from "advantaged" and "disadvantaged" backgrounds. These categories were based on the father's
occupation and an interview to assess the quality of linguistic fostering provided in the home. Each group of 24 was further divided at the outset with half attending nursery school and half at home. All four subgroups were equated on mean Stanford-Binet I. Q. (means = 129, 128.3, 127.5 and 125.3). Children's speech was recorded in a variety of contexts including play situations, interviews, story telling, problem solving, etc. Analyses of the children's language included measures such as length of utterances, noun phrase complexity, verb phrase complexity and language use (the latter based on a taxonomy of language use developed by Tough). Children in the disadvantaged groups made lower mean scores on the measures of structural complexity of language but when consideration was given to the range of each child's performance it was found that each disadvantaged child, on occasion, used language as complex as each advantaged child. According to Tough, the most significant conclusions of her study relate not so much to differences in the complexity of the forms of language used in the two groups, but in the difference in the kinds of views that the disadvantaged child seemed to take of his experiences. Basically, she argues that disadvantaged children tend not to impose the same complex meanings on events and situations as children who are at advantage. They are inclined to be less reflective, less apt to give explanations and justifications and less willing to project readily into the experiences of others. Tough points out that it is not the case that these children lack the resources of language to do these things, only that they are less inclined to do so because of a lack of motivation,
experience, and awareness. Thus it seems clear from Tough's work that children of equivalent intellectual ability are not equally disposed to use language in particular ways. These differences in language use arise not out of any deficiencies in the speaker's tacit understanding of the linguistic system, but seem to arise out of the cultural constraints which affect the speaker's communicative intent. In Hymes' (1972) conception, the difference is one of communicative competence and it seems that the linguistic learning environment plays a critical role in the understanding that the child develops of the uses to which language can be put. Entwistle (1971, 1979) has presented evidence suggesting that there are perhaps large differences among social and ethnic groups in cognitive style—such things as what is attended to, how problems are seen and solved, and how language is socialized. She suggests that "those children who learn to read best are those who need to in order to make sense of their lives" (Entwistle, 1971, p. 116). It is thus important for research attempting to relate the development of metalinguistic acquisition to beginning reading achievement to focus on how such awareness helps children "make sense of their lives," that is, how meaning develops through the child's awareness of the uses of language. Ultimately, the understanding that the child has of the uses of language will also affect his understanding of the nature and purposes of reading. In fact, understanding the nature and purposes of reading may impose upon a child requirements different from or in addition to those required of him to understand the uses of spoken language. This may be so because, just as speech and
print represent quite distinct forms of language, they also may be used for quite different purposes. It is to the question of the functional relationship between speech and print that this review now turns its attention.

2. Speech versus print. The notion that writing is merely speech written down has been at the heart of many reading programs which emphasize that the primary task of learning to read is "the process of transfer from auditory signs for language signals, which the child has already learned, to the new visual signs for the same signals" (Fries, 1963, p. 120). Fries takes for granted that the codes of written and spoken language are virtually the same and emphasizes the dependence of written language upon the spoken. Bloomfield, another linguist, does not only consider written language as secondary to and dependent upon spoken language, but is apt to disregard written language altogether from a scientific, linguistic point of view. "Writing is not language but merely a way of recording language by means of visible marks" (Bloomfield, 1933, p. 21).

Recently, however, the written language has been considered an object worthy of investigation independent of the corresponding spoken language. There has been a strong tendency among linguists towards stressing the differences between the two codes, differences not only on the phonemic-graphemic level but also as regards morphemics and syntax. Linguists have even claimed that written language should be considered as a more or less independent system.
Soderbergh (1977) quotes the Scandinavian linguist Allen as stating that "the connection existing between a spoken language and its written counterpart is not direct and simple but so complicated that the two media should be looked upon as different entities" (p. 6). Francis (1962) considers "that a written text may be something other than an inaccurate secondary visual representation of an actually or potentially spoken primary, in fact it may be a sort of primary itself, with its own structure deriving from a separate system having a history of its own, closely related to but not directly dependent upon the spoken language" (p. 15-16). Gleason (1965) states that "written English has its own grammar. It is not exactly like that of spoken English, though in broad outlines and many details that resemblance is close" (p. 109). Goodman and Goodman (1977) suggest that oral and written language differ because of differences in function between the two. Oral language tends to be used for face-to-face communication while written language is used primarily to communicate over time and space. Thus

Oral language is likely to be strongly supported by the context in which it is used; written language is more likely to be abstracted from the situations with which it deals. Written language must include more referents and create its own context minimally supplemented by illustrations. Written language can be polished and perfected before it is read; therefore, it tends to be more formal, deliberate, and constrained than oral language. (p. 322)
Marquardt (1964) suggests other ways in which the language of print is different from the language of speech. He does so by suggesting that readers for children, although attempting to reflect children's speech, often convey more of the characteristics of spoken prose than of conversation. He elaborates nine major differences between spoken prose and ordinary conversation:

1. The intonation patterns of spoken prose are highly standardized, those of conversation are not.

2. Spoken prose is even in tempo; conversation is not.

3. The pauses in spoken prose are closely related to the grammatical structure of those sentences. In conversation they are frequently unpredictable.

4. Spoken prose does not rely on gestures and grimaces as much as does conversation.

5. In spoken prose stammers and errors in articulation are rare and conspicuous; in conversation they attract little attention.

6. Spoken prose has fewer phonetically different speech sounds than conversation has.

7. Conversation is generally more structurally incomplete than spoken prose because more of the meaning of the former is derived from context.

8. Conversation has a great deal of repetition, whereas spoken prose has little.

9. Conversation has many apparently meaningless words and phrases which serve to establish rapport between speakers and to act as silence fillers while the speaker thinks of what to say next.

(Summarized from Marquardt, 1964, p. 217)
Wilkinson (1970) mentions some similar differences between spoken and written language: spoken language is characterized by its greater redundancy, by the presence of 'echo-sounding' devices ("You know him, don't you?"), and by the presence of 'stabilizers' (hesitations, pauses, and words like "er" and "mm").

Wardhaugh (1971) adds the following as differences between language acquisition and beginning reading: language is acquired gradually whereas learning to read often has a sudden onset for children; language is acquired in a relatively relaxed, anxiety-free context whereas the anxiety in the context in which learning to read takes place may be quite high for parents, teacher, and child. Reading instruction is very formal and deliberate; language, however, is learned informally and unconsciously from a wide range of stimuli. The usual reinforcements experienced by literate adults for reading may be irrelevant for many children in the beginning stages; the benefits of learning to speak are too numerous and obvious to mention.

Vygotsky (1962) writes as follows on the differences in function between oral language and written speech:

Written speech is a separate linguistic function, differing from oral speech in both structure and mode of functioning. Even its minimal development requires a high level of abstraction.... Writing is ... speech without an interlocutor, addressed to an absent or imaginary person or to no one in particular — a situation new and strange to the child. [The child thus has only a vague idea of the usefulness of writing.] Writing ... requires deliberate analytical action on the part of the child. In speaking, he is hardly conscious of
the mental operations he performs and of the sounds he pronounces. In writing, he must take cognizance of the sound structure of each word, dissect it, and reproduce it in alphabetical symbols which he must have studied and memorized before. (pp. 98-99)

These comments relate specifically to the differences between writing and speaking but some of the same functional differences certainly apply to speech and reading as well. Downing (1979) suggests, in fact, that understanding the differences between speech and print may be critical for the child learning to read and this conception plays a major role in his cognitive clarity theory of learning to read.

If a child is to learn to read with a minimum of frustration it would seem that he must be or become aware of the structural as well as the functional differences between his oral language and the language of print to which he is to be introduced. Linguistic awareness or, more properly, metalinguistic awareness would seem to be a requirement if the child is to come to understand the purposes of language in both its oral and written forms. Cazden (1972) defines metalinguistic awareness as "the ability to reflect upon language as well as to comprehend and produce it" (p. 303)

The question of consciousness and metalinguistic awareness has been the subject of vigorous debate as has the precise terminology employed to denote the concept. In a recent paper Mattingly (1979) has proposed that linguistic awareness is not so much a matter of consciousness of grammatical knowledge itself, but of access to grammatical knowledge. His view thus
asserts that speakers can reflect on language and make judgements about, say, the grammaticality of a sentence, without being able to state the grammatical rules that operate to produce it. Speakers recognize when the rules are broken, although they have no consciousness of the rules themselves. C. Chomsky (1979) and Gleitman (1979) have responded to Mattingly's view by pointing out that his notion of access lies somewhere at the beginning of a consciousness continuum that culminates in a fully conscious and verbalizable form of language awareness. Thus C. Chomsky (1979) argues that access to a grammatical rule is simply the "potential for forming conscious judgements based on that rule" (p. 2) and that a "speaker must put his access to use and become conscious of linguistic properties of his language in order to qualify as linguistically aware" (p. 3).

The various terms employed for the ability to reflect on language as well as to comprehend and produce it indicate the relative emphasis that various linguists place on the role of consciousness and verbalizability in language awareness. Thus some (e.g., Mattingly, 1972, 1979) simply use the term "linguistic awareness"; others (e.g., Cazden, 1972; Chomsky, 1979; Gleitman, 1979) use the prefix "meta" to indicate the "extra" (meta = Greek - beyond) dimension of awareness involved in the ability to reflect on language as well as use it. Others have proposed terms to specify finer gradations of consciousness involved in linguistic awareness. Thus Ferguson (1981) suggests the term "epilinguistic awareness" to denote the child's ability to operate upon his language without being fully conscious of what he is doing. This notion may be similar to Mattingly's
concept of "access" and is exemplified by the ability of some children as young as four years to attempt phonological representation in their writing (so-called invented spellings - Read, 1975) without being able to fully explain their representations. DeStefano (1979) proposes the term "extralinguistic awareness" to cover "knowledge about events, relationships, objects, individuals, etc., and expectation and presuppositions, as they are called in pragmatics, about how all those factors interact appropriately ... with grammatical and phonological awareness in listening and reading comprehension" (p. 4).

The term adopted for this study is "metalinguistic awareness" and the scope of language behaviours which it encompasses as they relate to reading acquisition will be detailed at the conclusion of this literature review.

The remainder of this review will examine, in detail, the concept of metalinguistic awareness and the empirical evidence of its possible relation to reading acquisition.

3. Metalinguistic awareness: Its implication for learning to read. The first signs of an ability to reflect upon language begin to appear in some children at a very early age. Clark (1978), in a major review of evidence of metalinguistic awareness in children, lists the following signs as appearing from about age two onwards:
(i) Spontaneous corrections of one's own pronunciations, word forms, word order, and even choice of language in case of bilinguals;

(ii) Questions about the right words, the right pronunciation, and the appropriate speech style;

(iii) Comments on the speech of others: their pronunciation, their accent and the languages they speak;

(iv) Comments on and play with different linguistic units, segmenting words into syllables and sounds, making up etymologies, rhyming, and punning;

(v) Judgements of linguistic structure and function, deciding what utterances mean, whether they are appropriate or polite, whether they are grammatical;

(vi) Questions about other languages and about languages in general.

Cazden (1974) comments on the role of metalinguistic awareness in many children's games, and notes that children as young as three years of age delight in name calling and rhyming games. As Chukovsky (1963) points out, this playing with language indicates that the child is beginning to understand his language in a conscious manner since "only those ideas can become toys for him whose proper relation to reality is firmly known to him" (p. 103). Name-calling demonstrates the child's understanding of the arbitrary nature of the relationship between a word and its referent, an understanding often absent in young children (Vygotsky 1962, p. 128-130). The manipulation of simple sounds at a very early age (Weir, 1962) and a child's increasing sophistication in this ability as in a game such as Pig Latin suggests the child's growing ability in auditory discrimination and analysis of words into component sounds. Savin (1972) reports that a common characteristic of his intermediate grade poor readers was their inability to master
Pig Latin even though they were often highly motivated to learn such a 'secret' language. He suggests that it may be that such students have not developed the metalinguistic ability to reflect upon the sounds in the words they speak and hear.

Cazden (1972) lists a number of other examples of metalinguistic awareness in children. One such example is the child's growing awareness of the structure of his own spoken sentences. Work by MacKay and Thompson (1968) suggests that children go through several stages in their awareness of words in a sentence. Given a 'word folder' with a preselected store of words, plus a stand to display them on, five-year-old children characteristically begin by simply listing words with no apparent link, and read them as isolated words. Soon however the child begins to compose on his stand telegraphic sentences, e.g., "Children school", but read them as complete sentences, e.g., "The children go to school". Next the child begins to realize that words are missing from these sentences and begins to insert them in the proper place. Thus it seems that five and six-year-old children "recapitulate at the metalinguistic level of conscious awareness the development of telegraphic to complete sentence that they went through when they were two to three years old at the linguistic level of non-conscious oral speech" (Cazden, 1972, p. 87).

Another evidence of children's growing metalinguistic awareness is their increasing ability to discuss the meaning of words or give synonyms and paraphrases in addition to being simply able to use words correctly. Anglin (1970) found that young children (age five to ten) tend to sort words into
'syntagmatic' categories (e.g., dark - night) and not until much later (age 12 -15) did many children group paradigmatically by part of speech (e.g., dark - light). Thus another aspect of word knowledge which seems to shift from non-conscious to conscious awareness is part-of-speech (or form-class) membership.

Gleitman, Gleitman, and Shipley (1972) and de Villiers and de Villiers (1974) have investigated young children's awareness of syntactic and semantic properties of language. Rudiments of metalinguistic functioning were shown to exist in two-year olds, who gave judgements of grammaticalness in a role-modelling situation. Generally, correct usage of various grammatical forms greatly preceded the ability to either recognize or correct deviant forms. The ability to judge the correctness of deviant sentences greatly improved between the ages of five and eight.

Read (1975) studied the manner in which children categorize speech sounds as evidenced by their creation of certain nonstandard spellings. He discovered that children categorize speech sounds in unexpected but phonetically justified ways and found that children as young as age five can provide judgements of these categorizations.

Metalinguistic awareness, then, is a special kind of language performance, one which makes special cognitive demands. The concern of educators with this particular kind of language performance comes from increasing arguments that it is at least helpful - and may be critically important - not so much in the primary processes of speaking and hearing, as in what may be
considered the derived or secondary processes of reading and writing.

