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ABSTRACT

This monograph supplement to "The Journal of the Academy of Rehabilitative Audiology" contains eight papers on issues and strategies for communication assessment of hearing-impaired children, not only in the area of interpersonal communication, but in classroom and print discourse as well. Titles and authors of the papers are as follows: "Communication Competence and Assessment" (Richard Kretschmer and Laura Kretschmer); "Assessing Communication of Hearing-Impaired Children: Influences from Pragmatics" (Judith Felson Duchan); "Assessing English Syntax in Hearing-Impaired Children: Eliciting Production in Pragmatically-Motivated Situations" (Peter de Villiers); "Combining Formal and Informal Strategies for Language Assessment of Hearing-Impaired Children" (Mary Moeller); "A Sociolinguistic Assessment Scheme for the Total Communication Student" (Harold Johnson); "Perspectives on the Assessment of Reading" (Joan Laughton); "Assessing the Writing Abilities of Hearing-Impaired Children" (David Conway); and "Assessment Issues for Three Aspects of School Communication" (Sandra Tattershall et al.) (JDD)

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General Information

The purpose of **The Academy of Rehabilitative Audiology** is to provide a forum for the exchange of ideas on, knowledge of, and experience with habilitative and rehabilitative aspects of audiology and to foster and stimulate professional education, research, and interest in habilitative and rehabilitative programs for hearing-impaired persons.

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Editors

The Journal of the Academy of Rehabilitative Audiology

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Chapter 1

Communication Competence and Assessment

RICHARD R. KRETSCHMER, JR. and LAURA W. KRETSCHMER
University of Cincinnati

In the 10 years since we advocated informal grammatical sampling as an important technique for language evaluation of hearing-impaired children (Kretschmer & Kretschmer, 1978), evidence for the need to consider assessment of all aspects of communication performance, especially in context, has accumulated rapidly. In that time, the Individual Education Plan (IEP) has also assumed a prominent role in the education of handicapped children, a role that implies focus on and planning for individual language instruction as a way of enhancing communication abilities.

The research literature in the areas of general education, literacy, sociolinguistics, and children's development of communication competence also reveals a new focus in the past 10 years (Reich, 1986). The consensus is that the child's development and use of communication, whether spoken, signed, or written, must be seen in a socially interactive context. Children require both communication models and opportunities to communicate in order to construct their own communication competence. If the conditions of (a) sufficient samples of language and (b) sufficient social and communication interactions are met, then even significant hearing impairment should not preclude the development of both interpersonal communication and literacy in the vast majority of hearing-impaired children.

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In view of all the recent developments mentioned, it seems most appropriate for the Academy of Rehabilitative Audiology to sponsor a monograph on issues and strategies for communication assessment, not only in the area of interpersonal communication, but in classroom and print discourse as well. Achievement of communication competence in hearing-impaired children with whom we as audiologists, educators, speech-language pathologists, and parents come in contact requires both an understanding of the information on communication assessment that has been accumulating over the past 10 years and a commitment to act on that information in learning-teaching interactions. Through this monograph, we will share the perspectives of a number of experienced educators and researcher-clinicians on communication assessment. Through this document, we hope to achieve renewed interest and commitment to communication enhancement for all hearing-impaired children.

TERMINOLOGY IN THIS MONOGRAPH

As any professional in the field of hearing impairment soon realizes, hearing-impaired children are characterized more by their variety than by their homogeneity. This variety is reflected in communication/language abilities, use of communication modes, hearing levels, and educational and family experiences. Because the purpose of this monograph is to provide a framework for assessment of as wide a range of hearing-impaired children as possible, the term *hearing impaired* rather than *deaf* or *hard-of-hearing* has been selected. Individual authors have been asked to add modifiers such as mildly, moderately, severely, and profoundly impaired when appropriate, and to clarify whether research refers to children who speak and/or sign. Since we believe that language/communication learning principles are essentially modality free, we have also tried to encourage use of neutral terms such as *conversation* rather than speaking or signing when referring to interpersonal communication.

Finally, we also believe that the key to improved English literacy in hearing-impaired children is a firm knowledge of some interpersonal language system. Although ability to use English for interpersonal communication — rather than Spanish or American Sign Language (ASL) or any number of pidgin sign systems — makes the road to reading and writing English a shorter one, it is certainly not the only route to follow. It is, however, the route we will focus on in this monogr.

