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The Implementation of a Teacher Referral Behavioral Checklist in the Identification of Language Processing Deficits

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THE IMPLEMENTATION OF A TEACHER REFERRAL BEHAVIORAL CHECKLIST

IN THE IDENTIFICATION OF LANGUAGE PROCESSING DEFICITS
(TITLE)

BY

BARBARA T. VOSS

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ABSTRACT

The identification of language processing deficits has been acknowledged as a difficult task for the speech/language clinician. The literature has cited certain observable behaviors associated with language processing deficits, but these behaviors are often subtle enough to escape detection during routine speech and language screenings. Therefore, many language processing deficits are not identified until after the children have begun to experience academic struggle and/or failure. Several authors (Chalfant & Foster, 1974; Shepherd, 1982; Wiig & Semel, 1980) have suggested that classroom teachers may be useful in aiding speech/language pathologists in identifying these deficits. The purpose of this study was to evaluate the effectiveness of a Behavioral Checklist of documented observable behaviors which could be used as a teacher referral form to assist speech/language pathologists in the identification of children with potential language processing deficits.

The proposed Behavioral Checklist was completed by the classroom teachers of forty second and third grade subjects. Each subject was then given the Language Processing Test (LPT) (Richard and Hanner, 1985) and the Test of Problem Solving (TOPS) (Zachman, Jorgensen, Huisingh & Barrett, 1984). Each of the forty subjects were re-evaluated by their teachers on the Behavioral Checklist three weeks later. Scores were calculated for each of the measurements and compared statistically using the Pearson Product Moment Correlation Coefficient and Multiple Linear Regression.

Analysis of the data revealed significant reliability of the proposed Behavioral Checklist (R^2 = .77). Although the relationship between the Behavioral Checklist and language processing performance on the LPT and TOPS were not found to be statistically significant, an inverse relationship was suggested.

These findings indicate that the proposed Behavioral Checklist is a reliable measure for using classroom teachers to observe behaviors associated with potential language processing deficits. Future research needs to re-address the second question to determine the relationship between the Behavioral Checklist and standardized tests used for identifying children with potential language processing deficits.

DEDICATION

I wish to dedicate this thesis to Rita, Doug, Christy, Deb, Patty, Melanie and Andy for having the patience when I needed to talk; for the shoulders when I needed to cry; and for the love that was given in silence with the simple understanding that only real friends can share. Without their constant support and encouragement this project would not have been possible.

FRIENDSHIP

There´s a "Miracle called Friendship"
   that dwells within the heart.
And you don´t know how it happens
   or when it gets its start . . .

But the happiness it brings you
   always gives a special lift.
And you realize that "Friendship"
   is God´s most precious gift!

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I would like to take this opportunity to thank those people who helped transform this project from a dream into reality.

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CHAPTER I

INTRODUCTION

I. RATIONALE

"Learning the contents of the traditional curriculum depends upon acquiring a hierarchy of skills and knowledge," (Wiig & Semel, 1980, p. 368). For a child to acquire new knowledge and succeed in an academic setting, he must possess the ability to effectively expand and use his language. As a child progresses through school, the language becomes more complex and abstract. "The combination of abstract concepts and the complex language in which they are decoded taxes the child's ability to process the information; that is, to receive the message, attend to all critical elements, comprehend it, impose organization upon it, store it, retrieve it and express it." (Gerber & Bryen, 1981, p. 77). This serves as the definition of language processing. "The language of instruction, of assignment, of directions, of questioning, of conversation make strenuous demands upon the student's processing system" (Scholl, 1982, p. 251). If a child is unable to develop appropriate language processing skills, he may encounter difficulty in learning and, eventually, experience academic failure.

Children often experience difficulty in processing language in the absence of other major disabilities, such as, hearing loss, mental retardation, emotional disturbance or peripheral structural defects (Lubert, 1981). Children with language processing difficulties usually score within normal limits on picture vocabulary tests (Gerber & Bryen,

1981; Johnson & Mykelbust, 1967; Wiig & Semel, 1980).

A problem results from the fact that children who exhibit language processing difficulties are often not detected in routine speech and language screenings. The clues that may signal a language processing deficit are often subtle and difficult to detect. However, consistent behavior patterns may be a key to the early detection of children with learning disabilities (Shepherd, 1982). DeRuiter and Wansart (1982) believe that it is important to observe and analyze the behavioral responses of children in order to detect language processing problems. Furthermore, research has shown that there are distinct behaviors that are related to language processing deficits (German, 1982; DeRuiter & Wansart, 1982; Johnson & Myklebust, 1976; Wiig & Semel, 1980; Wiig, Semel & Nystrom, 1982).

Wiig and Semel (1980) believe that the school systems should make a conscious effort to implement procedures to assist speech and language pathologists in the identification of children with potential language processing deficits in the early and middle grades before academic struggle or failure occurs. Gerber and Bryen (1981) write that problems in language processing are one aspect of many learning disabilities. Shepherd (1982) supports Wiig and Semel's opinion and proposes that referrals be made on children who have potential learning problems so that comprehensive evaluations can be completed by a multidisciplinary team.

One way to assist in the identification of children with language processing disorders would be to obtain referrals from classroom teachers. Teachers work with the children for extended periods of time

each day. They see the behaviors exhibited by the children and are usually the first to observe children experiencing academic difficulties. Chalfant and Foster (1974) agree with and cite Haring and Ridgeway, who found that teacher observations were valuable in identifying children with learning problems.

II. STATEMENT OF PURPOSE

Although previous research has identified observable behaviors related to language processing disorders and has advocated the use of teacher referrals in the identification process, a valid and reliable referral instrument has not been developed. The purpose of this study was to develop a composite of documented observable behaviors which could be used as a teacher referral form. This behavioral checklist would serve to assist speech/language pathologists in the identification of children with language processing deficits.