The idea that such awareness is related to literacy is not new. More than forty-five years ago Vygotsky's (1962) observations were that literacy depends on, and in turn contributes to, making previously unconscious or tacit knowledge more conscious. In Vygotsky's words (1962):

The child does have command of grammar in his native tongue long before he enters school, but it is unconscious, like the phonetic composition of words. The same is true of grammar. The child uses the correct case or tense within a sentence but cannot decline or conjugate a word on request. Just as the child realizes for the first time in learning to write that the word "Moscow" consists of the sound m-o-s-c-o-w and learns to pronounce each one separately, he also learns to construct sentences, to do consciously what he has been doing unconsciously in speaking. (pp. 100 - 101)

Mattingly (1972) has focussed directly on the differences that must exist between learning to speak and learning to read. Everyone learns to speak, but not all languages have written forms; even when they do, not all speakers become literate and if they do, deliberate instruction is more apt to be required. Why? Mattingly, in his chapter on "Reading and Linguistic Process and Linguistic Awareness" says:

Speaking and listening are primary linguistic activities; reading is a secondary and rather special sort of activity that relies critically upon the reader's awareness of those primary activities. (p. 103)
It may be instructive to quote at some length from further selections of this paper by Mattingly since it forms the theoretical basis for much of the discussion of linguistic (metalinguistic) awareness in the literature after 1972. Mattingly suggests that the conscious appreciation of aspects of linguistic structure, especially of structural units and rules at the morphonemic and phonological levels is quite remarkable when we consider how little introspective awareness we have of the intermediate stages of other forms of maturationally acquired motor and perceptual behaviour, for example, walking and seeing. (p. 139)

Why should reading be, by comparison with listening, so perilous a process? First we have suggested that reading depends ultimately on linguistic awareness and that the degree of this awareness varies considerably from person to person. A further source of reading difficulty is that written text is a grosser and far less redundant representation than speech.

Reading is seen not as a parallel activity in the visual mode to speech perception in the auditory mode; there are differences between the two activities that cannot be explained in terms of the difference in modality. They can be explained only if we view reading as a deliberately acquired language-based skill, dependent upon the speaker-hearer’s awareness of certain aspects of primary linguistic activity. By virtue of this linguistic awareness, written text imitates the synthetic linguistic process common to both reading and speech, enabling the reader to get the writer’s message and so to recognize what has been written (pp. 144-145). [See Figure 1 for a visual model of this conception]
Fig. 1  A Schematic Interpretation of Mattingly's (1972) Model of Linguistic Awareness
What then is the empirical evidence that reading is a deliberately acquired language-based-skill, dependent upon the speaker-hearer's awareness of certain aspects of primary linguistic activity?

Studies by a number of investigators working out of the Haskins Laboratories in the United States have demonstrated that a child's perception of speech segments does not coincide with the unit phoneme as it is usually understood. Liberman et al. (1967) found that phoneme boundaries are often coarticulated. For example, a consonant may be merged with a related vowel. In the case of 'bat', for instance, the initial and final consonants are folded into the medial vowels, with the result that information about successive segments is transmitted more or less simultaneously on the same parts of the sound. In that sense, the syllable 'bat', which has three phonemic segments, has but one acoustic segment. Thus the acoustic properties of 'bat' do not allow for a precise demarcation of the phoneme boundaries. In other words, an understanding of the relationship between writing and speech in alphabetic languages such as English depends on 1) an awareness of the sound structure of the language and 2) the development of abstract concepts that are the basis of the logic of the orthography. The first of these factors is described by Shankweiler and Liberman (1976) as 'tacit knowledge'. They suggest that tacit knowledge is sufficient for comprehension of the spoken message but that reading and writing, on the other hand, demand an additional analytic capability of analysing words as strings of phonemes. This capacity is, of course, part of what Mattingly
Liberman (1973) investigated the relationship between young beginning reader's ability to segment speech into phonemes and their achievement in reading. Children in first grade (after appropriate pre-training) were asked to tap out the number of phonemes in a word. A reading achievement (word recognition) test in second grade showed that one-half of the lowest third of the class in reading had failed the phoneme segmentation test, whereas there were no failures among pupils in the top third of the class in reading.

Calfee, Lindamood, and Lindamood (1973) tested children from kindergarten upwards to grade twelve on their ability to match phonetic segments in speech with a sequence of coloured blocks to represent the auditory stimuli. The same children's reading and spelling achievements were also tested. More than fifty per cent of the total variance in reading ability was found to be predictable from pupils' scores on the phonetic segmentation task.

M. Clark (1976) made an intensive study of thirty-two Scottish children who were found to be able to read fluently when they started school at age five. A number of her observations pointed to these children's keen awareness of those aspects of language that are relevant to the task of learning to read. Clark notes in particular that these children possessed what seemed to be an exceptional memory for sounds in sequence. In a later paper (M. Clark, 1979) commenting on this same group of children, Clark states that "their speech and auditory discrimination was outstanding. Particularly impressive was
their ability to grasp such tasks and to process material aurally, such as digits, sentences, etc." (p. 4)

As in the case of phonemic discrimination cited above, Holden and MacGinitie (1972) have provided evidence that children of kindergarten age are not aware of the segmentation of their own speech into all the word units they are actually using. In one task, they asked kindergarten children to repeat a sentence and then repeat it again, tapping one in a line of poker chips for each word. They discovered that young children are more aware of content words, especially nouns and verbs, than of function words—articles, prepositions, auxiliaries, etc. On the tapping task, the children tended to attach a function word to the content word before or after it. So, for example, out of 24 responses to the test sentence *You have to go home*, 12 children segmented it: *You/ have to/ go/ home*, and five children segmented it: *You/ have/ to go/ home*.

Holden and MacGinitie then made the task more difficult by asking each child, after each item, to count the chips he has tapped and find the written sentence, one out of a set of four, that had the correct number of visually separated units. Of 24 children, none was correct four out of five times in both segmenting the sentence conventionally and identifying the written version which was congruent with that segmentation. Nine of the children could, however, identify 80 percent of the sentences which were congruent with their own unconventional forms of segmentation—e.g., *Red and green/ balloons/ popped*. 
As Holden and MacGinitie stress in their discussion, it is clear that children beginning school are still developing an awareness of aspects of their own speech which many teachers probably assume they have, and which they probably do in fact need in order to make sense out of instructions in phonics.

There are, however, suggestions that the Holden and MacGinitie techniques used to elicit information on young children's ability to isolate particular linguistic units often seem to have been too difficult for children to follow (see Clark, 1978, p. 27). Lundberg (1978) concurs by indicating that undue complexity in the Holden and MacGinitie tasks is due to the child having to perform the simultaneous tasks of repeating utterances and identifying their word boundaries. Furthermore, he suggests that the rhythmic pattern of sentences governs the marking behaviour of many children. Since content words are given more stress it is possible that this fact causes children to mark contentives and ignore functors.

Fox and Routh (1975) developed techniques which they claim avoid the above mentioned problems by asking children to repeat progressively smaller and smaller "bits" of sentences given them by the experimentor. Given Peter fell, for example, the children would be asked to "say just a little bit of it", namely just Peter or fell. With this technique, Fox and Routh found that four-year olds were almost perfect in breaking sentences down into words and syllables. Segmenting syllables into sounds was much harder although there was improvement with age. Fox and Routh found that there was a significant correlation between reading achievement and the ability to segment sentences into
various smaller units, though they admitted to the rather limited nature of the reading achievement measures employed.

There is further evidence that poor readers have particular difficulty with auditory segmentation tasks and even with tasks requiring only partial segmentation such as rhyming which does not seem to require a very analytical attitude. Johnson and Myklebust (1967) reported clinical observations of dyslexic children who even at the age of 12 were insensitive to rhyme, although they seemed to have normal hearing and speech.

The awareness of other morpho-phonemic features of English also seems to be differentially distributed among children on the basis of age, reading ability, and length of school attendance. Ehri (1975) found that preschoolers and kindergarten children showed little awareness of the independent lexical identity of function words and that preschool and kindergarten children performed less adequately than first grade readers on a number of other measures of lexical knowledge. The older children were better able to segment sentences into words and syllables, embed words in verbal contexts and identify the word distinguishing two otherwise identical sentences. In addition, the first graders were better able to shift from one unit of analysis to another as in switching from syllable identification to word identification. Ehri suggested that the superiority of the first graders on these tasks may in fact be a consequence of reading instruction.
Another approach to the study of the significance of metalinguistic awareness to learning to read is in the investigation of children's understanding and use of such technical terms as 'word', 'sound', 'letter', 'number', 'reading', 'writing', and so on.

Downing (1970, 1976, 1979) in reviewing the literature, considered that much of the difficulty children have in learning to read is related to "cognitive confusion", a term he borrows from Vernon (1957) who concluded that "the fundamental and basic characteristic of reading disability appears to be cognitive confusion and lack of system" (p. 307). Reid's (1966) study of twelve Scottish five-year-olds was the first to show how children's conceptions of reading and language develop during their first year of schooling. Initially, Reid found that the children lacked any idea of the purpose and use of written language and they exhibited considerable confusion about the meaning of such common linguistic terms as 'word', 'letter', 'sound', etc. Downing (1970) replicated Reid's study in England and confirmed her results. After appropriate pre-training in the experimental procedure, Downing's five-year-olds were asked to say whether each of a series of auditory stimuli were words: a non-verbal sound, a (meaningless) vowel phoneme, a single word, a phrase and a sentence. No child's category for 'a word' coincided with the concept of a spoken word usually held by teachers. Some children made only random guesses, some excluded non-verbal sounds, and some thought that only the word, the phrase, and the sentence were 'a word'. The experiment was repeated three times during the first school year, but although
some improvements were noted, no child achieved what teachers would usually consider to be a concept of 'a spoken word' by the end of the year. Similar results were obtained for the term 'sound', although some students understood it as meaning a phoneme by the final testing session. A Canadian replication of this study confirmed these children's similar confusion about the term 'word' (Downing & Oliver, 1974).

Beginners are no less confused about the terms used for units of written language such as 'word', 'letter', 'number', and so on. For example, Meltzer and Hearse (1969) asked American kindergartners and first-graders to "cut off a word" with scissors from a sentence printed on a card. Sometimes the word was cut off, but often 'a word' for these children were two words, and sometimes part of a word. Papandropoulou and Sinclair's (1974) research provides some insight into the way in which children attempt to understand these abstract linguistic concepts. When asked "to say a long and a short word" the youngest children (4.5 to 5.5 years) responded with names for long and large objects or words for actions that take a long time.

Francis' (1973) study shows how a clear understanding of linguistic concepts is related to learning to read. She found that for her fifty English primary-school boys and girls, the highest correlation was between reading achievement and knowledge of technical linguistic vocabulary, even with general vocabulary knowledge controlled. Her findings suggested that:

the children had never thought to analyse speech, but in learning to read had been forced to recognize units and sub-divisions. The use of words like 'letter', 'word' and 'sentence' in
teaching was not so much a direct aid to instruction but a challenge to find their meaning (p. 22).

Evanechko et al. (1973) developed a test, The Technical Language of Literacy Test, which was designed to measure the relationship between the children's understanding of technical linguistic concepts and reading achievement. This test and its subsequent revision by Ayers et al. (1977) proved to be highly correlated with more traditional tests of reading readiness, notably those of letter-name knowledge and auditory discrimination. Interestingly, the test also found a significant difference favouring the upper socio-economic levels in comparison with lower levels (Downing et al., 1977). Downing (1979) suggests that the intercorrelations of the Technical Language of Literacy Test with other reading readiness measures are due to the tapping of similar underlying basic factors - the child's cognitive clarity or confusion about concepts of literacy instruction.

A number of recent studies lend support to this contention by Downing. Meyer and Paris (1978), in an interview study, discovered that many young children (8 - 12 years old) were unaware of many important parameters of reading and were unable to specify characteristics of proficient readers. Evans, Taylor, and Blum (1979) as well as Johns (1980) demonstrated that certain linguistic awareness tasks do predict reading achievement, particularly those tasks which stress the interrelationship between oral and written codes rather than those which tap characteristics specific to the writing system.
One aspect of both the oral and written code that appears to be a significant factor in reading achievement is a child's awareness and understanding of connectives (Robertson, 1968). Rodgers (1974) reported on the ability of seventy-four grade one children to comprehend twenty selected connectives. He found that two-thirds of the children did not know: in spite of, yet, for (as because), although, nevertheless, still, thus, however. Half of the children were unfamiliar with: although (when it occurred in a medial position within a sentence), consequently, unfortunately, even if, because (also in medial sentence position). Connectives known by two-thirds of the children were: and, so, but, if, because. In another study (Rodgers et al., 1974) it was shown that an understanding of the use of these connectives is related to reading performance as measured by the Cooperative Primary Tests.

The last section of this review suggests that there are indications, from a wide range of investigations, that beginning readers are confused about the communication process and about concepts used in reading instruction. Finally, there is growing evidence that this confusion is an important factor in success or failure in learning to read.

**Metalinguistic Awareness And Metacognition**

It may be argued that language awareness is in fact an aspect of a broader area of development labelled metacognition. Flavell (1976) has characterized this as one's knowledge about one's own cognitive processes and their products:

I am engaging in metacognition (metamemory,
metalearning, meta-attention, metalanguage, or whatever) if I notice that I'm having more trouble learning A than B; if it strikes me that I should doublecheck C before accepting it as fact; if it occurs to me that I had better scrutinize each and every alternative in any multiple choice situation before deciding which is the best one; if I sense that I had better make a note of D because I may forget it...
(p. 232)

The major concern of studies in developmental metacognition has been with the regulative role of metacognition in remembering, learning, attending, or carrying out actions in order to achieve particular goals. Many of these same issues have been addressed by studies in metalinguistic awareness. Clearly the two are closely intertwined. Yet there seems to be at least one skill of metalinguistic awareness, that of reflecting on the product of an utterance (See Table 1), in which children may be doing something that is never called for in other forms of metacognition. With language, it is possible to reflect on language structure independent of its actual use. (It is, obviously, not possible to reflect on thought without thinking). Such "disembedded" reflection on language (Donaldson, 1978) is very common in many methods of reading instruction. Children are asked to attend to and identify specific linguistic units - anything from a sound up to a sentence, and to understand and provide definitions of many technical terms which are part of what Downing (1976) calls the "reading instruction register" which contributes to the "cognitive confusion" (Downing, 1979) that children often experience during beginning reading instruction.
Summary

This review has attempted to show how specific aspects of language development may be critical to the child's understanding of the nature and purposes of the reading task. Donaldson (1978) provides a clear summary of the main argument when she says:

In the early stages, before the child has developed a full awareness of language, language is embedded for him in the flow of events which accompany it.

(The child's) thinking is directed outwards on to the real, meaningful, shifting, distracting world. What is going to be required for success in our educational system is that he should learn to turn language and thought in upon themselves. He must become able to direct his own thought processes in a thoughtful manner. He must become able not just to talk but to choose what he will say, not just to interpret but to weigh possible interpretations. His conceptual system must expand in the direction of increasing ability to represent itself. He must become capable of manipulating symbols.