A MODEL OF COMMUNICATION/LANGUAGE

We presume that social exchange and the transmission of information to one another are the primary reasons why individuals interact and use language to communicate. That is, humans communicate to give information, to express feelings, to relay experiences, and not just to show off sentence formulation ability or mastery of vocabulary. We argue that the social demands of a communication situation determine, in large part, what specific information is to

be transmitted and what sentence forms are selected

Language competence cannot be fully understood without considering the purposes for which that language is being used and the types of information it communicates. The social and meaning bases of communication are modality free in that they operate in spoken and/or signed interpersonal communication efforts as well as in print. When persons speak, sign, read, or write, they are engaged in acts of meaningful communication. To achieve communication, certain conventions that are familiar to others must be employed, or the effectiveness of the communication efforts will be diminished. In addition, the communicator must decide upon the types of information he/she wishes to convey at a particular moment in time. It is only after the purposes and meaning have been considered, that speakers, signers, or writers concern themselves with formulation of specific, individual sentences. The form and complexity of any sentence is highly dependent upon what a person is trying to convey at a given moment and on the organization and extent of the ongoing discourse.

To paraphrase Bloom and Lahey's (1978) model, language is an intersection of use, meaning, and form. We would go one step further and argue that use and meaning drive the selection of form rather than all three being equal subsets in actual communication. Brief discussions of use, meaning, and form follow as a framework for understanding communication assessment.

Communication Use/Functions

Issues relating to the use of language in communication exchanges have come to be discussed under the topic of *pragmatics*. Larger units of conversation or print have come to be called discourse. This monograph will focus on assessment of pragmatic aspects, as well as discourse knowledge, in hearing-impaired children. As a way of explaining the current focus of research in the uses and organization of communication, we consider three strands of contemporary research that explore aspects of language use and communication organization. These areas of study are ones that the rehabilitative professional should be as familiar with these days as they are with information about child language. As we have pointed out, communication development can no longer be fully understood by focusing on the child's language production. We must be aware of the communication environment, the language models, and the social functions which surround the child to achieve the richest possible description of language learning. To enhance the reader's understanding of communication development, we will summarize the three areas of communication about which the most information, whether for adults or children, has been gathered.

One strand of research in pragmatics has focused on the range of communication intentions or speech acts possible in communication exchange. Speech act theorists argue that an individual sentence has attached to it a conversational expectation or a speech act (Austin, 1962; Bach & Harnish, 1982; Searle,

1975). The speech act of a sentence communicates to the listener the purpose or intention of the speaker. If the listener recognizes the intended speech act, he or she will react appropriately, thus allowing the conversation to proceed. Each speech act presupposes certain responses from the listener. For instance, if a speaker says "Can you go to the party?" this carries an interrogative speech act. This sentence was formulated to solicit an answer, either verbally or non-verbally, to a question. In contrast, the question "Can you open the door, please?" is clearly different since the intention is not to solicit an answer, but to prompt an action, namely, opening the door. Intentions that prompt actions are called imperative (command) speech acts. Speech act theorists have derived a considerable taxonomy ranging from simple intentions of declaring, questioning, and ordering, to more complex ones such as threatening, explaining, and persuading (Tough, 1977).

A second strand of language use research has explored the area of format schema. It is generally accepted that communication exchanges have certain formats that are governed by their own rules of organization (Brown & Yule, 1983; Gumperz, 1982; Schiffrin, 1987; Stubbs, 1983; Tannen, 1984). For instance, face-to-face conversation in English generally includes an opening sequence, a topicalization sequence, an information-giving sequence, and a termination sequence (Wardhaugh, 1985). In other words, English conversations are opened through specific routines such as, "Hi! How are you?" They center around mutually negotiated topics about which individuals exchange sets of information. They can also be formally terminated through specific routines such as, "Gee, I didn't know it was so late," or "See ya later." Although the components of conversation in ASL or in other spoken language may be different in form or arrangement from English, an observable format is likely for face-to-face exchange.

It should be noted that the information-giving portions of conversations also have specific purposes, in addition to the purposes of individual sentences (Lindfors, 1980). For instance, we can swap stories, give directions, tell jokes, try to impress others, and so forth. These conversational purposes have their own rules of organization as well. For example, when giving directions (Freedle & Hale, 1979), it is important to begin with an orienting statement that specifies what you intend to give directions about. Then, step-by-step chronologically ordered statements for accomplishing the task or locating the street are given. The key to effective direction-giving seems to be to provide only the most pertinent information while avoiding irrelevant or misleading details. Directions on how to make a cake need not include "Take a blue bowl," unless *blue* is a critical variable. Directions like the latter are quite common from young children who are still learning the mature format organization for direction-giving, however. Of course, we all know normal adult communicators who still give misleading directions regardless of what the model or standard is supposed to be.