The following research questions were posed:

1. Is the proposed Behavioral Checklist a reliable teacher referral instrument for identifying potential language processing deficits?

2. Are language processing behaviors as measured by the proposed Behavioral Checklist explained by (linearly related to) performance on the Language Processing Test and Test of Problem Solving?

CHAPTER II

REVIEW OF THE LITERATURE

I. LANGUAGE PROCESSING DEVELOPMENT

"Virtually every activity of life is conducted in language" (Shuy, 1984, p. 167). "Using language, both decoding other people's messages and encoding one's own, is a uniquely human function. It effects all learning and all interactions" (Wiig & Semel, 1980, p. 3). The inability to learn and use language results in an inability to effectively communicate and interact with other humans.

"Language can be defined as a socially shared code or conventional system for representing concepts through the use of arbitrary symbols and rule-governed combinations of those symbols" (Owens, 1984, p. 3). Owens (1984) defines communication as effective decoding, transmission and encoding of language. Owens (1984, p. 5) quotes Muma as stating that, "communication is the primary function of language".

Language can be sub-divided into receptive and expressive language components. Receptive language involves the aspects of decoding, understanding and comprehension. Expressive language pertains to the ability to encode or verbally respond. In most instances, language is learned through an auditory modality. Human beings who are physiologically and psychologically intact will acquire the language of those around them if they grow up around people who speak to them. "Human interaction is a necessary part of language acquisition" (Berko Gleason, 1985, p. 14).

"The acquisition of words, their meanings, and the links between

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them does not usually happen at once. Children´s strategies for learning word meanings and relating them to one another change as their internal representation of language constantly grows and becomes reorganized" (Pease & Berko Gleason, 1985, p. 103). In the beginning stages of language development, children learn words individually and begin to form a language base. As emerging sensori-motor knowledge increases and is gradually replaced by linguistic knowledge, an organizational system for learning language is established.

Language develops by first attaching labels to objects and/or object relationships that are experienced in the environment. Once mental representations and associated meanings for language have been developed, communication expansion can occur. Initial organization and processing strategies of language acquisition allow for the retrieval and the combination of words needed for communication. Effective and efficient encoding of utterances relies on the ability to draw from this organized language base. As memory and the ability to encode, store and retrieve information increases, so does the ability to formulate and use longer and more complex language structures. Discovery of the key to human interaction lies in the ability to apply language knowledge for communicative purposes.

Nearly every human verbal response relies heavily on the ability to recall information from long-term memory (DeRuiter & Wansart, 1982). Efficiency in encoding language relies on the amount of organization within the language system. "The refinement of efficient encoding systems during the preacademic and elementary school years is

critical for academic achievement" (Isreal, 1984, p. 232). "For the child to learn, he must possess a brain that has the capacity to perceive, comprehend, store, integrate, associate, and retrieve auditory information" (Scholl, 1982, p. 251). An inability to complete these tasks may eventually result in academic difficulties. "Without adequate development in both language and the strategies for processing information, a serious mismatch between the child and educational requirements is likely to result" (Gerber & Bryen, 1981, p. 77).

Language is one of the most crucial of all skills needed in any learning situation (King, 1984; Shames & Wiig, 1982; Shuy, 1984; Wiig & Semel, 1980). King (1984) explains that, "Just as success in learning is linked to skill in language, failure in school ultimately involves some kind of failure in language" (p. 175). Shames and Wiig (1982) point out that the inability to effectively use language is often not apparent until children are faced with the challenges of school. "Performance of academic tasks consists, largely, of the processing of information that is linguistically encoded; therefore, children with deficits in language are likely to experience difficulty in the performance of those tasks" (Gerber & Bryen, 1981, p. 76).

This language deficit can be observed in the behaviors that are displayed when a response is encoded (DeRuiter & Wansart, 1982). An inability to effectively process the language results in inefficient and ineffective output. After basic vocabulary and language abilities have been acquired, the demands for language processing increase. Using more refined language involves more complexity, thereby increasing the demand on the processing system.

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Previous literature in the areas of speech/language pathology and learning disabilities has suggested that classroom teachers may be valuable aids in the identification of children with potential learning problems (Chalfant & Foster 1974; Shepherd, 1982; Wiig & Semel, 1980). Classroom teachers work with the children for extended periods of time each day in a variety of contexts. They are often the first ones to observe academic struggle, as well as observe the behaviors associated with learning problems. Therefore, teachers might be an excellant source of information for the speech/language pathologist in identifying the students at risk for language/learning deficits.

II. LANGUAGE PROCESSING MODELS

There are two major theories to explain refinement and expansion of initial language processing. The first theory, which is widely accepted by audiologists, is called bottom-up processing. In this theory, each auditory stimulus component is individually processed. Duchan & Katz, (1983) explain that "information from the acoustic signal must be processed through several steps and in several ways before it becomes influenced by higher-level knowledge" (p. 37). However, Rees (1973) emphasizes that individual speech sounds occur much too rapidly in connected speech to allow each phoneme to be processed individually.

Many people, speech language pathologists among others, are not willing to accept the bottom-up theory of processing. They feel that processing does not occur one step at a time, but rather, it involves a means by "which the listener uses knowledge of the language and the

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world to make informed guesses about the speaker's message" (Duchan &
Katz, 1983, p. 35). Processing from a holistic or semantic based
viewpoint is termed top-down processing. This theory proposes that
processing begins by grasping the main idea or image, and then analyzes
the individual word and phoneme components to refine the message. Top-
down processing requires higher-order linguistic processing of word,
phrase, and sentence structures (Duchan & Katz, 1983). This viewpoint
uses the listener's lexical and semantic knowledge as the basis of
processing.