Now the principle symbolic system to which the preschool child has access is oral language. So the first step is the step of conceptualizing language - becoming aware of it as a separate structure, freeing it from its embeddedness in events.(pp. 88-89)

The first section of this review has attempted to show how varying degrees of children's awareness of the functions of language predispose some children to come to school with this step already taken - or at least begun - while others have not yet begun to reflect at all on their language and have little awareness of its purposes.
As literate adults, we have become so accustomed to the written word that we seldom stop to think of how it differs from the spoken one. These differences were highlighted in the second section of this review with the implication that an awareness of the special characteristics of written discourse may be related to reading acquisition and performance.

Finally, the review dealt with metalinguistic awareness as a crucial aspect of functional language development which makes special cognitive demands on the child and which may be critically related to early reading achievement.

**Conceptual Framework Of The Problem**

The general problem of this investigation is whether metalinguistic awareness is significantly related to reading achievement in first grade children. The review of literature has suggested many possible aspects of metalinguistic awareness and it is now necessary to define those which may be thought most specifically related to reading acquisition. To do this a theoretically defensible conceptual framework of the relationship between reading acquisition and metalinguistic awareness is presented. The conceptual framework is based, in part, on Vygotsky's (1962) theory of language development, Downing's (1979) cognitive clarity theory of reading and on a hierarchy of metalinguistic skills suggested by E. Clark (1978) and supported by Ryan (1980).
Vygotsky (1962) claimed that, in order to become literate, an individual must first come to the awareness of words as arbitrary symbols. This awareness may be regarded, in fact, as a prerequisite to achieving any of the forms of metalinguistic awareness that may be required for the acquisition of reading. As Vygotsky (1962) states:

The child must learn to distinguish between semantics and phonetics and understand the nature of the difference. At first he uses verbal forms and meanings without being conscious of them as being separate. The word to the child is an integral part of the object it denotes.... Simple experiments show that preschool children "explain" the names of objects by their attributes.... The fusion of the two planes of speech, semantic and vocal, begins to break down as the child grows older, and the distance between them gradually increases. Each stage in the development of word meanings has its own specific interrelation of the two planes. A child's ability to communicate through language is directly related to the differentiation of word meanings in his speech and consciousness.... Only when this development is completed does the child become fully able to formulate his own thought and to understand the speech of others. (pp.128-130)

Thus the awareness of words as arbitrary symbols would seem primary to the child's acquisition of reading and failure to develop such awareness may explain some of the difficulty young children have of making sense of the arbitrary symbolic relationship printed words have to their experiential world.

Secondly, as the literature review has tried to show, a child's awareness of the function of language, as well as his awareness of the differences between spoken and written language, may be an important factor in his acquisition of reading. John Downing (1979) has proposed a theory of learning to read which emphasizes the role of metalinguistic awareness
increasing with age and instruction. His cognitive clarity theory is summarized in eight postulates of which postulates 3-6 are of particular relevance to this study. These postulates are:

3. The learning to read process consists of the rediscovery of a) the functions and b) the coding rules of the writing system;

4. Their rediscovery depends on the learner's linguistic awareness of the same features of communication and language as were accessible to the creators of the writing system;

5. Children approach the task of reading instruction in a normal state of cognitive confusion which slowly develops into increasing cognitive clarity about the functions and features of language;

6. Under reasonably good conditions, children work themselves out of the initial state of cognitive confusion into increasing cognitive clarity about the functions and features of language. (p. 37)

Clark (1978) has provided a review of research on developmental aspects of children's awareness of language. She has summarized her findings by suggesting a developmental hierarchy of growth in metalinguistic awareness. The hierarchy commences with a child's spontaneous repair of speech to his articulate explanations of rules or the deviations from those rules (see Table 1).
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<td>Metacognitive Skills And Awareness Of Language</td>
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1. Monitoring one's on-going utterances  
   (a) Repairing one's own speech spontaneously  
   (b) Practicing sounds, words, and sentences  
   (c) Adjusting one's speech to the age and status (and language spoken) of the listener  

2. Checking the results of an utterance  
   (a) Seeing whether the listener has understood or not (and then repairing when necessary)  
   (b) Commenting on the utterances of oneself and others  
   (c) Correcting the utterances of others  

3. Testing for reality  
   (a) Deciding whether a word or description works or not (and if not, trying another)  

4. Deliberately trying to learn  
   (a) Practicing new sounds, words, and sentences  
   (b) Role-playing and "doing the voices" for different roles  

5. Predicting the consequences of using inflections, words, phrases or sentences  
   (a) Applying inflections to "new" words out of context  
   (b) Judging, out of context, which utterance would be politer, or which more appropriate for a specific speaker  
   (c) Correcting word order and wording in sentences earlier judged "silly"  

6. Reflecting on the product of an utterance  
   (a) Identifying linguistic units (phrases, words, syllables, sounds)  
   (b) Providing definitions  
   (c) Constructing puns and riddles  
   (d) Explaining why certain sentences are possible and how they should be interpreted  

Clark's review does not specifically focus on metalinguistic awareness as it relates to reading acquisition but a review by Ryan (1980) does. Ryan concurs with Clark's ranking of the metalinguistic hierarchy by suggesting a progression from the minimal level of spontaneous rule-following behaviour, to the use of language strategies in processing distorted sentences, to categorical judgements regarding grammaticality, and finally to articulate explanations of rules or particular deviations from those rules. (p. 41)

Ryan's review concludes with a prediction of the kinds of metalinguistic tasks that will probably be most strongly associated with reading performance,

Tasks such as word segmentation and sentence repetition [rather than] with the more demanding tasks such as syntactic corrections or explicit articulation of language rules. (p. 55)

Ryan suggests that structural knowledge must be accessible for deliberate application but it need not be totally conscious and verbalized by the child. Ryan concludes her paper with a proposal that "major research efforts be directed towards illuminating the relationships between a young child's reading level and his ability in metalinguistic tasks which demand various degrees of awareness" (p. 55). This study proposes to be a contribution toward such an effort.

Table 2 presents six metalinguistic abilities which are here proposed to be either necessary or extremely helpful to acquisition of reading. These six abilities involve awarenesses specifically related to Vygotsky's and Downing's theories as detailed above and follow conceptually from the implications of
the reviews of E. Clark and Ryan also discussed above. Each of
the six abilities will be assessed by means of a test, the first
of which has been designed by the author and the remaining five
taken from existing test instruments or previously researched
activities. For ease of reference this battery of
metalinguistic tasks will be called the Test of Metalinguistic
Awareness (TOMA). The exact nature of the TOMA will be
described in Chapter II following the statement of the problem
and research hypotheses. Chapter II will also provide a clear
rationale for the inclusion of each subtest in the TOMA battery.
Table 2
Metalinguistic Abilities Proposed To Relate To Reading Acquisition

1. Awareness of words as arbitrary symbols - Vygotsky (1934/1962)
   Test designed by R.W. Bruinsma
2. Awareness of the purposes of literacy - Downing, 1979
   Subtest B1 "Understanding Literacy Functions" from the Test of Linguistic Awareness in Reading Readiness - LARR (Ayers et al., 1977)
3. Awareness of the structure of language - Clark, 1978 Level 5
   "Grammatic Completion" subtest of the Test of Language Development (TOLD) (Newcomer & Hamill, 1977)
4. Awareness of language units - Clark, 1978 Level 6
   Analysis of spoken language into words, syllables and phonemes (Fox & Routh, 1975)
5. Awareness of the language of instruction - Downing, 1979
   Subtest C2 "Technical Language of Literacy" from the LARR (Ayers et al., 1977)
6. Awareness of functional and logical relationships in language - after Watts, 1944
   "Connectives Test" (Rodgers, Slade, & Conry, 1974)
Statement Of The Problem

The main problem of the investigation may be stated in general terms as follows:

Is metalinguistic awareness significantly related to reading achievement in first grade children?

Metalinguistic awareness was measured by the TOMA and reading achievement was measured by the reading subtests of the Stanford Achievement Test Primary Level I. Operationally then, the problem may be stated as follows:

Are the differences in the abilities of first grade children to perform the metalinguistic tasks of the TOMA significantly related to differences in reading achievement on the reading subtests of the Stanford Achievement Test Primary Level I (RSAT) by these same children?

The nature of the relationships between first grade children's performance on the TOMA and the RSAT was explored in several ways as discussed in Chapter II under the heading of Statistical Analyses.

A number of subsidiary questions were also considered in this study specifically as they related to sex differences in reading performance and performance on metalinguistic tasks.

There exists a large body of research evidence which suggests that in North America at least, primary grade girls tend to be superior to primary grade boys in reading achievement (see for e.g., Dykstra & Tinney, 1969; Johnson, 1973 - 1974). Little of the research on the development of metalinguistic awareness has focussed on sex differences but it was conjectured
that, if metalinguistic abilities underlie reading acquisition, then girls may also show superior ability in performance on metalinguistic tasks. This conjecture was examined in this study as outlined in Chapter II which follows.
CHAPTER II

RESEARCH DESIGN AND METHODOLOGY

This investigation related measures of selected metalinguistic abilities of first grade children to reading achievement during the Spring of the grade one year. The basic design employed in the study was correlational utilizing multiple regression analysis. Factor analytic procedures were used to further elucidate the relationship between metalinguistic measures and reading achievement measures.

The design and methodology are discussed in this chapter with respect to the following:

1 Subjects
2 Instrumentation
3 Data collection procedures
4 Statistical procedures

Subjects

There were 113 subjects used in this study (64 males and 49 females). This comprised the majority of students of five grade one classes selected from a mid-sized school district in the central Fraser Valley of British Columbia.

The five classes were selected by the Director of Instruction of the school district as representative of the district population. The subjects selected reflected the urban-rural mix of the school district as well as its multi-ethnic
composition. The predominant socioeconomic status of the sample was middle-class. No students for whom English is a second language were included in the sample.

Instrumentation

Metalinguistic awareness was measured by a Test of Metalinguistic Awareness (TOMA) which was compiled by the investigator (see Appendix A for a copy of the TOMA including instructions for administration and scoring). Reading achievement was measured by the reading subtests (A and B) of the Stanford Achievement Test Primary Level I Form A (Madden et al., 1973). The following will describe each subtest of the TOMA with a brief statement of the rationale for its inclusion within the battery. A description of the reading achievement measures concludes this section.

Test Of Metalinguistic Awareness (TOMA)

Subtest 1: Awareness of words as arbitrary symbols. This subtest is based on tasks suggested by Vygotsky (1962) and involves an activity in which children are asked to exchange names of two common animals (cow and dog). Subsequent questions attempt to determine whether the children can transfer characteristic features of the animals to the new names or whether, as in the case with Vygotsky's young children, an exchange of names will mean an exchange of features. Vygotsky suggests that a primary prerequisite for the acquisition of
literacy is an awareness on the part of the child that words are arbitrary symbols. As Vygotsky (1962) says:

The child must learn to distinguish between semantics and phonetics and understand the nature of the difference. At first he uses verbal forms and meanings without being conscious of them as being separate. The word to the child is an integral part of the object it denotes.... The fusion of the two planes of speech, semantic and vocal, begins to break down as the child grows older.... A child's ability to communicate through language is directly related to the differentiation of word meanings in his speech consciousness.... Only when this development is completed does the child become fully able to formulate his own thought and to understand the speech of others. (pp. 128 - 130)

Subtest 1 is designed to test the hypothesis that an awareness of words as arbitrary symbols is primary to the child's acquisition of reading. The subtest has a reliability of 0.77 as calculated from the research data using the K-R 21 formula (Stodola & Stordahl, 1967).

Subtest 2: Awareness of the purposes of literacy.
Subtest 2 is taken from the Test of Linguistic Awareness in Reading Readiness (LARR) (Ayers et al., 1977). In the LARR the subtest is entitled "Understanding Literacy Function" and is designed to discover whether or not the child understands the purposes of literacy. In the test the child is to circle persons who are enjoying a book, learning that there is a sale on, finding what music to listen to, telling someone a story and similar literacy behaviours. As previously discussed in the literature review, Downing's cognitive clarity theory of learning to read posits that a child's awareness of the
functions of language are an important factor in his acquisition of reading. Ayers and Downing (1980) report a K-R 20 reliability coefficient of 0.95 for this subtest.

Subtest 3: Awareness of the structure of language. Subtest 3 is taken from the Test of Language Development (TOLD) (Hammill & Newcomer, 1977). In the TOLD this subtest is called "Grammatic Completion" and is designed to measure the child's ability to use common morphological forms. The subtest most closely resembles the Illinois Test of Psycholinguistic Abilities Grammatic Closure subtest and Berko's Test of Morphology (Hammill & Newcomer, 1977). The correlation of the TOLD subtest with the ITPA subtest is reported to be 0.78.

The TOLD Grammatic Completion subtest differs from the ITPA Grammatic Closure subtest mainly in the absence of pictorial clues. Newcomer and Hammill avoided pictorial clues in an attempt to insure that the task be totally verbal as is the case in the child's ordinary use of spoken morphological forms. A validation study of the TOLD (Roadhouse & Wong, 1978) showed that the Grammatic Completion subtest discriminated among three groups of primary school children: normal readers, reading-disabled, and language delayed.

Subtest 3 is designed to test a child's awareness of certain key structural (grammatical) elements of spoken English. Although a completion format does not require a child to articulate reasons for his choices, it does force the child to bring his grammatical knowledge to a level of conscious awareness. Thus the subtest is designed to test Ryan's (1980) hypothesis that structural knowledge must be accessible to the
child for deliberate application to the reading acquisition task but it need not be totally conscious and verbalizable. It is also designed to test the investigator's hypothesis that structural understandings of language are less important than functional ones as the child attempts to learn to read.

Hammill and Newcomer (1977) report a K-R 20 reliability coefficient of 0.96 for this subtest.

Subtest 4: Awareness of language units. This measure represents a replication of part of a study by Fox and Routh (1975). The original study was designed to determine a child's ability to segment oral language into units of various sizes. The general procedures used in this study have been described in the Review of Literature section of this study while specific procedures are outlined in Appendix A. Fox and Routh found significant correlations between reading achievement and the ability to segment sentences into various smaller units. The reading achievement measure used in the study was admitted to be limited in scope (The Slosson Oral Reading Test - SORT; Slosson, 1963) and replication with other populations was suggested. In view of the extensive literature on the possible role of phonemic awareness in learning to read (see the literature review), and because the Fox and Routh methodology circumvents some of the difficulties suggested by other methods, this procedure was chosen to assess the subjects' awareness of the sound structure of the English language. No reliability data for the test are reported by Fox and Routh; however a pilot of the subtest by the investigator (n=26) resulted in a test-retest reliability of 0.89 and the reliability calculated from the
actual data by means of the K-R21 formula was 0.87.

**Subtest 5:** Awareness of the language of instruction.
Subtest 5 is again taken from the LARR developed by Ayers *et al.* (1977) -- subtest C2 "Technical Language of Literacy". It tests the child's knowledge of technical terms used in describing language such as "letter", "word", "number", and so on. Along with Subtest 2 of the TOMA it is specifically designed to test Downing's cognitive clarity theory of learning to read. K-R 20 reliability of the subtest is reported as 0.91 and it was found to be a valid predictor of reading achievement in grade 1 as measured by the part scores and total scores on the Cooperative Primary Reading Test (Ayers & Downing, 1980).