It is important to realize that the notion of format organization (schema)

is applicable to print as well as conversation. When one writes, it is usually for a purpose (Smith, 1982). One intends to write a story, a set of directions, an impassionate plea for some position. These individual purposes impose specific organizational conditions on larger units of print that are in addition to the intentions of any single sentence (Brewer, 1980). Writing English stories supposes that there will be a setting statement that details the protagonist, the time frame, and the location (Stein, 1983). Thus, an opening such as, "Once upon a time there was a small troll that lived under a hill in the kingdom of Endor," fulfills this expectation. The protagonist is the troll, that is, the story will probably be written from his perspective; the time frame is pretend time; and the location is the kingdom of Endor. Once the setting is known, a conflict is introduced and the remainder of the story generally consists of a series of attempts to resolve the conflict. Such formats have been described for other genres of print including poems, recipes, essays, and textbooks (Gillham, 1986; Meyer, 1984).

A third strand of research deals with the notion of discourse/text-building. Text-building refers to the various operations that occur within a unit of discourse or text that influence syntactic use; that is, the discourse forces that underlie the use of specific linguistic forms. It has been found, for instance, that the use of pronouns in text or conversation is intimately tied to the topicalization process (Sanford, 1985). Once the topic has been introduced into an English conversation, it is obligatory to use pronouns. Indeed, it is difficult to fully evaluate use of pronouns without evaluating a user's understanding of this discourse requirement. Similar discourse conventions have been described for almost every syntactic form in English, whether in conversation or print. It is reasonable to expect that discourse organization descriptions in language systems such as ASL will be forthcoming as well.

Meaning/Semantics

Issues relating to meaning are studied under the topic of *semantics*. Use of meaning in communication can be considered (and assessed) on at least three levels, each of which is discussed in various chapters of this monograph. First there is the level of individual word meaning. It is often argued that the meaning of a word can be described fully by a dictionary entry (Clark & Clark, 1977). In fact, the meaning of an individual word should be considered primarily in relation to the meanings of other words. Researchers in semantics have come to focus on the semantic networks of particular words or groups of words (Scholnick, 1983). That is, the semantic organization of a language involves a network of interlocking relationships among words. The word *sit*, for example, cannot be fully defined without an idea of who, what, and where the sitting is done. A person sitting down is clearly different from someone sitting with a neighbor's child.

The contemporary view suggests that an individual sentence also carries meanings that are significantly different from the meanings of the individual

words in that sentence. For example, predicate nominative sentence frames carry the meaning of someone or something equalling someone or something else such as, "Mr. Reagan is the President," and "The ball is a toy." The first noun phrase in each sentence ("Mr. Reagan" and "the ball") is equal in meaning to the second noun phrase ("the President" and "a toy"). Thus, this second level of meaning is conveyed, not through the meanings of the individual words, but through the semantic frame of the sentence itself. Terms from case grammar (Chafe, 1970; Cook, 1979) can be used to label these semantic relationships such as: Entity (Mr. Reagan) – Stative-Static (equals) – Entity-Equivalent (the President). In case grammar, each of the meaning units in a sentence is referred to as a proposition. A meaning unit consists of one verbal unit, described in traditional terms as either a verb, an adjective, or an isolated preposition, and all of the arguments (nouns, adverbs, and prepositions) required to complete the relationship. A sentence may contain one proposition or several, each of which can be described using case grammar terminology. (See Table 1 for one example of such a set of semantic relationships.)

Table 1

An Example of a Multi-Propositional Sentence

The big boy, who is standing over there, is Jean's friend.	
PROPOSITION	**SEMANTIC RELATIONSHIPS**
boy big	Entity-Stative-Static-Characteristic (Size)
boy stand over there	Mover-Action-Affective-Location
boy friend	Entity-Stative-Static-Entity-Equivalent
Jean have friend	Possessor-Possession-Causative-Patient

At the third level of semantic focus, individual sentences are joined together to form meanings that transcend the meanings of the individual sentences or their words. Some discourse units result in total meanings that relate to physical phenomena, while others relate to social encounters. A description of Mt. Rushmore should result in an understanding of this physical location, while a story about the struggle between good and evil should result in some understanding of social ethical conflict. These larger units of meaning can be referred to either as schemas in the Piagetian sense (McCabe & Balzano, 1986; Piaget, 1952) or as scripts (Nelson, 1986; Schank & Abelson, 1977). Unfortunately, the term *schema* is used to describe both the formal organizational aspects of discourse discussed earlier and the larger units of meaning developed by a discourse unit. When reading the various chapters in this monograph, it should be clear which meaning is intended, however.