The theories of bottom-up and top-down processing have both been
widely criticized, debated, and defended in the literature (Duchan &
Katz, 1983; Lubert, 1981; Rees, 1973; Rice, 1983; Tallal, Stark,
Kallman, & Mellitis, 1981). Dissatisfaction with these viewpoints
prompted the emergence of several neuropsychological processing
theories. A neuropsychological model utilizes components of each
theory. One neuropsychological model which has merited some attention
and recognition is based on brain behavior relationships. This theory
utilizes A. R. Luria's organization of the brain and advocates that
"observed behaviors are related to brain function" (Richard & Hanner,
1985, p. 7). Luria contends that the listener hears an acoustic signal
and the brain reacts to this signal in a certain way. The manner in
which the brain interprets the acoustic signal can be evaluated by
observing the listener's response to the auditory signal.

Luria divides the brain into three functional units. The first
unit ". . . regulates the energy and level of tone of the cortex . . "

(Luria, 1970, p. 66) and is located in the upper and lower parts of the brain stem, particularly the reticular formation. The second functional unit is comprised of the temporal, parietal and occipital lobes. It is located in the "rear parts of the cortex" and is responsible for " . . . analysis, coding and storage of information" (Luria, 1970, p. 67). Furthermore, the second functional unit is sub-divided into a hierarchical organization of three major zones. Each lobe involved in the second functional unit contains a primary zone that is responsible for the reception of stimuli; a secondary zone that processes the stimuli, i.e., attaches meaning to it, organizes it, and stores it for later recall; and a tertiary zone that integrates the information with the other portions of the brain (Luria, 1970). Luria's third functional unit "comprises the frontal lobes and is involved in the formation of intentions and programs for behavior" (Luria, 1970, p. 68).

The temporal lobe of Luria's second functional unit is primarily responsible for speech, language, and hearing. Effective processing requires a coordinated effort of neural activity in its zones. First, auditory stimuli must be accurately received in the primary zone of the temporal lobe for processing. If the signal is not accurately received, there will be problems in attempting to interpret the stimuli. Second, the information must be properly coded, organized, and stored in the secondary zone. Again, an inability to complete any of these tasks could result in a processing deficit. Finally, the tertiary zone integrates what has been processed in the secondary zone

and relates it with other parts of the brain for higher level language tasks (Luria, 1970).

Deficits in processing usually manifest themselves through behavioral responses. DeRuiter and Wansart (1982) stress the importance of evaluating the system to determine processing problems by examining behavioral responses. By comparing behavioral responses with the known responsibilities of each of the zones, assumptions can be made regarding where a deficit or breakdown in processing is occurring.

III. LANGUAGE PROCESSING BEHAVIORS

Numerous researchers in the fields of speech pathology and learning disabilities have acknowledged specific behaviors that occur in children as a result of processing deficits (DeRuiter & Wansart, 1982; German, 1982; Johnson & Myklebust, 1967; Wiig & Semel, 1980; Wiig, Semel, & Nystrom, 1982).

The most prevalent behavior recognized is that of using functional definitions, descriptions or circumlocutions instead of the target word (DeRuiter & Wansart, 1982; German, 1982; Johnson & Mykelbust, 1967; Wiig & Semel, 1980; Wiig, Semel & Nystrom, 1982). An example of this behavior would be "the yellow thing to write with" rather than saying the word "pencil". Another behavior indicating processing difficulties is the use of semantically related substitutions (Johnson & Myklebust, 1967), such as, "apple" for "orange", or "food" for "cake".

The use of general, generic or original language is also a behavior indicative of processing deficits (DeRuiter & Wansart, 1982;

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Johnson & Myklebust, 1967; Wiig & Semel, 1980). Wiig & Semel (1980) give the example of a child who exhibits this "extended word use" by saying, "I got volcano craters all over", (p. 329), when the child, in fact, has the chicken pox! Another example of this behavior was noted by DeRuiter & Wansart (1982) when they explained that a child may use words such as "thing" or "stuff" instead of a specific name. German (1982) reported that children often use word substitutions that have "phonemic attributes of the target word . . . (e.g., stool for spool)" (p. 224). This characteristic has also been noted by Wiig, Semel, & Nystrom (1982). In their study of learning disabled children with word-finding problems, Wiig & Semel (1980) attribute this behavior to ". . . similarities in sounds between the intended and the substituted words . . . " (p. 324).

Children with processing problems have also been observed to use pauses in their speech when they have trouble retrieving a particular word (Johnson & Myklebust, 1967; Wiig & Semel, 1980; Wiig, Semel & Nystrom, 1982). Perseveration and reauditorization are two other behaviors that have been reviewed by Johnson & Myklebust (1967); Shames & Wiig (1982); Wiig & Semel (1980); Wiig, Semel, & Nystrom (1982).This behavior involves repeating key information to assist the child in retrieving words needed to answer a question. German (1982) has noted the behavior of a child answering "I don't know" to a question, when it is known that the child does, in fact, know the correct answer. Furthermore, Hallahan & Kauffmann (in Scholl, 1982) note that teachers have observed that children " . . . cannot remember what they learn

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from hour to hour or from day to day" (p. 243). This behavior suggests that the children are unable to efficiently organize the information as it is presented. They appear to have forgotten what was taught when required to encode a response concerning recent subject matter.

Other behaviors indicative of language processing deficits are mentioned in the literature with less consistency and explanation. One behavior involves the use of semantically empty placeholders, such as, "uh, uhm, err, ah, well" (Wiig & Semel, 1980). For example, a child might say, "I err, ah went to the err ah the uhm store to buy uh some err delicious well err something" (Wiig & Semel, 1980, p. 329).