**Subtest 6:** Awareness of functional and logical relationships in language. Robertson (1968) has demonstrated that children's understanding of connectives is an important factor in reading achievement. Rodgers (1974) reported on the ability of seventy-four grade one children to comprehend twenty selected connectives. He found that two-thirds of the children did not know the meaning of the following connectives: in spite of, yet, for (as because), although, nevertheless, still, thus, and however. Two-thirds of the children did not know the following words: and, so, but, if and because. Approximately half of the children knew the meanings of the connectives: although (when it occurred in a medial position within the sentence), consequently, unfortunately, even if, and because (also in a medial sentence position).
The subtest used here is identical to the one used by Rodgers, Slade, and Conry (1974) and is described by them as:

A twenty item sentence completion test. Given the first part of the sentence (which began or ended with a connective), the child supplied (orally) an appropriate ending. Example: "If the wind blows very hard..."

The test developed by Rodgers, Slade, and Conry is an original one patterned on those developed by Watts (1944). No reliability data for this subtest are presented in the Rodgers et al. study. A pilot of the subtest by the investigator (n=26) resulted in test-retest reliability of 0.90.

The appropriate completion of the connectives test requires that a child be aware of both structural and functional aspects of English; structural in that specific syntactic forms are used with different connectives and functional in that the connectives themselves signal the purposes for which sentences are to be used, e.g., stating causality or conditionality; indicating sequence or relationship. Again, as in TOMA Subtest 3, the child is not asked to give articulate explanations of the meaning and use of the connectives, but a "middle level" of awareness is required to consciously reflect on the meaning and function of a connective and respond in a syntactically and semantically appropriate manner. The fact that connectives are used to indicate important semantic relationships within and between sentences suggests their importance in reading comprehension.
Reading Subtests Of The Stanford Achievement Test

The Stanford Achievement Tests are a respected battery of general achievement tests used widely in the assessment of academic achievement K - 12. The Primary Level I of this test is normed for children in grades 1.5 - 2.4. The Reading subtest of the Primary Level I test consist of two parts: A - word reading and B - reading comprehension. Time for administration of Part A is 20 minutes and for Part B it is 25 minutes. Raw scores can be converted to percentile ranks, stanines, grade equivalents and scaled scores. Data are provided on both content and construct validity. Reliability of the Reading subtests is reported as split-half estimates based on odd-even scores corrected by Spearman-Brown Formula (Part A r =0.95; Part B r=0.95) as well as based on the Kuder-Richardson Formula 20 (Part A r=0.94; Part B r=0.95). The standard error of measurement in raw score points is reported as 2.5 for Part A and 2.4 for Part B.

Reading Part A consists of fifteen pictures each with three associated words to be selected for each picture for a total of forty-five items. Reading Part B consists of sentences with missing words with three word choices provided of which the student is to choose the one which correctly fits the context. Part B is thus a modified cloze task requiring the student to be able to read contextually. Part B has forty-two items.
Data Collection Procedures

Data collection proceeded in two phases. During March 1981 the children selected for the study were administered the TOMA in two sessions. The first session consisted of group administration of Subtest 2 and 5 to the five intact classes used in the study. Two of the classes were administered Subtest 2 first followed by Subtest 5 while three of the classes were administered the two Subtests in the opposite order. Administration of both Subtests required approximately twenty-five minutes of class time.

The second testing session of TOMA was carried out during a three week period from March 9 to March 27, 1981. Each subject was individually tested on the remaining subtests of the TOMA (1, 3, 4 and 6) randomly administered. Each individual testing period lasted approximately twenty-five minutes and subjects' responses were recorded directly on the TOMA record form (see Appendix B). All testing was done in the morning between the hours of 9 and 12 Noon by the investigator. Responses for Subtests 3, 4 and 6 were audiotaped so that they could be rechecked for accuracy of assessment and scoring.

The second phase of data collection consisted of the administration of the standardized reading measure. This took place between April 21 and April 30, 1981. Once again testing was conducted in two sessions during the mornings only. Reading subtests A and B were administered to intact classes on two consecutive mornings following the procedures specified in the manual accompanying the test. All tests were handscored by the investigator. Standardized testing was delayed till the end of
April, 1981 in order to meet the requirement of the school district which wanted the measure for purposes of end of year program evaluation and to allow the end of grade norms to be used in scoring the tests.

Statistical Procedures

The main purpose of the study was to determine the relationship between first grade children's performance on selected metalinguistic measures and their reading achievement.

The analysis was conducted in three phases. Phase I of the analysis was concerned with examining the relationships among and between the subjects' performance on the subtests of the TOMA and RSAT. As well, this phase was concerned with exploring the underlying constructs of the TOMA and the RSAT by means of factor analysis. Three specific questions were posed during this phase of the analysis.

Phase II analyses examined the predictive relationship of the TOMA to the RSAT employing regression analysis. Three questions were posed during this phase of the analysis.

Phase III was concerned with differences in the subjects' performance on both the RSAT and the TOMA as a function of their gender. Two questions were asked, two hypotheses stated and statistical procedures used to investigate these questions are outlined.
The three phases of analysis and the specific questions investigated are detailed below.

Phase I: Analysis of the Relationships of the TOMA and the RSAT and Analyses of Their Factor Structure.

**Question 1.** Are there significant relationships between first grade children's scores on the TOMA and the RSAT?

**Hypothesis.** There will be positive and significant correlations between both subtest and composite scores on the TOMA and subtest and composite scores on the RSAT.

**Statistical Procedures.** Pearson-product moment correlations were computed to produce a correlation matrix of all the variables. Relevant correlations were isolated and tested for significance at the 0.01 level of probability using one-tailed significance tests.

**Question 2.** Does the combined data of the TOMA and the RSAT exhibit a distinct and interpretable factor structure?

**Statistical Procedures.** The Alberta-General Factor Analysis Program - AGFAP (Hakstian & Bay, 1973) was used to perform a variety of factor analyses on a disattenuated correlation matrix (Lord & Novick, 1968, p. 69-74 for rationale) using the six variables of the TOMA and the two variables of the RSAT. Principle components factor analysis using one, two, and three factors with a variety of orthogonal and oblique rotations were performed. The results were examined to find the analysis which yielded the most parsimonious and pure factor solution.

**Question 3.** Does the TOMA alone exhibit a distinct and interpretable factor structure obtained from the TOMA correlation matrix?

**Statistical Procedures.** The AGFAP was used to perform the same factor analyses as for Question 2 but utilized a 6 x 6 disattenuated correlation matrix.
matrix of the six TOMA subtests. The results were examined to find the most parsimonious and pure factor solution and the nature of this factor solution compared to that used in Question 2.

**Phase II: Regression Analyses**

**Question 4.** What does each factor of the TOMA contribute to reading achievement, i.e., what proportion of the variance in reading achievement (dependent variable) can be attributed to variances of the TOMA factors (independent variables)?

**Statistical Procedures.** Factor scores for each TOMA factor were obtained simply by identifying the salient variables of interest and using these to measure the factors (see Gorsuch, 1974: 237-239 for a justification for this procedure). A multiple regression analysis was performed with the TOMA factors as independent variables and the RSAT factor as the dependent variable.

**Question 5.** What proportion of the variance in the reading achievement measure (RSAT) can be attributed to each of the variances in the subtests of the TOMA?

**Statistical Procedure.** A stepwise multiple regression analysis was performed using TOMA subtests 1 - 6 as independent variables and the RSAT composite reading achievement score as the dependent variable. \( R^2 \) was calculated for each independent variable, and each partial unstandardized regression coefficient was converted to a beta weight and tested for significance by means of an F test.

**Question 6.** What is the relationship between the predicted scores and the observed scores for the dependent variable (RSAT)?
Statistical Procedure. Prediction equations were calculated to express the predicted relationship between scores obtained on various numbers of the TOMA subtests and those obtained on the criterion measure (RSAT). Standard errors of estimate for each equation were calculated and residuals were examined. The coefficient of alienation (k) and the index of forecasting efficiency were calculated for the multiple regression prediction equations.

Phase III: Analysis of the Subjects' Performance by Gender

Question 7. Are there significant differences between composite and subtest scores obtained on the RSAT by boys and girls when differences in age are controlled?

Hypothesis. Girls in this study will score significantly higher than boys on both the composite RSAT (Part A plus B) and each subset of the RSAT.

Statistical Procedures. Analyses of Variance (ANOVA) were calculated first on RSAT subtest total scores by sex and then on each of RSAT Part A and Part B scores by sex with differences in age as a covariate. One-tailed significance was set at $p < 0.05$.

Question 8. Are there significant differences between composite and subtest scores obtained on the TOMA by boys and girls when differences in age are controlled?

Hypothesis. Girls in this study will score significantly higher than boys on both the composite TOMA and each of its subtests.

Statistical Procedures. Analyses of Variance (ANOVA) were calculated first on TOMA subtest scores by gender and then on each of TOMA subtest 1-6 scores by gender. Age differences in subjects were controlled for in each case by using age in months as a covariate. One-tailed significance was set at $p < 0.05$. 
Except for the factor analyses, all statistical analyses utilized programs from the Statistical Package for the Social Sciences (Nie et al., 1975).
CHAPTER III

ANALYSIS OF THE DATA: RESULTS AND DISCUSSION

This chapter presents descriptive data and the results of the statistical analysis of the data relevant to the three phases and eight questions examined in this investigation.

Results for Phase III

Questions 7 and 8

Questions 7 and 8 were concerned with whether there were significant differences on scores obtained by boys and girls on the reading achievement measures (i.e., RSAT) and the metalinguistic measures (i.e., TOMA). The results of this phase of the analyses are reported first, since they have a bearing on the results of Phase I and II.

It was hypothesized that the girls' scores would significantly exceed boys' scores on both measures. Despite the fact that there is evidence from a wide range of studies that primary grade girls tend to be superior to primary grade boys in reading achievement (Dykstra & Tinney, 1969; Gates, 1961; Gunderson, 1965; Hirst, 1969; Johnson, 1973-74), the results of this study fail to support the hypothesis. Using differences in age in months as a covariate, none of the ANOVA comparisons of differences of boys' and girls' scores on the two subtests of the reading measure (RSAT) proved to be significant at the 0.05 level (Table 10, Appendix C).
Since the main thesis of this investigation is that metalinguistic abilities underlie reading achievement, it was also hypothesized that girls in the study would score significantly higher than boys on both the composite TOMA and each of its subsets. Again, with age differences controlled for by covariation, none of the ANOVA comparisons of the differences of the boys' and girls' scores on the six subtests of the TOMA proved to be significant at the 0.05 level (Table 10, Appendix C).

Since none of the age covariate measures were found to be significant, the boys' and girls' scores on the RSAT and the TOMA subtests were also compared using simple t-tests. All t-test comparisons were found to be non-significant at the 0.05 level, thus corroborating the ANOVA findings reported above.

As there were no significant differences in performance on both the RSAT and the TOMA subtests as a function of the subjects' gender, all subsequent analyses were performed on the sample as a whole without regard to gender.

Results for Phase I

Question 1

The significance of the relationship between the subjects' scores on the TOMA and the RSAT was explored in Question 1. Specifically, it was hypothesized that there would be positive and significant correlations between both subtest and composite scores on the TOMA and subtest and composite scores on the RSAT.
Table 3 reports the means, standard deviations and intercorrelations for the six TOMA variables and the two RSAT variables as well as their composites.
Table 3
Means, Standard Deviations And Intercorrelations For The TOMA And RSAT Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
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<tbody>
<tr>
<td>TOMA 1</td>
<td></td>
<td>0.11</td>
<td>0.41</td>
<td>0.26</td>
<td>0.21</td>
<td>0.33</td>
<td>0.47</td>
<td>0.25</td>
<td>0.28</td>
<td>0.28</td>
</tr>
<tr>
<td>TOMA 2</td>
<td></td>
<td></td>
<td>0.32</td>
<td>0.26</td>
<td>0.39</td>
<td>0.32</td>
<td>0.55</td>
<td>0.31</td>
<td>0.37</td>
<td>0.36</td>
</tr>
<tr>
<td>TOMA 3</td>
<td></td>
<td></td>
<td></td>
<td>0.46</td>
<td>0.36</td>
<td>0.56</td>
<td>0.79</td>
<td>0.30</td>
<td>0.29</td>
<td>0.31</td>
</tr>
<tr>
<td>TOMA 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.36</td>
<td>0.20</td>
<td>0.77</td>
<td>0.33</td>
<td>0.34</td>
<td>0.35</td>
</tr>
<tr>
<td>TOMA 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.41</td>
<td>0.67</td>
<td>0.45</td>
<td>0.43</td>
<td>0.45</td>
</tr>
<tr>
<td>TOMA 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.62</td>
<td>0.31</td>
<td>0.36</td>
<td>0.35</td>
</tr>
<tr>
<td>TOMA composite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.48</td>
<td>0.49</td>
<td>0.51</td>
</tr>
<tr>
<td>RSAT 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.83</td>
<td>0.94</td>
</tr>
<tr>
<td>RSAT 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.97</td>
</tr>
<tr>
<td>RSAT Composite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std Dev</th>
<th>Mean</th>
<th>Std Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>3.48</td>
<td>2.01</td>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
<td>17.18</td>
<td>5.37</td>
<td>4.</td>
</tr>
<tr>
<td>5.</td>
<td>22.72</td>
<td>4.22</td>
<td>6.</td>
</tr>
<tr>
<td>7.</td>
<td>135.02</td>
<td>18.74</td>
<td>8.</td>
</tr>
<tr>
<td>9.</td>
<td>26.41</td>
<td>11.41</td>
<td>10.</td>
</tr>
</tbody>
</table>

Note: p < 0.05 for r values between 0.20 and 0.24
p < 0.01 for r values between 0.25 and 0.30
p < 0.001 for r values greater than 0.30
The hypothesis that there would be a significant relationship between TOMA and RSAT scores was supported for composite and subtest scores. The correlation between the TOMA composite and the RSAT composite was 0.51 which is significant beyond the 0.0001 level of probability. Thus approximately 26 percent of the variance in reading achievement as measured by the RSAT can be accounted for by the variance in the composite TOMA scores. Furthermore, each of the six TOMA subtests is significantly related to each of the two RSAT subtests as well as its composite (all ps < 0.01). TOMA Subtest 5 had the highest correlation with the RSAT subtests and RSAT composite. Thus TOMA Subtest 5 alone accounts for approximately 20 percent of the variance in reading achievement as measured by RSAT.