Another behavior mentioned by Wiig & Semel (1980) is the overuse of stereotypic phrases, such as, "you know, you see." They present the following example: "You see I went to the whatcha´ma call it store to buy that thing, you know" (Wiig & Semel, 1980, p. 329). The use of starters has also been documented. Starters, which are most often used to begin sentences, phrases, and clauses, include "and then, and, then, now, well," etc. (Wiig & Semel, 1980).

Imprecise and restrictive verb use is a behavior also observed with processing deficits. For example, utterances may include the use of "I got the fish" instead of the more precise verb, "I caught the fish"; or "I made the dress" for "I sewed the dress" (Wiig & Semel, 1980).

The presence of any of these behaviors may indicate the presence of a language processing deficit. A language processing evaluation should be completed to determine if a problem does exist.

IV. LANGUAGE PROCESSING ASSESSMENT

Effective auditory processing requires accurate reception of verbal stimuli in the primary zone of the temporal lobe. This can be assessed through tests of hearing acuity and speech discrimination. The usual method for determining if hearing acuity is within normal limits is to conduct pure tone air conduction hearing screening at levels no higher than 25dB for 1000, 2000, 4000Hz (Anderson, 1978).

Tests of speech discrimination are used "to evaluate the functional state of the auditory system at suprathreshold levels" (Goetzinger, 1978, p. 155). Goetzinger (1978) cites the development of the CID W-22 words lists (Hirsh et al., in Katz, 1978) and the NU No. 4 and No. 6 word lists (Tillman et al., in Katz, 1978) for the evaluation of speech discrimination abilities. Both tests consist of 50 phonetically balanced monosyllabic words which can be administered via live voice or prerecorded audio tape at 25-50dB above sensation level. Goetzinger (1978) reports that neither the NU No. 4 or No. 6 have had extensive clinical use. However, he refers to Carhart (in Katz, 1978) who discovered that "as long as the test items are meaningful monosyllables for the patient and their phonetic distribution is appropriately diversified, one 50 word compilation is relatively equivalent to another" (p. 154).

There are a limited number of language processing assessment instruments available. In the following paragraphs, several of the most commonly used instruments are reviewed.

The Clinical Evaluation of Language Functions (CELF), (Semel &

Wiig, 1980) is accepted as a diagnostic instrument to evaluate language processing abilities. The purpose is to "provide differentiated measures of selected language functions in the areas of phonology, syntax, semantics, memory, and word finding and retrieval (Semel & Wiig, 1980, p. 1). The test was designed to "probe specific language processing and production abilities of school-age children" (Semel & Wiig, 1980, p. 1). The CELF can be administered to children in kindergarten through 12th grade, contains 13 subtests and requires an administration time of 76 minutes.

Semel and Wiig (1980) encourage the use of classroom behavioral observations, as well as the formal results obtained from administration of the CELF, in making a diagnosis regarding language processing.

Although the CELF has been accepted as a diagnostic instrument for language processing, its purpose and effectiveness have also been criticized. Muma (1984) criticizes the construct validity of the CELF in the areas of "(a) an absence of a theoretical base; (b) an incompatibility of concepts with the contemporary psycholinguistic literature; and (c) the use of terminology in bastardized ways" (p. 101). Muma argues that the absence of a precise model, as well as the conflicting definitions of terms used in the CELF, results in an instrument that cannot provide valid estimates of language processing deficits.

Semel and Wiig recommend administration of the Illinois Test of Psycholinguistic Abilities (ITPA) (Kirk, McCarthy, & Kirk, 1968) as a

supplementary test in the diagnosis of language processing deficits.

The ITPA is based on a psycholinguistic model which " . . . attempts to relate those functions whereby the intentions of one individual are transmitted (verbally or nonverbally) to another individual, and, reciprocally, functions whereby the environment or the intentions of another individual are received and interpreted" (Kirk, McCarthy, & Kirk; 1968, p.6). Norms are given for the age range of two years four months through ten years three months.

Willeford and Billger (1978) refer to a study by Burns and Watson in which " . . . a factor-analysis study of the ITPA found little or no basis for the supposition that the Revised Edition of the ITPA measures the ten distinct entities suggested by its 12 subtests. Rather, they suggest that no more than five abilities are measured and that, if there are ten distinct psycholinguistic abilities, the ITPA does not seem able to measure them separately or individually." Willeford (1976) found that many children with " . . . confirmed, auditory-based learning disabilities, score at normal or above age levels on the auditory subtests of the ITPA" (Willeford & Billger, 1978, p. 413).

These findings suggest that the ITPA may not be an appropriate instrument in the assessment of processing disorders. Furthermore, the administration of the CELF requires a considerable amount of time.

The Test of Word-Finding (TWF) (German, 1986) is a test to assess word-finding skills. It is designed to measure accuracy and speed in naming. Analysis of the nature in naming responses and observation of secondary behavioral characteristics, such as gestures or extra-

verbalizations, are two aspects incorporated in test administration and scoring. Norms are given for children between the ages of six years six months and twelve years eleven months.

The test requires an administration time of 20-30 minutes and consists of five sections. The TWF assesses only word-retrieval skills and does not evaluate the entire language processing system or other processing behaviors.

The Language Processing Test (LPT), developed by Richard and Hanner (1985), is designed using a neuropsychological model which incorporates A. R. Luria's model of brain organization. "The LPT evaluates behaviors mediated in the secondary zone of the temporal lobe. Therefore, primary zone dysfunction must be eliminated as a factor. Primary zone dysfunction can be identified through tests of hearing acuity and hearing discrimination" (Richard & Hanner, 1985, p. 7).

The LPT assesses functioning in the secondary zone by looking at responses through a hierarchy of increasingly complex tasks. The test consists of two pretests and six subtests, can be administered in approximately thirty minutes and is appropriate for children between the ages of five years zero months and eleven years eleven months.

Richard and Hanner include a set of behaviors that may indicate deficits in language processing. Word retrieval difficulties, inappropriate word usage, neutral or nonspecific word usage, inability to correct recognized errors, seemingly poor memory, avoidance or no response, rehearsal behavior, and pauses are behaviors identified in

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students "whose language disorders may be most appropriately identified by the LPT" (Richard & Hanner, 1985, p. 9).

The Test of Problem Solving (TOPS), "is an expressive test designed to assess children's thinking and reasoning abilities critical to events of everyday living" (Zachmann, Jorgensen, Huisingh, & Barrett, 1984, p. 7). TOPS is appropriate for students over six years of age, is normed for students six years zero months through eleven years eleven months, and is comprised of five subtests. The TOPS is designed to yield expressive responses which reflect a student's ability to verbalize his logical thought processes. In order "to elicit these expressive responses in the most natural interactive manner possible, the examiner's questions deal with common occurrences depicted in fifteen illustrations" (Zachmann, Jorgensen, Huisingh, & Barrett, 1984, p. 11-12). The student's task is to analyze the picture and question to formulate the best response. The TOPS yields possible answers to questions of thinking ability, relevancy of responses, word-finding abilities and comprehension skills (Zachmann, Jorgensen, Huisingh, & Barrett, 1984).

TOPS is an assessment instrument that can be used to make inferences concerning the tertiary zones of Luria's second functional unit. Responses for TOPS require integration of information from the primary, secondary, and tertiary zones of the processing system.

Language processing assessment instruments are available. However, the behaviors associated with a language processing deficit are often subtle enough to escape detection during routine speech and

language screening. Classroom teachers interact with the children on a daily basis and are often the first to detect the presence of these behaviors. Therefore teacher referral plays an important part in the initial detection of language processing deficits.

V. CONCLUSION

The ability to process language is essential to effective communication with other human beings. The proposed theories of processing attempt to explain the components for attaching meaning to auditory stimuli. The neuropsychological model incorporating brain behavior relationships, appears to be the most satisfactory theory at present.

Research has indicated that specific patterns of behavior are consistently observed with language processing deficits. These behaviors are manifested when verbal output is formulated in response to reception of auditory stimuli.

Assessment of children exhibiting these behaviors has not been consistent. Routine speech and language screening often misses these behavioral patterns, resulting in a missed diagnosis of a language processing deficit. A composite behavioral checklist for teachers referrals would appear to be beneficial for documenting observation of language processing problems in the classroom.

CHAPTER III

METHODS

Subjects

The subjects for this study were 40 second and third grade students from Lake Crest School in Oakland, Illinois. While all of the subjects were selcted from a normal classroom setting, it is possible that some of the subjects were receiving remedial services in such areas as speech/language or learning disabilities. Each subject was required to return a signed parental consent form in order to participate in the study (Appendix A). The grade distribution of subjects is presented in Table 1.

TABLE 1. Distribution of Subjects by Grade Level.

Grade Level	Number of Subjects
Second	16
Third	24
Total	40

Subjects had to pass two hearing measurements before two standardized language tests were administered. Subjects were required to pass a pure tone air conduction hearing screening at 25dB for 500Hz, 1000Hz, 2000Hz, and 4000Hz. Subjects were also required to pass a speech discrimination test with at least 80% accuracy using the CID W22 word lists at 65dB.

Derivation of Behavioral Checklist

A prototype of the study was completed in March 1986 at Lincoln

School in Monticello, Illinois, to develop and refine the Behavioral

Checklist for experimental investigation. Subjects for the prototype

were five first, second and third grade students. Each student

returned a positive parental consent form before testing was

initiated. The respective classroom teachers completed a Behavioral

Checklist (Appendix B) on each child from which a composite score was

calculated for future reference. Scores were calculated using the

following: Never (N) = 1; Rarely (R) = 2; Sometimes (S) = 3; Often

(O) = 4; and Always (A) = 5. Within one week of the completion of the

checklist, the students were given the Language Processing Test

(Richard & Hanner, 1985). Responses were recorded on the appropriate

form for later scoring and analysis. After the Behavioral Checklist

and the LPT were completed for each subject, the investigator held

individual conferences with each of the three classroom teachers. The

purpose of the conference was to discuss the teacher's interpretations

of each of the ten stimulus behaviors listed on the Behavioral

Checklist and to determine if their interpretations were consistent

with those of the investigator. All three teachers were in agreement

with the investigator as to an appropriate interpretation of each

stimulus item on the Behavioral Checklist.

Further analysis of the prototype data resulted in the following

revision of the Frequency Scale: NEVER = 0, RARELY = 1, SOMETIMES = 2,

OFTEN = 3, and ALWAYS = 4. This revision was prompted by an observed

inflation of scores, with a score of 10 being the minimum possible

score. It was felt that the revision reduced the mathematical

complexity of the scoring system. Further revision resulted in replacement of numerals with capital letters in the frequency scale (Appendix C). This change was made in an attempt to make completion of the Behavioral Checklist more descriptively objective.

Analysis of the prototype data resulted in the proposed Behavioral Checklist (Appendix C) to be used in the present study. The proposed Behavioral Checklist consisted of ten observable behaviors that have been cited in the literature as being associated with language processing deficits. The behaviors were listed in a descriptive manner and in no particular order. The Frequency Scale for rating observations of the behaviors consisted of the following: N (Never), R (Rarely), S (Sometimes), O (Often), and A (Always). There was an optional section at the bottom of the Behavioral Checklist for teachers to add additional comments.

Materials

The proposed Behavioral Checklist (Appendix C) was used to assess the frequency of the ten behaviors associated with language processing.