**Question 2**

Principal components factor analysis was used to explore the factor structure of the eight variables used in the study. Table 4 reports the 8 x 8 disattenuated correlation matrix used in the factor analysis. Disattenuation was used to adjust the correlations with regard to the reliabilities of the measures correlated (Lord & Novick, 1968). One, two, and three factor solutions with a variety of orthogonal and oblique rotations were examined. A three factor solution utilizing a 0.25 Harris-Kaiser oblique rotation was found to represent the best simple structure solution. Table 5 reports the relevant data for this factor solution. Other three factor solutions utilizing differing degrees of axes rotation yielded similar but less factorially pure results.
Table 4
Disattenuated Correlations Used
In Factor Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOMA 1</td>
<td></td>
<td>0.13</td>
<td>0.48</td>
<td>0.32</td>
<td>0.25</td>
<td>0.40</td>
<td>0.30</td>
<td>0.53</td>
</tr>
<tr>
<td>TOMA 2</td>
<td></td>
<td></td>
<td>0.34</td>
<td>0.29</td>
<td>0.41</td>
<td>0.35</td>
<td>0.33</td>
<td>0.39</td>
</tr>
<tr>
<td>TOMA 3</td>
<td></td>
<td></td>
<td></td>
<td>0.50</td>
<td>0.38</td>
<td>0.61</td>
<td>0.31</td>
<td>0.31</td>
</tr>
<tr>
<td>TOMA 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.40</td>
<td>0.23</td>
<td>0.36</td>
<td>0.38</td>
</tr>
<tr>
<td>TOMA 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.45</td>
<td>0.48</td>
<td>0.46</td>
</tr>
<tr>
<td>TOMA 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.33</td>
<td>0.34</td>
</tr>
<tr>
<td>RSAT 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.88</td>
</tr>
<tr>
<td>RSAT 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5  
Factor Loadings And Eigenvalues For The Six TOMA And The Two RSAT Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>I</th>
<th>II</th>
<th>III</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TOMA 1</td>
<td>0.83</td>
<td>-0.20</td>
<td>-0.44</td>
</tr>
<tr>
<td>2. TOMA 2</td>
<td>0.05</td>
<td>-0.10</td>
<td>0.84</td>
</tr>
<tr>
<td>3. TOMA 3</td>
<td>0.87</td>
<td>0.11</td>
<td>0.13</td>
</tr>
<tr>
<td>4. TOMA 4</td>
<td>0.48</td>
<td>-0.25</td>
<td>0.07</td>
</tr>
<tr>
<td>5. TOMA 5</td>
<td>0.23</td>
<td>-0.27</td>
<td>0.51</td>
</tr>
<tr>
<td>6. TOMA 6</td>
<td>0.69</td>
<td>0.11</td>
<td>0.31</td>
</tr>
<tr>
<td>7. RSAT 1</td>
<td>0.02</td>
<td>-0.93</td>
<td>0.05</td>
</tr>
<tr>
<td>8. RSAT 2</td>
<td>0.03</td>
<td>-0.91</td>
<td>0.08</td>
</tr>
</tbody>
</table>

TOMA Subtests 1, 3, 4, and 6 loaded on Factor I; RSAT Subtests 1 and 2 loaded on Factor II, and TOMA Subtests 2 and 5 loaded on Factor III. Loadings were considered salient at a magnitude of 0.40 and above (Gorsuch, 1974, p. 185).
The solution illustrated in Table 5 is factorially quite simple and can be interpreted to fit the nature of the test variables in a conceptually satisfying manner.

Factor I seems to measure more structural aspects of language awareness. This is especially to be noticed in the high loading of TOMA Subtest 3 on this factor. It may be recalled that TOMA Subtest 3 is a grammatic completion exercise. TOMA Subtest 4 which was designed to measure the sound *structure* of language, loads most heavily on Factor I (0.48), although there is also a moderate loading (-0.25) of this variable on Factor II suggesting some relationship to the reading comprehension construct posited for this factor. TOMA Subtest 6 is a connectives test which clearly depends on a child's syntactic (structural) sense of the language as well as requiring awareness of the purpose (function) for which the connective is to be used. The high loading (0.83) of TOMA Subtest 1 on Factor I is somewhat more difficult to account for. It may be recalled that TOMA Subtest 1 measures the child's understanding of the arbitrary semantic relationship of a word to its referent. In a practical sense, an awareness of this arbitrary word–referent relationship presents an understanding of a profound principle of language, i.e., that there is no structurally necessary relationship between a symbol and its referent. Thus the word "cow", in itself, tells nothing about the characteristics of cows *per se*; children who do not realize this misunderstand the primary structural arbitrariness of a given language.
Factor II clearly represents the reading comprehension construct of the RSAT. Reading Part A of the RSAT is a word (vocabulary) comprehension measure, and Part B is a connected prose comprehension measure in a modified cloze format.

It is suggested that Factor III represents a functional language construct. TOMA Subtest 2 is a test designed to measure a child's awareness of the purposes (functions) of reading and writing. TOMA Subtest 5 is designed to measure the child's awareness of the meanings (functions) of the "reading instruction register" (Downing, 1979). TOMA Subtest 5 also loads to a limited extent on Factor II (-0.27) and Factor I (0.23), indicating that this subtest shares some common characteristic of these factors as well.

**Question 3**

Factor analytic procedures similar to that employed to answer Question 4 were used to determine the factor structure of the TOMA alone. A two factor solution utilizing principal components factoring with a 0.25 Harris-Kaiser oblique rotation provided the best simple structure solution. Table 6 reports the relevant data for this factor solution. It may be noted that the nature of the factor solution used to achieve this solution is identical to that used in Question 4 except the number of factors is reduced from three to two. Again the TOMA subtests have salient loadings on the two factors in the same manner as before with an additional increase in factor simplicity.
Table 6
Factor Loadings And Eigenvalues
For The Six TOMA Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TOMA 1</td>
<td>0.93</td>
<td>-0.33</td>
</tr>
<tr>
<td>2. TOMA 2</td>
<td>-0.03</td>
<td>0.86</td>
</tr>
<tr>
<td>3. TOMA 3</td>
<td>0.80</td>
<td>0.12</td>
</tr>
<tr>
<td>4. TOMA 4</td>
<td>0.50</td>
<td>0.29</td>
</tr>
<tr>
<td>5. TOMA 5</td>
<td>0.25</td>
<td>0.66</td>
</tr>
<tr>
<td>6. TOMA 6</td>
<td>0.64</td>
<td>0.24</td>
</tr>
</tbody>
</table>

Eigenvalues
2.87
0.95

For subsequent analysis it was decided to consider TOMA Subtests 1, 3, 4, and 6 as representing a "structural awareness of language" construct while TOMA Subtests 2 and 5 were considered to represent a more "functional awareness of language" construct.
Results for Phase II

Question 4

Multiple regression analysis was used to determine the relative contribution of the two TOMA factors (Structure and Function) to reading achievement.

The dependent variable in the multiple regression analysis was the composite RSAT. It was considered appropriate to combine the two readings subtests for composite analysis for a number of reasons. First, the Pearson $r$ between the two subtests was 0.83, indicating considerable common variance between them. Second, both subtests measure a component of reading comprehension, and it was not clear that this construct should be partitioned into a number of sub-constructs particularly in the case of beginning readers. Third, the factor analysis supported the notion that both RSAT subtests are measuring a single construct.

The independent variables in the multiple regression analysis were the TOMA Structure factor and the TOMA Function factor defined by factor analysis. These variables were created by identifying all the salient TOMA variables of the factors and summing these variables to measure the factors (Gorsuch, 1974, p. 238).
Table 7 reports the results of the multiple regression analysis using the factor data. The Function factor entered the regression equation first and accounted for approximately 24 percent ($R^2 = 0.24$) of the variance in the reading comprehension scores. Adding the Structure factor to the regression equation accounted for an additional 5 percent of the variance in reading comprehension. Thus awareness of the functional aspects of language was considerably more successful in accounting for reading achievement than was awareness of structural language factors.

Table 7
Summary Results Of The Multiple Regression Analysis Using Factor Data

<table>
<thead>
<tr>
<th>Dependent Variables (Reading Comp.)</th>
<th>Independent Variables</th>
<th>Simple $R$</th>
<th>$R^2$</th>
<th>B</th>
<th>Beta</th>
<th>$F$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor I</td>
<td>Factor II (Function)</td>
<td>0.49</td>
<td>0.24</td>
<td>1.07</td>
<td>0.36</td>
<td>15.29$^1$</td>
</tr>
<tr>
<td>Factor III (Structure)</td>
<td></td>
<td>0.44</td>
<td>0.29</td>
<td>0.34</td>
<td>0.25</td>
<td>7.67$^1$</td>
</tr>
</tbody>
</table>

$^1 p < 0.01$
Question 5

A stepwise multiple regression analysis using all six TOMA subtests as independent variables was performed to discover the proportion of the variance in the RSAT which could be attributed to each of the variances in the subtests of the TOMA. Table 8 reports the summary results of this analysis.

Table 8
Summary Results Of The Stepwise Multiple Regression Analyses Using Raw Score Data

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variables</th>
<th>r</th>
<th>R</th>
<th>R^2</th>
<th>B</th>
<th>Beta</th>
<th>F</th>
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</thead>
<tbody>
<tr>
<td>Composite</td>
<td>TOMA 5</td>
<td>0.45</td>
<td>0.45</td>
<td>0.20</td>
<td>1.18</td>
<td>0.26</td>
<td>7.20</td>
</tr>
<tr>
<td></td>
<td>TOMA 4</td>
<td>0.35</td>
<td>0.50</td>
<td>0.25</td>
<td>0.40</td>
<td>0.18</td>
<td>3.42</td>
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<tr>
<td></td>
<td>TOMA 2</td>
<td>0.36</td>
<td>0.52</td>
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<td>0.91</td>
<td>0.17</td>
<td>3.48</td>
</tr>
<tr>
<td></td>
<td>TOMA 1</td>
<td>0.28</td>
<td>0.55</td>
<td>0.30</td>
<td>1.32</td>
<td>0.14</td>
<td>1.80</td>
</tr>
<tr>
<td></td>
<td>TOMA 6</td>
<td>0.35</td>
<td>0.56</td>
<td>0.31</td>
<td>0.82</td>
<td>0.14</td>
<td>1.80</td>
</tr>
<tr>
<td></td>
<td>TOMA 3</td>
<td>0.31</td>
<td>0.56</td>
<td>0.31</td>
<td>-0.20</td>
<td>0.05</td>
<td>0.24</td>
</tr>
</tbody>
</table>

p < 0.01
From an examination of Table 8 it is clear that achievement on TOMA Subtest 5 is most highly associated with reading achievement as measured by the RSAT. Approximately two-thirds of the TOMA battery's predictive power resided in Subtest 5 alone and only the beta weight of this subtest is statistically significant (Beta = 0.26; F = 7.20; p < 0.01).

The finding for Question 6 that a Function factor was a better predictor of reading achievement than was a Structure factor is due primarily to the presence of TOMA Subtest 5 in the "Function" factor. TOMA Subtest 2, the other variable in the Function factor contributed relatively little to the prediction of reading scores.

It is of particular interest to note that TOMA Subtest 3, which is clearly the most "structural" measure in the battery, is the least significant variable in the multiple regression analysis. The inclusion of this variable in the analysis accounts for no additional variance in the reading achievement score.

**Question 6**

This question examined the "goodness of fit" between the scores predicted by the multiple regression analysis and the actual scores achieved by the study's subjects on the reading achievement measure.
The equation for the prediction of reading achievement on the RSAT from the entire TOMA battery is

\[ RSAT = -13.55 + 1.18 \text{ (TOMA 5)} + 0.40 \text{ (TOMA 4)} + 1.32 \text{ (TOMA 1)} + 0.82 \text{ (TOMA 6)} - 0.20 \text{ (TOMA 3)} \]

This equation, with a multiple R of 0.56, accounts for about 31 percent of the variance in reading achievement. The standard error of estimate for this equation is 16.46.

By using only TOMA Subtest 5 in the regression analysis, 20 percent of the variance in reading achievement can be accounted for. The prediction equation is

\[ RSAT = 13.47 + 2.07 \text{ (TOMA 5)} \]

The standard error of estimate for this equation is 17.25.

Since between 69 and 80 percent of variance in reading achievement is unaccounted for by the TOMA subtest scores (depending on the number of subtests used), there clearly exist other significant variables which account for the remaining variance. An examination of the residuals and the standardized residual plots for the two regression equations indicates the substantial but limited power that the metalinguistic variables have in predicting reading achievement.

A summary of the predictive usefulness of the TOMA battery is provided in Table 9 which indicates values of the coefficient of alienation \( (k) \) as well as indices of forecasting efficiency \( (E) \) as a function of the number of TOMA variables entered into the multiple regression prediction equation.
The coefficient of alienation \((k)\) compares the standard error of estimate with the standard deviation of the dependent measure. It is thus a comparison of predictive error for a set of data with the predictive error in the worst possible prediction situation \((S / S = 1-R^2)\), and the reduction in predictive error reflected by \(R\) is the index of forecasting efficiency \((E = 1-k)\) (Kirk, 1978, p. 138).

Table 9

Value Of \(k\) And \(E\), As A Function Of The Number Of TOMA Variables Entered In A Multiple Regression Equation

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>Multiple (R)</th>
<th>(k)</th>
<th>(E)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TOMA 5</td>
<td>0.45</td>
<td>0.89</td>
<td>0.11</td>
</tr>
<tr>
<td>2. TOMA 4</td>
<td>0.50</td>
<td>0.87</td>
<td>0.13</td>
</tr>
<tr>
<td>3. TOMA 2</td>
<td>0.52</td>
<td>0.85</td>
<td>0.15</td>
</tr>
<tr>
<td>4. TOMA 1</td>
<td>0.55</td>
<td>0.84</td>
<td>0.16</td>
</tr>
<tr>
<td>5. TOMA 6</td>
<td>0.56</td>
<td>0.83</td>
<td>0.17</td>
</tr>
<tr>
<td>6. TOMA 3</td>
<td>0.56</td>
<td>0.83</td>
<td>0.17</td>
</tr>
</tbody>
</table>
Summary of Results

The hypothesis that girls' scores on both the RSAT and the TOMA would significantly exceed the boys' scores on these same measures was rejected, as differences in scores on all subtest measures as function of gender were not statistically significant.

The hypothesis of a significant positive relationship between metalinguistic awareness as measured by the TOMA and reading achievement as measured by the RSAT was accepted.

Factor analysis suggested the existence of three factors among the eight variables in the study. Factor I was considered to be a structural language awareness construct, Factor II a reading comprehension construct, and Factor III a functional language awareness construct.

Using the reading comprehension factor as the dependent measure and the Structure and Function factors as independent measures in a multiple regression analysis, the Function factor accounted for about 24 percent of the variance in reading comprehension while the Structure factor added about 5 percent for a total of about 29 percent of the variance accounted for.