The Language Processing Test (LPT) (Richard & Hanner, 1985) and the Test of Problem Solving (TOPS) (Zachman, Jorgensen, Huisingh, & Barrett, 1984) were administered to each subject to assess language processing abilities.

Equipment

A Maico 19 portable audiometer was used to conduct pure tone air conduction hearing screenings.

A Panasonic Model #RX - 5080 cassette recorder and Realistic Nova 40 headphones, and a prerecorded cassette tape of the CID W22 words were used to conduct speech discrimination testing. Prior to testing, a Type 2 Ansi SI.4 1565-B sound level meter was used to calibrate the pre-recorded speech discrimination tape with the cassette recorder at 65dB.

Procedures

Parental consent forms were distributed to every second and third grade student attending Lake Crest School. Only those students who returned positive notes of parental consent were considered in initial subject selection. Due to the small number of parental consent forms that were returned, all students who returned a signed parental consent form were included in the initial subject selection.

Each subject's classroom teacher completed the proposed Behavioral Checklist for each student who returned a signed parental consent form.

Pre-requisite testing of hearing acuity and speech discrimination was conducted by the investigator in a quiet room at Lake Crest School. The pre-experimental tests were administered to the subjects in the following order:

1. A pure tone air conduction hearing screening was administered at 25dB for 500, 1000, 2000, and 4000Hz.

2. A speech discrimination test was given at 65dB via earphones using the CID W22 half lists. A criteria of at least 80% was required to pass this test.

Successful completion of both pre-experimental hearing tests was

necessary for further inclusion in the study. Subjects who passed both pre-requisite hearing tests were administered the Language Processing Test and the Test of Problem Solving. Tests were administered in random order by one of two Eastern Illinois University graduate students in Speech Pathology and Audiology. Both examiners had been trained in the administration of hearing and language tests during their professional education programs. One examiner administered all of the LPTs with the other examiner administering all of the TOPS. Twenty students were administered the LPT first in the series of two tests with the other twenty being administered the TOPS first.

Three weeks after the initial Behavioral Checklist was completed, the classroom teacher once again completed a Behavioral Checklist for reliability measurements. The classroom teachers were not aware that they would be asked to re-evaluate the students with the Behavioral Checklist.

All experimental testing was conducted in a quiet room at Lake Crest School within a maximum period of three weeks following completion of the initial Behavioral Checklist by each subject's teacher.

Assessment Analysis

The investigator converted the letter ratings on the Behavioral Checklists into numerical data using the following scoring system: N (Never) =0; R (Rarely) = 1; S (Sometimes) = 2; O (Often) = 3; and A (Always) = 4. After this conversion, the investigator computed a composite score for each subject on each of the two completed

Behavioral Checklists for use in analysis procedures.

The Language Processing Test and the Test of Problem Solving were scored by the respective examiners as directed in the manuals. Standard scores for each subject were recorded for later analysis.

The Pearson Product Moment Correlation Coefficient and Multiple Linear Regression were used to statistically analyze the data.

RESULTS

At the outset of this study the following research questions were posed:

1. Is the proposed Behavioral Checklist a reliable teacher referral instrument for identifying potential language processing deficits?

2. Are language processing behaviors as measured by the proposed Behavioral Checklist explained by (linearly related to) performance on the Language Processing Test and Test of Problem Solving?

The Pearson Product Moment Correlation Coefficient and Multiple Linear Regression were used to statistically analyze the descriptive data to address the posed question. An N = 40 was used for all statistical analyses.

The statistical hypothesis for reliability was as follows: The proposed Behavioral Checklist is a reliable measure in the identification of language processing deficits.

The null hypothesis was as follows: The proposed Behavioral Checklist is not a reliable measure in the identification of language processing deficits.

$$HO: \quad R^2 = 0$$
$$HA: \quad R^2 \neq 0$$
$$p < .05$$

The Pearson Product Moment Correlation Coefficient was used to correlate the scores obtained on the initial behavioral checklist with those obtained on the same checklist three weeks later. Results are presented in Table 2.

TABLE 2. Pearson Product Moment Correlation Coefficients for the proposed Behavioral Checklist.

Checklist Reliability Coefficient R^2 = .766
                                        p   = .0001

Scores on the Behavioral Checklist re-evaluations were found to correlate significantly with the initial checklist evaluations at the .0001 level of confidence. Based on the above statistical data, the proposed Behavioral Checklist is a reliable referral instrument for observation of the behaviors associated with language processing. Therefore, the null hypothesis was rejected and the alternate hypothesis was accepted.

The second issue was to determine if language processing, as measured by the Behavioral Checklist, was related to language processing as measured by the LPT and TOPS. Multiple linear regression was used to address this issue.

The statistical hypothesis for multiple linear regression was as follows: Language processing behaviors as measured by the proposed Behavioral Checklist (Y) are explained by (linearly related to) performance on the Language Processing Test (X1) and the Test of Problem Solving (X2).

The null hypothesis was as follows: Language processing behaviors as measured by the proposed Behavioral Checklist (Y) are not explained by (linearly related to) performance on the Language Processing Test (X1) and the Test of Problem Solving (X2).

Full Model: $Y' = a + b1X1 + b2X2$

Restricted Model: $Y' = a$

where Y = score on the Behavioral Checklist

    X1 = standard score on the LPT

    X2 = standard score on the TOPS

and a, b1, and b2 are determined using the least squares criterion. An α level of .05 was used to establish significance.

Table 3 presents the statistical analysis of the data yielding the following means, standard deviations, and correlations for the variables.

TABLE 3.   Means, standard deviations, and correlations for Behavioral Checklist (Y), LPT (X1) and TOPS (X2).