A multiple regression analysis using all the TOMA subtests indicated that Subtest 5 (Awareness of the Language of Instruction) accounted for the greatest amount of variance in reading achievement (20 percent) while the addition of the remaining five subtests added only another 11 percent to the variance accounted for.
The index of forecasting efficiency for the entire TOMA was 17 percent and for TOMA Subtest 5 alone it was 11 percent.
Chapter IV

SUMMARY, LIMITATIONS, CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDY

This chapter summarizes the study, discusses limitations, draws conclusions based on the findings, and suggests implications pertinent to the types of subjects who participated in the study. The chapter concludes with recommendations for further study.

Summary

The purpose of this study was two-fold: (1) to suggest specific metalinguistic abilities relating to reading acquisition and to provide a conceptually defensible rationale for the measurement of these abilities by a battery of tests, and (2) to gather empirical data concerning the relationship of the defined metalinguistic abilities to reading achievement in a group of first grade children.

The review of literature in Chapter I and the subsequent development of a conceptual framework for the problem suggested six aspects of metalinguistic awareness that were considered of possible importance for early reading achievement:

1. Awareness of words as arbitrary symbols
2. Awareness of the purposes of literacy
3. Awareness of the structure of language
4. Awareness of the language units
5. Awareness of the language of instruction
6. Awareness of the relational aspects of language

Each of these aspects of metalinguistic awareness was operationally measured by means of a subtest; all of the subtests together comprised a Test of Metalinguistic Awareness (TOMA). The empirical component of this study involved an examination of the relationship between the scores of 113 first grade children on the TOMA and those on a standardized reading achievement measure (the reading subtests of the Stanford Achievement Test - RSAT).

Objectives Of The Study

The objectives of this study were to answer the following questions:

1. Are there significant relationships between the first grade children's scores on the TOMA and those on the RSAT?
2. Do the combined data of the TOMA and the RSAT exhibit a distinct and interpretable factor structure?
3. Does the TOMA alone exhibit a distinct and interpretable factor structure which can be harmonized with the factor structure obtained from the combined TOMA-RSAT correlation matrix?
4. What does each factor of the TOMA contribute to reading achievement?
5. What proportion of the variance in the reading achievement measure (RSAT) can be attributed to each of
the variances in the subtests of the TOMA?

6. What is the relationship between the predicted scores and the observed scores for the dependent variable?

7. Are there significant differences between the composite and subtest scores obtained on the reading achievement measure (RSAT) by boys and girls when differences in age are controlled?

8. Are there significant differences between composite and subtest scores obtained on the TOMA by boys and girls when differences in age are controlled?

**Procedures**

There were 113 subjects used in the study (64 males and 49 females). The subjects were first grade students in classes selected from a mid-sized school district in the central Fraser Valley in British Columbia. English was the first language of all the subjects and the predominant socio-economic character of the sample was middle-class.

During March, 1981, all subjects were administered the subtests of the TOMA in two separate sessions. In April, 1981, all subjects were administered the reading achievement measure, also in two sessions. All testing and scoring were carried out by the investigator.
Analysis Of Data And Questions

Analysis of the data was conducted in three phases, each designed to answer a number of questions posed in the study. Phase I concerned itself with exploring differences in performance on the RSAT and the TOMA as a function of the subjects' gender. Phase II was concerned with examining the relationships among and between the subjects' performances on the subtests of the TOMA and the RSAT as well as with exploring the factor structure of the TOMA and the RSAT. Phase III analyses examined the predictive relationship of the TOMA to the RSAT employing multiple regression analysis.

A brief summary of the findings for the eight questions posed in the study follows:

1. Scores on the TOMA and the RSAT were significantly related. Table 3 reports the extent and statistical significance of these relationships. The overall Pearson r between the composite TOMA and the composite RSAT was 0.51 (p < 0.001).

2. The combined data of the TOMA and the RSAT suggest a three factor structure interpreted as a reading comprehension factor, a structural language factor, and a functional awareness factor.

3. The TOMA alone exhibits a two factor structure interpreted as the same Structure and Function factors as in Question 4.

4. Multiple regression analysis with the combined RSAT as the dependent variable and the two factors of the TOMA
as the independent variable, indicated that the Function factor accounted for about 24 percent and the Structure factor an additional 5 percent of the variance in the RSAT.

5. Multiple regression analysis using the six subtests of the TOMA as independent variables and the combined RSAT as dependent variable confirmed the primary contribution of TOMA Subtest 5 to the reading achievement scores ($R^2 = 0.20$; Beta = 0.26; $p < 0.01$) followed by TOMA Subtest 4 ($R^2 = 0.25$); TOMA Subtest 2 ($R^2 = 0.27$); TOMA Subtest 1 ($R^2 = 0.30$); TOMA Subtest 6 ($R^2 = 0.31$); TOMA Subtest 3 ($R^2 = 0.31$), all with non-significant beta values.

6. The standard error of estimate for the prediction equation utilizing all six TOMA subtests ($R = 0.56$) was 16.46; for the prediction equation using only Subtest 5 ($R = 0.45$) it was 17.25.

7. There were no significant differences between boys' and girls' scores on the RSAT with age controlled by covariation.

8. There were no significant differences between boys' and girls' scores on the TOMA with age controlled by covariation.
Limitations Of The Study

The conclusions to be presented must be considered in light of the following limitations of the study:

1. The results of the study indicate that much of the variance in reading achievement was unaccounted for and could be contributed to variables other than those used in this study. Two important variables not considered are socio-economic status and intelligence.

   There is evidence to suggest that socio-cultural and socio-linguistic factors may be crucial in determining the ease with which children learn to read (Entwistle, 1971, 1979) but this study has not considered these factors.

   School district policy made it impossible to obtain I.Q. scores for the subjects of the study; thus this potentially important underlying variable could not be considered in the analysis of the results. I.Q. has been shown to be an important factor in reading achievement (Livo, 1970; Lohnes & Gray, 1972) and it may be that a verbal intelligence factor also underlies achievement in some or all of the metalinguistic tasks. The present study cannot provide insight into these possible relationships.

2. All correlational studies are subject to the common error of confusing correlation with causation. This study has demonstrated the degree to which metalinguistic awareness as measured by performance on
the TOMA tasks is related to early reading achievement as measured by the RSAT. As the presumed relationship between the two variables is conceptually strong, the significant positive correlation obtained may be suggestive of some causal connections among the variables of the RSAT and the TOMA. This study does not, however, demonstrate such causal connections.

3. This study does not address the question of the role of reading instruction in developing metalinguistic awareness. Ehri (1979), for example, has noted the problem of the "alternative causal relationship between lexical awareness and learning to read" (p. 84). She states that the problem may be more apparent than real in that "lexical awareness may interact with the reading acquisition process, existing as both a consequence of what has occurred and as a cause facilitating further progress" (p. 84).

The availability of subjects placed considerable constraints on the time at which students could be tested. Subjects who were tested with the TOMA had already received about six months of prior reading instruction. The extent to which this instruction led to an increase in subjects' metalinguistic awareness is difficult to assess. Thus it remains to be demonstrated that development of metalinguistic awareness does facilitate progress in learning to read. The present investigation has only demonstrated, within the limitations indicated, that the level of development of
children's metalinguistic concepts can contribute significantly to the prediction of their reading achievement towards the end of grade one.

4. Conclusions about the relationship of metalinguistic awareness and reading achievement are limited by the selective number of metalinguistic concepts assessed and to the specific reading achievement measure employed.

Conclusions And Implications Of The Study

The following conclusions are suggested from the findings of this study:

1. There were no significant differences between the boys and the girls in the sample on any of the reading or metalinguistic subtests.

There are suggestions that cultural factors may account for the differences in language and reading ability usually found between boys and girls in Canada and the United States (Johnson & Greenbaum, 1980). Johnson (1973 - 74) found that boys read significantly better than girls in England and Nigeria while girls generally made more significant gains in reading in the United States and Canada. He reported that results indicated that the differences could be attributed to cultural influences. It may thus be that the finding of no significant differences due to gender in this study is related to the attitudes about reading that the teachers have instilled in their young
2. Metalinguistic awareness as measured by the TOMA is a significant though limited predictor of reading achievement for the first grade subjects of this study.

The 31 percent of variance in reading achievement accounted for by metalinguistic awareness is both a statistically and educationally significant amount, especially if it can be subsequently demonstrated that this amount is separate from that due to socio-linguistic and intelligence factors. Although caution must be exercised in drawing implications from this result, a major pedagogical implication does suggest itself; i.e., all other factors being equal, a child with a high level of linguistic awareness might have relatively less difficulty in learning to read (by any method) than a child with a low level of metalinguistic awareness. If a "bottom-up", part-to-whole approach to beginning reading instruction is employed, such an approach would tend to favour children with high levels of metalinguistic awareness. Such a method might prove more difficult for a child with a low level of metalinguistic awareness. For the latter child, the Language Experience Approach (LEA) would probably be more suitable.

The conceptual grounds for the above implications have been alluded to in the third section of the literature review. Briefly, as Vygotsky and others have indicated, writing is a much more highly conventionalized and abstract form of communication than is oral language. Learning to read necessarily involves the child in a conscious process of
thinking about language and dealing with it in highly abstract ways. This, in essence, is what the possession of metalinguistic awareness allows the child to do. A "bottom-up" approach to beginning reading is, by definition, a more analytical approach to learning to read than is a "top-down" approach. A child with a high degree of metalinguistic awareness is, in fact, capable of an analysis of language; thus the linguistically aware child is ready to benefit from a reading program that relies on a part-to-whole analysis of language, for example, a synthetic-phonetic approach to beginning reading.

A child with a low level of metalinguistic awareness is not accustomed to "thinking about language". Such a child functions primarily at a semantic level of language use and analysis. Research in recall of information demonstrates that people tend to remember the semantic content of messages more easily than their syntactic or phonological aspects (Franks & Bransford, 1976). In addition, research in reading comprehension indicates that comprehension occurs only when one can integrate unknown information with what is already known (Perfetti, 1976). Therefore, with children possessing little metalinguistic awareness, it would seem most productive to employ a beginning instructional methodology that emphasizes meaning and the most familiar forms of language. A language experience approach would seem to fulfill both requirements in that it employs the child's own familiar oral language to move towards the understanding of the nature of more abstract written language.
3. Metalinguistic awareness related to functional aspects of language is a more significant predictor of reading achievement than is awareness of structural aspects of language.

To the extent that this conclusion is warranted by the data, it helps to explain findings in other studies of the lack of relationship of language measures to early reading achievement. Many of these studies attempted to relate structural aspects of language development to reading achievement. For example, Bougere (1969) asked the question: "Is the relationship between measures of oral language competency and early reading achievement strong enough to be useful for prediction purposes?" A linguistic analysis of the verbal output of a stratified random sample of 60 first graders was made on the basis of 18 language measures. Predictive data were scores on these measures as well as on the Metropolitan Readiness Test. Criterion data were scores on the Stanford Achievement Test Primary I Battery. Results showed that none of the language measures predicted achievement as well as the Metropolitan Readiness Test. The author concludes that "there is a need for qualitative as well as quantitative aspects of oral language behaviour" (p. 56). Cordes (1965) similarly found no significant relationship between reading achievement and oral language ability for 305 grade one boys. Oral language ability was measured by items of the Berko Morphology Test and oral responses to colored pictures. The Berko Morphology Test items were selected to measure the ability of the subjects to apply morphological rules to new words and is similar in many respects
to TOMA Subtest 3, which is a grammatic completion subtest. In the present study, TOMA Subtest 3 had the lowest relationship to reading achievement.

As the literature review has demonstrated, there is an extensive body of research on the possible importance of a child's awareness of the phonemic nature of language and early reading achievement (for e.g., Liberman et al., 1967; Holden & MacGinitie, 1972; Liberman, 1973; Calfee, Lindamood, & Lindamood, 1973; Fox & Routh, 1975; Shankweiler & Liberman, 1976). Although the evidence summarized in Table 8 indicates that TOMA Subtest 4 was the second most powerful predictor of reading achievement, it explained only an additional 5 percent of the variance in reading achievement. It may be, as Ehri (1979) has suggested, that the Fox and Routh (1975) protocol is too repetitive and thus overestimates the real phonemic segmentation ability of the child. On the other hand, as critics of other segmentation tasks point out (Clark, 1978; Lundberg, 1978), these tasks often require the child to understand and remember quite complex instructions. In view of the difficulty in designing clear and effective phonemic segmentation tasks for young children, the results of this and other studies pertaining to this task must be viewed with some caution.

In general, the findings of this study suggest that researchers would do well to distinguish between structural and functional aspects of language knowledge and awareness, and that teachers should pay particular attention to a child's awareness of the functional aspects of language.
4. TOMA Subtest 5 — Awareness of the language of instruction — accounted for the greatest amount of the variance in reading achievement.

The 20 percent of variance in reading achievement accounted for by TOMA Subtest 5 suggests that teachers should make every effort to discover whether their students understand the "reading instruction register". Downing's cognitive clarity theory suggests the importance of young children having clearly in mind what it is they have to do to learn to read. Being clear about the meaning of such reading instruction terms as "letter", "number", "word", "printing", "writing", etc., seems to be very important in approaching the learning-to-read task.

**Recommendations For Further Research**

This investigation has provided partial answers to some of the problems under study and has suggested other areas for future research. The following suggestions for further study are offered:

1. It is recommended that this study be replicated but with the following modifications:

   a) Use a group of subjects who have had no formal reading instruction.

   b) Collect information pertaining to socio-linguistic factors and intelligence and add these as independent variables in the multiple
regression analysis.

c) Cross-validate the resulting predictions equation(s) with a new sample of similar subjects to determine the stability and generalizability of these equations.

2. The lack of difference between boys and girls in reading achievement and metalinguistic awareness measures merits further consideration. It is recommended that study be undertaken of possible cultural factors that influence reading achievement in beginning readers.

3. The findings of this study suggest the existence of differing degrees of relationship between reading achievement and awareness of structural vs. functional aspects of language. It is recommended that this distinction be further explored by research.

4. This study has concerned itself primarily with metalinguistic awareness at the phoneme through sentence level of language. Future research should also be directed at examining the relationship of early reading achievement and metalinguistic awareness to extended discourse structure.

5. It is recommended that effort be made to design and implement longitudinal experimental studies employing
groups of children receiving differing amounts of training in metalinguistic concepts with a view of ascertaining the impact of such differential prior to training on subsequent reading achievement.
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APPENDIX A. Test of Metalinguistic Awareness (TOMA)

Manual for Administration
Subtest 1. Awareness of Words as Arbitrary Symbols
(after Vygotsky 1962:129)

Say to the child:

I WOULD LIKE TO ASK YOU SOME QUESTIONS ABOUT WORDS AND PLAY A WORD GAME WITH YOU. IN THIS GAME I WILL ASK YOU SOME QUESTIONS TO WHICH YOU ANSWER EITHER "YES" OR "NO".

LET'S PRETEND THAT YOU ARE TRAVELLING IN A STRANGE COUNTRY WHERE EVERYTHING IS BACKWARDS, UPSIDE-DOWN, INSIDE-OUT AND JUST GENERALLY MIXED UP. IN THIS COUNTRY A DOG IS CALLED "COW" AND A COW IS CALLED "DOG".

(Show the child a picture of a dog. Ask: IN THIS COUNTRY OF MAKE BELIEVE WHAT IS THIS ANIMAL CALLED? If the child responds with "COW", carry on with the PROCEED section below. If the child responds with "DOG" remind him/her that in this strange country a dog is called "cow" and a cow is called "dog". Ask, while pointing to the picture of the dog: NOW WHAT DO WE CALL THIS ANIMAL IN OUR STRANGE COUNTRY? If the child responds with "COW" carry on with PROCEED below. If the child still responds with "DOG", stop the game and say; I GUESS THIS IS A PRETTY HARD GAME. LET'S JUST FORGET IT AND GO ON TO THE NEXT ONE.)

PROCEED

Say to the child:

ANSWER "YES" OR "NO" TO THESE QUESTIONS

1. IN THIS STRANGE COUNTRY, DOES A COW HAVE HORNS?
   Response YES NO
   Score 0 1

2. IN THIS STRANGE COUNTRY, DOES A DOG GIVE MILK?
   Response YES NO
   Score 1 0

3. IN THIS STRANGE COUNTRY, CAN A COW BARK?
   Response YES NO
4. IN THIS STRANGE COUNTRY, DOES A COW HAVE HOOVES?
Response YES NO
Score 1 0

5. IN THIS STRANGE COUNTRY, DOES A DOG EAT GRASS?
Response YES NO
Score 0 1

6. IN THIS STRANGE COUNTRY, CAN A DOG SLEEP ON YOUR BED?
Response YES NO
Score 1 0

Score possible 0 1 2 3 4 5 6
Subtest 2. Awareness of the Purposes of Literacy

Taken from Subtest B1 "Understanding Literacy Functions" Test of Linguistic Awareness in Reading Readiness (LARR) by Ayers et al., 1977

All instructions and test procedures are exactly as prescribed by the authors of the test.

Scoring: The rule on every item is that the child SCORES 1 if every correct response in that item is made and no incorrect response is made. In all other cases the score is 0.

The manual and scoring key follow on the next page.

Note: Test used with permission of the authors.
PRACTICE EXERCISE FOR SUBTEST 1

AFTER THE TEST BOOKLETS HAVE BEEN DISTRIBUTED, FOR SAMPLE EXERCISE (a) SAY:

We are going to play a game. Please turn the page and put your finger on the pail.

POINT TO THE PAIL IN THE TEST BOOKLET. CHECK TO SEE THAT EACH CHILD HAS FINGER ON THE CORRECT PLACE.

Now listen carefully while I tell you how to play the game. Look at the big box with the picture in it. Which things can you ride in?

PAUSE.

Yes, you can ride in the two cars. Now to play the game you must draw a circle around each car.

DRAW CIRCLES ON THE TEST BOOKLET CLEARLY SHOWING THE CIRCLING OF ONE CAR AND THEN THE OTHER.

Now, in the same picture, circle the part that people can read. Circle the part that people can read.

PAUSE.

Yes, you should have circled the sign on the store.

DEMONSTRATE THAT YOU ARE CIRCLING THE BOX WHICH SAY VICTOR'S HARDWARE. ENSURE THAT EACH CHILD HAS CIRCLED THE SIGN BOX.

FOR SAMPLE (b) SAY:

Now, put your finger on the ring.

MAKE SURE THAT ALL OF THE CHILDREN HAVE MOVED THEIR FINGER TO THE RING.

In the row of boxes, circle each thing that you can write with. Circle each thing that you can write with.

PAUSE.

Yes, you should have circled the pen in the first box because you can write with it, and you should have circled the pencil in the last box because you can write with it, too. You should not have circled the baseball or the leaf because you do not write with them.

Now that you know how to play the game, let's look at some more pictures and stories. After this I will not help you play the game. You must do it all by yourself. Remember to look carefully at the pictures and listen to the story to find out which pictures to draw a circle around. Just try to do the best you can by yourself.

Now turn the page.
CHECK THAT EACH CHILD HAS TURNED THE PAGE.

1. Put your finger on the banana. Some of the people in the row of boxes wanted to enjoy a story about spaceships. Circle each person who is enjoying a story about spaceships.

2. Put your finger on the table. Some of the people in the row of boxes wanted to enjoy a story. Circle each person who is enjoying a story.

3. Put your finger on the comb. Circle each person who is learning how to build a birdhouse.

Now turn the page.

4. Put your finger on the pail. Circle each person who is finding what shows are on television.

5. Put your finger on the watch. Circle each person who is finding what time the bus goes.

6. Put your finger on the saw. Circle each person who is learning that there is a sale on.

7. Put your finger on the balloon. Circle each person who is finding what music to listen to.

Now turn the page.

8. Put your finger on the plane. Circle the children who asked people to pay money for the drinks.

9. Put your finger on the rabbit. Circle each person who is telling someone a story.

10. Put your finger on the tree. Circle each person who is telling their friend what they made for dinner.

Now turn the page.

11. Put your finger on the broom. Circle each person who is telling someone a story.

12. Put your finger on the elephant. Circle each person who is helping their brother remember what groceries to buy.

13. Put your finger on the duck. Circle each person who knew how to remember a recipe.


Now turn the page.
15. Put your finger on the leaf. Circle each person who is sending a message.

16. Put your finger on the banana. Circle each person who is giving directions.

17. Put your finger on the dog. Circle each person who is telling the class about going to the fair.

18. Put your finger on the snake. Circle each person who is leaving a message.
TEST OF LINGUISTIC AWARENESS
IN READING READINESS
Subtest B1
Understanding Literacy Functions

Douglas Ayers
John Downing
Brian Schaefer
University of Victoria, Canada

Illustrator: Dawn Chuddy

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Key

TEST OF LINGUISTIC AWARENESS
IN READING READINESS
Subtest B1
Understanding Literacy Functions

Douglas Ayers
John Downing
Brian Schaefer
University of Victoria, Canada

Illustrator: Dawn Chuddy

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Subtest 3. Awareness of the Structure of Language

Taken from the "Grammatic Completion" subtest of the Test of Language Development (TOLD) by Newcomer and Hammill, 1977.

All instructions and test procedures are exactly as prescribed by the authors of the test.

The manual and scoring instructions follow.

Grammatic Completion

Instructions: The Examiner says to the child, "I AM GOING TO SAY SOME SENTENCES NOW. IN EACH SENTENCE ONE WORD IS MISSING. SEE IF YOU CAN TELL ME THE MISSING WORD IN EACH SENTENCE. TRY THIS ONE, 'BILL IS A BOY AND JOHN IS A (....)'," Read each item clearly and slowly providing sufficient time for the subject to respond.

The accuracy of the child's response to the example item is not important. The demonstration item only serves to convey the procedure, i.e., the subject must supply missing words. Should the child fail to supply a word, Examiner must say, "CAN YOU TELL ME THE WORD THAT GOES HERE?, 'BILL IS A BOY AND JOHN IS A (....)"?" If the child still fails to respond, the Examiner holds up a pencil and say, I WRITE WITH A PENCIL AND THIS IS A (....)." Regardless of the subject's response to this item, the Examiner should proceed to item #1. If the subject provides the missing word on the first demonstration, the Examiner goes directly to item #1. Testing is discontinued after 5 consecutive failures.

Scoring: The Examiner should record all subject's answers on the score sheet in the space provided at the end of the sentence. Each correct response should be scored 1, while errors are scored 0. The number correct equals the total raw score. A maximum of 30 points may be obtained. Spontaneous corrections of earlier responses are accepted. The Examiner may not offer prompts in an effort to elicit a response.

On all test items, the missing word is located at the end of the sentences. Although one-word responses are called for, in some instances, the child may complete the sentence with more than one word, e.g., item 22 -- "JOHN LIKES TO THROW A BALL EVERY DAY. YESTERDAY HE (THREW A BALL)." Or item 12 -- "BETTY LIKES TO EAT COOKIES. EVERY DAY SHE (EATS SOME COOKIES)." Credit should be given for these types of responses, as long as the correct form of the missing word is supplied. In cases where the child provides multiple word responses which do not include the word depicted in the parentheses in the items, no credit is
given -- e.g., item 18 -- "A PERSON WHO PLAYS A DRUM IS A (DRUM PLAYER)." -- no credit; item 14 -- "JANE LIKES TO JUMP. NOW SHE IS (GOING TO JUMP)." -- no credit; item 9 -- "THE HAT BELONGS TO MOTHER. WHOSE HAT IS IT? IT IS (MOM'S)." -- no credit. The child does not receive credit unless he gives the precise form stipulated within the parentheses.

Items:

1. Mary has a dress and Joan has a dress. They have two (dresses).
2. Joey likes to play. Right now he is (playing).
3. The shoes belong to the boy. Whose shoes are they? They are the (boy's).
4. Betty likes to swim every day. Today she is (swimming).
5. A lady likes to drive. Everyday she (drives).
6. A boy likes to ride his bicycle everyday. Today he is (riding).
7. They toys belong to the children. Whose toys are they? They are the (children's).
8. A girl plays the piano everyday. Yesterday she (played).
9. The hat belongs to mother. Whose hat is it? It is (mother's).
10. The dress belongs to the woman. Whose dress is it? It is the (woman's).
11. A person who sings is a (singer).
14. Jane likes to jump. Now she is (jumping).
15. A cake might be small, but a cupcake is (smaller).
16. A person who paints fences is a (painter).
17. A dog can be big, but a horse is (bigger).
18. A person who plays a drum is a (drummer).
19. Joe had a gumdrop, and Sue had a handful of gumdrops, but Tom had a bagful so he had the (most).
20. Bob is a man. Bill is a man. Bob and Bill are two (men).
21. A cake might be small, and a cupcake is smaller, but a cookie is the (smallest).
22. John likes to throw a ball everyday. Yesterday he (threw).
23. Today I found a leaf. Yesterday I found two (leaves).
25. A spoonful of ice cream is good, two spoonfuls are better, and a dishful is (best).
26. Joe had one gumdrop. She had a handful of gumdrops so she had (more).
27. Mary is woman. Joan is a woman. Mary and Joan are two (women).
29. I have a mouse. She has a mouse. We have two (mice).
30. Jeff ate the candy quickly, and when Bill came, it had all been (eaten).
SUBTEST 4. Awareness of Language Units

After Fox and Routh, 1975 (Used with permission)

PRELIMINARY TASKS

Begin by saying:

I AM GOING TO SAY SOME THINGS TO YOU AND I WANT YOU TO SAY
JUST WHAT I SAY. FOR EXAMPLE, IF I SAY, "PETER JUMPS", YOU
WOULD SAY "PETER JUMPS." NOW LET'S TRY IT. PETER JUMPS.

Give the child an opportunity to respond to the example. When
he responds correctly ask him to repeat the following eight
sentences:

(1) He fell.
(2) Where is Mother?
(3) Maybe she can go.
(4) Someone found a book.
(5) We went after school.
(6) All the people went home.
(7) A lady lived in that house.
(8) The little boy looked out the window.

NOTE: If the child responds by repeating only part of the
sentence, repeat the example with the following instructions:
"NO, ______ IS ONLY PART OF WHAT I SAID. PLEASE SAY ALL OF
IT."

PART 1. SEGMENTING SENTENCES INTO WORDS.

Give the child the task of segmenting into words the same eight
sentences he has repeated in the PRELIMINARY TASKS.
Say:
NOW I'M GOING TO SAY SOMETHING TO YOU AND I WANT YOU TO SAY JUST A LITTLE BIT OF IT. FOR EXAMPLE, IF I SAY "PETER JUMPS", YOU WOULD SAY "PETER". NOW LET'S TRY IT. I'LL SAY "PETER JUMPS".

If the child responds correctly to the example he is then presented with the eight sentences to be segmented. For each sentence, if the child responds with a multi-word phrase, the experimenter then repeats this phrase back to him saying, "TELL ME A LITTLE BIT OF (PHRASE)."

In this way the child is led to segment each multiple word phrase completely into words, if he is capable of doing so, before progressing to the remainder of the sentence. The SCORING PROCEDURE involves drawing a line under each response unit produced by the child with a number under the line to indicate the order of the responses to that sentence. For example, the six consecutive responses to the last sentence in the series might be scored in the following way:

The little boy looked out the window.

```
1 4 5
2
6
```

A sentence is scored as successfully segmented if the child is able in this way to divide it into all of its separate words. If the child responds to the first example by repeating the entire sentence instead of a portion of it say, "NO, _____ IS ALL OF WHAT I SAID. SAY JUST A LITTLE BIT OF IT." Then repeat the example.

PART 2. SEGMENTING WORDS INTO SYLLABLES

This task requires the child to segment into syllables or units smaller than the words given the following bisyllabic words taken from the previous sentences: MAYBE, WINDOW, AFTER, LITTLE, SOMEONE, LADY, MOTHER, and PEOPLE.

Say to the child:

NOW, I'M GOING TO SAY SOMETHING TO YOU AND I WANT YOU TO SAY JUST A LITTLE BIT OF WHAT I SAY. FOR EXAMPLE, IF I SAY "PETER," YOU WOULD SAY "PETE." NOW LET'S TRY IT. I'LL SAY "PETER."

The child is required to segment each word at whatever boundary he chooses. Responses are recorded by underlining the portion of the word which the child used for his response. Two SCORES are obtained from the child's performance on this task, the
number of words segmented in any way and the number segmented at
the conventional syllable boundary indicated by a standard
dictionary. If the child gives a complete word response in this
task instead of a portion of a word, he is told, "NO, _____ IS
ALL OF WHAT IS SAID. PLEASE SAY JUST A LITTLE BIT OF WHAT I
SAY."

PART 3. SEGMENTING SYLLABLES INTO INDIVIDUAL SOUNDS

This task requires the child to segment syllables into
individual sounds. The 13 syllables to be used are: MAY, BE,
AFT, WIN, DOW, LIT, TLE, SOME, ONE, LAD, MOTH, PEO, and PLE.
Say to the child:

I AM GOING TO SAY SOMETHING TO YOU AND I WANT YOU TO SAY
JUST A LITTLE BIT OF WHAT I SAY. FOR EXAMPLE, IF I SAY
"PETE," YOU WOULD SAY "PE." NOW LET'S TRY IT. I'LL
SAY "PETE."