	Means	Standard Deviations	Correlations	
			Y	X1
Y	7.025	6.427		
X1	40.725	7.756	−.037	
X2	47.625	3.506	−.256	.421*
				*p < .05

The correlation between the independent variables of LPT (X1) and TOPS (X2) show a significant positive relationship, i.e., the scores increase and decrease similarly. Furthermore, the correlation coefficients indicate an inverse relationship between the dependent

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variable Behavioral Checklist (Y) and the two independent variables of
LPT (X1) and TOPS (X2). This suggests that as the Behavioral Checklist
score increased (higher frequency of language processing behaviors
observed) the scores on the standardized tests decreased (poorer
language processing performance).

The analysis of variance is summarized in Table 4.

TABLE 4. Analysis of Variance for LPT and TOPS regressed on the
Behavioral Checklist (p < .05).

Source	df		SS	MS	F
Model	2		114.935	57.468	1.42
X1		1	2.254		
X2		1	112.681		
Error	37		1496.039	40.433	(p = .254)
Total	39		1610.975		

The full model regression equation was $Y' = 29.60 + .071X1 - .535X2$
and had an R = .07. This means that only 7% of the variance of the
Behavioral Checklist (Y) was accounted for by LPT (X1) and TOPS (X2).
A comparison of the restricted model to the full model yielded an F =
1.42 with 2 and 37 degrees of freedom, which was not significant at α
= .05. Therefore, the restricted model of $Y' = 29.60$ was accepted.
This means that language processing behaviors as measured by the
proposed Behavioral Checklist are not explained by (linearly related
to) performance on the LPT and TOPS.

CHAPTER V

DISCUSSION

Previous research and literature has shown that there are certain observable behaviors that are associated with language processing deficits. It has also been shown that many children with language processing deficits are not identified until after academic struggle or failure has occurred. The purpose of this study was to determine if the proposed Behavioral Checklist could be used as a reliable teacher referral form to appropriately identify children with potential language processing deficits.

The proposed Behavioral Checklist was completed on each of 40 second and third grade students. Those subjects who passed pure tone hearing screening and speech discrimination testing were evaluated using the Language Processing Test and Test of Problem Solving. The tests were completed during one testing session. Three weeks after the teachers filled out a Behavioral Checklist, the Behavioral Checklist was completed again to serve as a reliability measurement.

Results of the study indicate that the proposed Behavioral Checklist is a reliable instrument for teachers to use in observing behaviors associated with language processing. Although an inverse linear relationship was indicatedbetween scores on the Behavioral Checklist and performance on the Language Processing Test and the Test of Problem Solving the relationship was not found to be significant.

The research questions proposed at the onset of this study were:

1. Is the proposed Behavioral Checklist a reliable teacher referral instrument for identifying potential language processing deficits?

2. Are language processing behaviors as measured by the proposed Behavioral Checklist explained by (linearly related to) performance on the Language Processing Test and Test of Problem Solving?

In answer to the first question, a statistically significant correlation was found between the two evaluations of the Behavioral Checklist. This significant correlation was found using four individual classroom teachers, two from second grade and two from third grade. The correlation coefficient was significant enough to suggest that the proposed Behavioral Checklist can reliably be used by classroom teachers to assist speech/language pathologists in identifying children who exhibit behaviors associated with potential language processing deficits.

The significant correlation confirms previous research that has suggested that classroom teachers may be valuable aids in identifying the behaviors associated with language processing deficits. In this study, the behaviors that have been cited in the literature were reliably observed by the classroom teachers of second and third grade students. Thus far, these behaviors have been subtle enough to escape detection during routine speech and language screenings. This study has shown that teachers can reliably observe these behaviors as early as second grade. This study also suggests that early identification

using the Behavioral Checklist may be possible before children experience academic struggle or failure.

In answer to the second question, scores on the Behavioral Checklist were not significantly related to performance on the Language Processing Test and the Test of Problem Solving. Therefore, there appears to be no significant relationship between language processing as measured by the Behavioral Checklist and language processing as measured by the LPT and TOPS.

There are several reasons why significance may not have been found in the second aspect of this study. First, only four teachers were utilized in this study. Informal analysis of the data revealed that one teacher rated most of the students in her classroom with "N" or "Never" exhibiting the behaviors associated with language processing. This one teacher's low rating scores suggest a possible unfamiliarity in observing behaviors that are associated with language processing. Her inability to observe these behaviors may have skewed the data in this study. With careful observation it is unlikely that the majority of the ratings would have been "N" or "Never". Miller (1984) has suggested that it would be normal for children to exhibit some of these behaviors, since their processing systems are not fully developed by second and third grade. It is when several of these behaviors are used consistently that potential language processing deficits are suggested.

It is also possible that the speech/language pathologist in this school conducts minimal language therapy. If language has not been properly in-serviced, teachers may not be trained to recognize behaviors which are indicative of language processing problems. The

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effectiveness of the Behavioral Checklist in this school may therefore, be minimized.

The major conclusion based on the data and analyses obtained in this study is that the proposed Behavioral Checklist is a reliable instrument for observing the behaviors associated with language processing. The study supports previous research that has suggested that teachers may be valuable aids in identifying these behaviors (Chalfant & Foster, 1974; Wiig & Semel, 1980). The Behavioral Checklist demonstrated significant intrajudge reliability, as teachers were able to consistently evaluate the frequency of behaviors associated with language processing in individual students.

However, the relationship between the observed behaviors evaluated on the Behavioral Checklist and assessment instruments for language processing was not substantiated in this study. This raises questions regarding what the Behavioral Checklist actually measures, or if the assessment instruments adequately evaluate language processing deficits. Future research needs to re-address the second aspect of this study to determine if there is a significant relationship between the Behavioral Checklist and standardized tests used for identifying children with potential language processing deficits.