For syllables three phonemes long (i.e. AFT, WIN, LIT, SOME,
ONE, LAD, MOTH), the two phonemes remaining after initial
segmentation at the beginning or end of the syllable are
presented with the instruction: "TELL ME A LITTLE BIT OF ___." Responses are recorded by drawing a line number under the sounds made by the child, with a number beneath the line to indicate response order. The total SCORE on this task is the number of the 33 phonemes present in the syllables identified by the child.

Note: All responses should be tape-recorded to facilitate
scoring by re-analysis if necessary.
Subtest 5. Awareness of the Language of Instruction.

Taken from Subtest C2 "Technical Language of Literacy" Test of Linguistic Awareness in Learning to Read (LARR) by Ayers et al., 1977.

All instructions and test procedures are exactly as prescribed by the authors of the test.

Scoring: The rule on every item is that the child scores 1 if every correct response in that item is made and no incorrect response is made. In all other cases the score is 0.

The manual, test booklet and scoring key follow.

Note: Test used with permission of the authors.
AFTER THE TEST BOOKLETS HAVE BEEN DISTRIBUTED, FOR SAMPLE EXERCISE (a) SAY:

Now, we are going to play another game. Remember, you must look and listen carefully so that you will know how to play the game.

Open the booklet. Find the apple in the first box. Put your finger on the apple.

POINT TO THE APPLE IN THE TEST BOOKLET, THEN CHECK THAT EACH CHILD HAS THE CORRECT PLACE.

Now look at the things in the long box.
POINT TO THEM.
Here, here, here and here. I want you to find each thing that is an animal. Which is the animal?

Yes, this one.
The rabbit.
To play the game you draw a circle around your choice of the things I tell you to look for. I told you to look for each thing that is an animal. So draw a circle around the rabbit because it is an animal.

DRAW CIRCLE AROUND THE RABBIT IN YOUR TEST BOOKLET. CHECK THAT EACH CHILD MADE ONLY THE ONE CIRCLE.

FOR SAMPLE (b) SAY:

Now, put your finger on the flag in the next small box.

POINT TO THE FLAG IN THE TEST BOOKLET. CHECK TO SEE THAT EVERY CHILD HAS FINGER ON THE RIGHT PLACE.

In the long box beside the flag find each thing that someone can eat. Then circle each thing that someone can eat.

PAUSE. Did you find the things that someone could eat?
PAUSE.
Yes, someone could eat the banana, the apple and the strawberry. So you should have made a circle around the banana.

DRAW A CIRCLE AROUND THE BANANA IN THE TEST BOOKLET.

And around the apple.
DRAW A SECOND CIRCLE AROUND THE APPLE IN THE TEST BOOKLET.

And another circle around the strawberry.

DRAW A CIRCLE AROUND THE STRAWBERRY. CHECK THAT EACH CHILD HAS MADE THREE CIRCLES.

Now that you know how to play the game let's play it with some other things.

1. Put your finger on the tree. Look at the other things in the long box. Circle each thing that you think is a number. Circle each number.

2. Put your finger on the ring. Look at the things in the long box. Circle each thing that you think is a number.

3. Put your finger on the shoe. In the long box circle each thing that is a letter. Circle each letter.


Now turn the page.

Check that each child has turned the page.

5. Put your finger on the goat. Circle each letter.

6. Put your finger on the house. Circle each thing that is printing. Circle each piece of printing.


9. Put your finger on the sock. Circle each thing that is writing. Circle each piece of writing.


11. Put your finger on the watch. Circle the top line of the story. Circle the top line of the story.


Now turn the page.

13. Put your finger on the pail. Circle each thing that is
a word. Circle each word.
15. Put your finger on fish. Circle the first word in the box. Circle the first word.
16. Put your finger on the broom. Circle the first word in the box.
17. Put your finger on the rabbit. Circle the first two words in the box. Circle the last two words.
18. Put your finger on the flower. Circle the last word in the box. Circle the last word.
19. Put your finger on the snowman. Circle the last two words in the box. Circle the last two words.
20. Put your finger on the chair. Circle each thing that is a capital letter. Circle each capital letter.
22. Put your finger on the banana. Circle each thing that is a period. Circle each period.
23. Put your finger on the cup. Circle each period.
24. Put your finger on the candle. Circle each thing that is a question mark. Circle each question mark.
25. Put your finger on the cat. Circle the first letter in each word. Circle the first letter in each word.
26. Put your finger on the tricycle. Circle the last letter in each word. Circle the last letter in each word.
27. Put your finger on the radio. Circle each thing that is a sentence. Circle each sentence.
28. Put your finger on the bear. Circle each thing that is someone's name. Circle each name of someone.
TEST OF LINGUISTIC AWARENESS
IN READING READINESS

Subtest C1
Technical Language of Literacy

Douglas Ayers
John Downing
Brian Schaefer
University of Victoria, Canada

Illustrator: Dawn Chudy

© COPYRIGHT 1977
Tom is a fat dog.
He has a bone.
It is his food.

There are many kinds of birds. Some are small.
A wren is a small bird.
m  this  33  
F  ELEPHANT  man  b 
Can you read?  
She went to town.  
My watch is broken.  
Take a seat.  
Look at all the houses.  
Victoria, Canada.
Dr. Smith bought a car.

Ottawa, Ontario.

Can all birds fly? Yes, they can. But can an emu fly?

See my dog.

Come here.

The plant grows 22 blow snow flow grows

tree bush Susan comb
Key

TEST OF LINGUISTIC AWARENESS
IN READING READINESS

Subtest C1
Technical Language of Literacy

Douglas Ayers
John Downing
Brian Schaefer
University of Victoria, Canada

Illustrator: Dawn Chudy

© COPYRIGHT 1977
Dr. Smith bought a car.

Ottawa, Ontario

Can all birds fly? Yes, they can. But can an emu fly?

See my dog.

Come here.

The plant grows.

22 blow snow grow

flow

tree bush Susan comb
6. A

7. B

came truck to house

8. C

TELLING

9. D

People went

store ran meeting place

10. E

11. F

777 2525 dog chair

12. G

Tom is a fat dog
He has a bone.
It is his food.

13. H

There are many kinds of birds. Some are small.
A wren is a small bird.
A  B  C  D

14  m  OOOOO  this  33

15  F  ELEPHANT  man  b

16  Can you read?

17  She went to town.

18  My watch is broken.

19  Take a seat.

20  Look at all the houses

21  Victoria, Canada.
Subtest 6. Awareness of Functional and Logical Relationships in Language

Taken from the "Connectives Test" developed by Rodgers, Slade and Conry, 1974

Note: It is essential that the child's response to this test be audiotaped in order that the responses may be accurately judged for appropriateness.

Say to the child:

IN THIS ACTIVITY I AM GOING TO READ SOME INCOMPLETE SENTENCES TO YOU. I WOULD LIKE YOU TO FINISH THEM FOR ME SO THAT THEY MAKE SENSE. HERE'S IS ONE THAT WE CAN PRACTICE ON:

e.g. Sally and John asked mother for ....

(Help the child make a correct response and offer additional examples but make sure that none of the examples use the connectives featured in the test.)

Test.

Scoring: Score 1 for each sentence completion which provides a semantically appropriate response in term of the connective used.
TEST OF CONNECTIVES

1. The mouse saw the cat, and -
2. Ice-cream is good to eat, but -
3. At kindergarten the children sing songs, also -
4. Mary got her arithmetic right, so -
5. Because it snowed all night -
6. Although Lisa dropped the cup on the floor -
7. David would like a bike for his birthday; nevertheless -
8. Benny hurt his foot, consequently -
9. The car ran right over the kitten, yet -
10. In spite of all the sunny weather -
11. The Canucks win a lot of their hockey games; however -
12. If the wind blows very hard -
13. Matthew built a dog-house for his puppy; unfortunately -
14. Unless you have the money -
15. John ate his supper quickly, for -
16. Lucy's cousin sent her a doll for her birthday; still -
17. We planted some tulips and daffodils, thus -
18. My sister had a Barbie doll for her birthday, although -
19. Robert went to the store, because -
20. Christmas is a happy time, even if -
APPENDIX B. Record Form for the Test of Metalinguistic Awareness
<table>
<thead>
<tr>
<th>T O M A</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEST OF METALINGUISTIC</td>
<td>Grade</td>
</tr>
<tr>
<td>AWARENESS</td>
<td>Sex</td>
</tr>
<tr>
<td></td>
<td>School</td>
</tr>
<tr>
<td></td>
<td>Examiner</td>
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</table>

<table>
<thead>
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<th>Date Tested</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Date of Birth</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Year</th>
<th>Month</th>
<th>Day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBTEST</th>
<th>RAW SCORES</th>
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<tbody>
<tr>
<td>1.</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
</tr>
</tbody>
</table>

| TOTAL   |            |
## SUBTEST 1. AWARENESS OF WORDS AS ARBITRARY SYMBOLS

<table>
<thead>
<tr>
<th></th>
<th>Score 1 or 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. NO</td>
<td></td>
</tr>
<tr>
<td>2. YES</td>
<td></td>
</tr>
<tr>
<td>3. YES</td>
<td></td>
</tr>
<tr>
<td>4. NO</td>
<td></td>
</tr>
<tr>
<td>5. YES</td>
<td></td>
</tr>
<tr>
<td>6. NO</td>
<td></td>
</tr>
</tbody>
</table>

No. of 1s [__]
No. of 0s [__]
Total [__]
## SUBTEST 2. AWARENESS OF THE PURPOSES OF LITERACY

<table>
<thead>
<tr>
<th></th>
<th>SCORE 1 Or 0</th>
<th>SCORE 1 Or 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>A BC</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>A D</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>B C</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>B C</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>B D</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>A BD</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>B D</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>A C</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>B CD</td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>A D</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>A BC</td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>C D</td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>A BC</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>B CD</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>B D</td>
<td></td>
</tr>
</tbody>
</table>

**No. of 1s** __

**No. of 0s** __

**Total ____/20**
SUBTEST 3. AWARENESS OF THE STRUCTURE OF LANGUAGE

<table>
<thead>
<tr>
<th>GRAMMATICAL COMPLETION</th>
<th>Discontinue after 5 consecutive failures</th>
<th>Score 1 or 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mary has a dress and Joan has a dress. They have two (dresses).</td>
<td>____</td>
<td>1.</td>
</tr>
<tr>
<td>2. Joey likes to play. Right now he is (playing).</td>
<td>____</td>
<td>2.</td>
</tr>
<tr>
<td>3. The shoes belong to the boy. Whose shoes are they? They are the (boy's).</td>
<td>____</td>
<td>3.</td>
</tr>
<tr>
<td>4. Betty likes to swim every day. Today she is (swimming).</td>
<td>____</td>
<td>4.</td>
</tr>
<tr>
<td>7. They toys belong to the children. Whose toys are they? They are the (children's).</td>
<td>____</td>
<td>7.</td>
</tr>
<tr>
<td>10. The dress belongs to the woman. Whose dress is it? It is the (woman's).</td>
<td>____</td>
<td>10.</td>
</tr>
<tr>
<td>11. A person who sings is a (singer).</td>
<td>____</td>
<td>11.</td>
</tr>
<tr>
<td>15. A cake might be small, but a cupcake is (smaller).</td>
<td>____</td>
<td>15.</td>
</tr>
<tr>
<td>16. A person who paints fences is a (painter).</td>
<td>____</td>
<td>16.</td>
</tr>
<tr>
<td>17. A dog can be big, but a horse is (bigger).</td>
<td>____</td>
<td>17.</td>
</tr>
<tr>
<td>18. A person who plays a drum is a (drummer).</td>
<td>____</td>
<td>18.</td>
</tr>
<tr>
<td>19. Joe had a gumdrop, and Sue had a handful of gumdrops, but Tom had a bagful so he had the (most).</td>
<td>____</td>
<td>19.</td>
</tr>
<tr>
<td>21. A cake might be small, and a cupcake is smaller, but a cookie is the (smallest).</td>
<td>____</td>
<td>21.</td>
</tr>
<tr>
<td>23. Today I found a leaf. Yesterday I found two (leaves).</td>
<td>____</td>
<td>23.</td>
</tr>
<tr>
<td>25. A spoonful of ice cream is good, two spoonfuls are better, and a dishful is (best).</td>
<td>____</td>
<td>25.</td>
</tr>
<tr>
<td>26. Joe had one gumdrop. She had a handful of gumdrops so she had (more).</td>
<td>____</td>
<td>26.</td>
</tr>
<tr>
<td>27. Mary is woman. Joan is a woman. Mary and Joan are two (women).</td>
<td>____</td>
<td>27.</td>
</tr>
<tr>
<td>29. I have a mouse. She has a mouse. We have two (nice).</td>
<td>____</td>
<td>29.</td>
</tr>
<tr>
<td>30. Jeff ate the candy quickly, and when Bill came, it had all been (eaten).</td>
<td>____</td>
<td>30.</td>
</tr>
</tbody>
</table>

No. of 1s____
No. of 0s____
Total(30)____
SUBTEST 4. AWARENESS OF LANGUAGE UNITS

Part 1. Segmenting Sentences into Words

1. He fell.

2. Where is mother?

3. Maybe she can go.

4. Someone found the book.

5. We went after school.

6. All the people went home.

7. A lady lived in that house.

8. The little boy looked out the window.
Part 2. Segmenting Words into Syllables

1. Maybe 5. Someone
2. Window 6. Lady
3. After 7. Mother
4. Little 8. People

No. of words segmented in any way ____/8
No. of words segmented at the conventional syllable boundary ____/8
Subtotal ____/16

Part 3. Segmenting Syllables into Individual Sounds

1. May 8. Some
2. be 9. one
3. Aft 10. Lad
4. Win 11. Moth
5. dow 12. Peo
6. Lit 13. ple
7. tle

Subtotal ____/33
Total ____/84
SUBTEST 5. AWARENESS OF THE LANGUAGE OF INSTRUCTION

<table>
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<tr>
<th></th>
<th>SCORE 0 or 1</th>
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<th>SCORE 0 or 1</th>
<th></th>
<th>SCORE 0 or 1</th>
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<td>1.</td>
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<td>11.</td>
<td></td>
<td>21.</td>
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<tr>
<td>2.</td>
<td></td>
<td>12.</td>
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<tr>
<td>3.</td>
<td></td>
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<td>23.</td>
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<tr>
<td>5.</td>
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<td>15.</td>
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<td>25.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td></td>
<td>17.</td>
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<td>27.</td>
<td></td>
</tr>
<tr>
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Total /29
## SUBTEST 6. AWARENESS OF THE FUNCTIONAL AND LOGICAL RELATIONSHIPS IN LANGUAGE

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Total __/20
APPENDIX C. ANOVA Data For Sex Differences
Table 10
ANOVA Data For Sex Differences In
Achievement On TOMA and RSAT Variables
With Age As A Covariate (n=113)

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