Based on the statistical data obtained and conclusions that were drawn, several implications for future research have been formulated.

1. It may be beneficial to have several teachers complete the Behavioral Checklist on any given student. In doing this, a better estimate of the child's performance in different school settings may be gained. This approach would also minimize a

possible skewing effect by one teacher.

2. Further research investigating the reliability of the
    Behavioral Checklist could be done with a variety of different
    populations. For example,

    a. disordered populations, such as, learning disabled,
        behavioral disordered, educable mentally handicapped, and
        trainable mentally handicapped;

    b. different age ranges;

    c. male versus female;

3. Factor analysis of the ten specific behaviors could be
    completed to determine which behaviors are better predictors
    of potential language processing deficits.

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Appendix A

PARENTAL CONSENT FORM

Dear Parent,

I am a graduate student at Eastern Illinois University. As part of my professional training, I am conducting some research in cooperation with the Oakland School District.

I am requesting permission to involve your child in this study. Each student included will have their hearing tested and complete two evaluation tests. These tests will be conducted in the school building during regular school hours with the cooperation of your child's teacher. The results of these tests will not influence the student's academic status in any way. I want to reassure you that your child's name will not appear in the results of the study.

Successful completion of this research project is dependent upon your cooperation. I hope you will allow your child to participate in this enjoyable and educational endeavor.

Thank you for your support. If you have any questions, feel free to contact me at 345-9231 after 4:30 p.m.

                                        Sincerely,

                                        Barbara T. Voss
                                        Graduate Student
                                        Eastern Illinois University

I give permission for my child _____ to
participate in the study conducted by Barbara T. Voss. I understand
that there is no risk involved and that I may withdraw my child at any
time after the study has begun.

_____
Parent or Guardian's Signature

_____
Date Signed

_____
Child's Date of Birth

Please return this to the child's teacher at Lake Crest School by
October 3, 1986. Thank you for your cooperation!

Appendix B

NAME_____

BEHAVIORS	FREQUENCY				
	NEVER	RARELY	SOMETIMES	OFTEN	ALWAYS
1. Student has trouble thinking of and using every-day words. The student may or may not eventually think of the words. (i.e. "I ate the sandwich for lunch.")	1	2	3	4	5
2. When a specific word is prompted, the student names category instead of the specific label. (i.e. animal", or "food" instead of "dog", or "cake".)	1	2	3	4	5
3. When a spoken mistake is brought to the student's attention, he recognizes it, but cannot correct it. (i.e. "ride on a car/ride in a car" or "walk on the steps/walk up the steps.")	1	2	3	4	5
4. Student uses a similar sounding word for the target word. (i.e. "I went down the sideway"/"I went down the sidewalk.")	1	2	3	4	5
5. Student answers, "I don't know" to a question when it is known that he does. (i.e. The student is asked to name two body parts, and he replies, "I don't know.")	1	2	3	4	5
6. Student struggles a great deal or requires extensive review to answer a question that he knew the answer to the day before. (i.e. The student gave correct answers yesterday, but today it seems like he is hearing the information for the first time.)	1	2	3	4	5
7. Student talks to himself or repeats key information while trying to answer. (i.e. The student is asked to name two fruits, and he repeats to himself "fruit, fruit, fruit".)	1	2	3	4	5
8. The student is slow to begin answering a question (i.e. There is a time lag between the end of the question asked and the beginning of the student's answer.)	1	2	3	4	5
9. The student uses neutral, generic, or original language instead of specific words. (i.e. "things", "stuff", "thingamajig", or "zhoot".)	1	2	3	4	5
10. The student describes an object instead of using a specific label. (i.e. yellow thing I write with/pencil, quacking bird/duck.)	1	2	3	4	5

ADDITIONAL COMMENTS (optional):_____

_____

DIRECTIONS   NAME_____

1. Fill in the child's name.
2. Read BEHAVIORS.
3. Circle FREQUENCY.

BEHAVIORS	FREQUENCY				
	NEVER	RARELY	SOMETIMES	OFTEN	ALWAYS
1. Student has trouble thinking of and using every-day words. The student may or may not eventually think of the words. (i.e. "I ate the sandwich for lunch.")	N	R	S	O	A
2. When a specific word is prompted, the student names category instead of the specific label. (i.e. animal", or "food" instead of "dog", or "cake".)	N	R	S	O	A
3. When a spoken mistake is brought to the student's attention, he recognizes it, but cannot correct it. (i.e. "ride on a car/ride in a car" or "walk on the steps/walk up the steps.")	N	R	S	O	A
4. Student uses a similar sounding word for the target word. (i.e. "I went down the sideway"/"I went down the sidewalk.")	N	R	S	O	A
5. Student answers, "I don't know" to a question when it is known that he does. (i.e. The student is asked to name two body parts, and he replies, "I don't know.")	N	R	S	O	A
6. Student struggles a great deal or requires extensive review to answer a question that he knew the answer to the day before. (i.e. The student gave correct answers yesterday, but today it seems like he is hearing the information for the first time.)	N	R	S	O	A
7. Student talks to himself or repeats key information while trying to answer. (i.e. The student is asked to name two fruits, and he repeats to himself "fruit, fruit, fruit".)	N	R	S	O	A
8. The student is slow to begin answering a question (i.e. There is a time lag between the end of the question asked and the beginning of the student's answer.)	N	R	S	O	A
9. The student uses neutral, generic, or original language instead of specific words. (i.e. "things", "stuff", "thingamajig", or "zhoot".)	N	R	S	O	A
10. The student describes an object instead of using a specific label. (i.e. yellow thing I write with/pencil, quacking bird/duck.)	N	R	S	O	A

ADDITIONAL COMMENTS (optional):_____
_____