Form/Syntax

Issues relating to formulation and arrangement of sentences is covered

under the topic of *syntax*. Syntax can be described at different levels, just as discourse and semantics were. First, one could consider the rules that allow for the production of the individual, basic sentence frame. To return to our semantic case example ("Mr. Reagan is the President," or Entity -- Stative-Static -- Entity-Equivalent) we could also say it has been realized using a Noun Phrase (NP)+be+NP syntactic organization in English. In ASL, the equivalent sentence could be produced by indexing the two entities in space and then using the sign *equal*, shifting from one indexed space to the other.

The second level of syntax involves rules for conveying less important information such as time and number. This is permitted through the use of morphological structures in English, such as word affixes for tense or plurality markers. In ASL, incorporation, body posture, sign repetition, and facial expressions can be used to mark such information (Wilbur, 1987).

Third, one can consider syntactic operations or rules that allow for combining propositions into longer, more complex units. Although encoded differently, both ASL and English have three such operations for increasing complexity; namely, coordination, relativization, and complementation (Clark & Clark, 1977; Wilbur, 1987). Coordination refers to the joining of two propositions into some sort of higher-order relationship, using such forms as *and*, *because*, or *if*. Relativization is the act of using one proposition to specify the argument (noun or adverb) of another proposition. This can be accomplished through the use of embedded adjectives, relative clauses, and possessives. Complementation refers to the use of one proposition as an argument (noun or adverb) in another proposition. An example would be: "I want to go to the movie." What is wanted in this case is *the right to go to a movie*, a proposition that has been incorporated into the proposition *I want something*.

We would like to stress that syntactic units carry the ability to transmit specific types of semantic meanings and/or to signal specific types of discourse structures. The careful evaluation of a child's syntactic knowledge requires consideration of how well both of these aspects are accomplished. Describing syntax outside of its functions of conveying meaning and building on-going discourse does not provide a complete picture of a particular child's syntactic abilities nor, we might add, of his or her general language abilities.

PERSPECTIVES ON COMMUNICATION ASSESSMENT

In recent years, educational assessment in general and communication assessment in particular have tended to proceed from two perspectives, namely, product assessment and process assessment (Laine & Schultz, 1985). Product assessment models have argued the need to compare an individual child's test scores with sets of normative data. Product-oriented tests include structured sets of questions or tasks that are presented in a specified manner, along with the normative data with which the performance of the child can be compared in terms of a total performance score, subtest scores, or both. Examples of

product-oriented assessment procedures in education include achievement tests and language tests of syntactic knowledge or vocabulary identification. In contrast, process-oriented assessment models urge that the individual child be compared to him- or herself rather than to group data. Process assessment uses samples of a child's performance that may include actual behavior sampled over time and or cross sectionally within various contexts. Examples of process-oriented assessment procedures include criterion referenced tests, informal grammatical sampling, and descriptions of naturally occurring conversation or other discourse units. The underlying assumptions of each of these two test approaches are addressed next.

Product assessment. Product-oriented procedures are based on the assumption that there is a need to identify and isolate individual educational or language skills for evaluation and that one can do so. To achieve results, such procedures emphasize decontextualized test items as a way of trying to examine only one skill, fact, or linguistic rule at a time. As a consequence, most product-oriented language tests must focus on the evaluation of syntax or vocabulary knowledge.

If communication needs drive the selection of syntactic forms within conversation, then it seems unproductive to decontextualize language assessment for individual children; that is, to test form apart from function. This is of particular concern when language and communication abilities are being assessed in order to establish classroom or clinical instructional goals. Unless the teacher or clinician has substantial amounts of information about the hearing-impaired child's ability to understand and generate forms in conversation or print, then we argue that description of that child's communication is incomplete.

Although it may be important for institutions to know how individual children compare to some external standard, particularly for appropriate placement and monitoring of general educational progress, we would argue that such knowledge is of limited value to teachers or clinicians. Although we often read that a 10-year-old hearing-impaired child's performance on a test of syntactic use is like that of a 5-year-old normal-hearing child, such information does not tell us either what should be done in the classroom or what the child's ability to use such forms is like in conversation. In contrast, through analysis of communication processes, we could learn that the same child is having difficulty understanding and using *who/which;* that this form confusion appears most commonly when the relative clause is an object-subject-verb rather than a subject-verb-object construction; and, further, that the child lacks appreciation of the function of specifying through relative clauses. This latter information, in contrast to general test scores, is very useful for classroom teachers and clinicians.

More importantly, we think that the constant comparison of hearing-impaired children to normal-hearing children has developed a deficit attitude in education of the hearing impaired. We recognize this attitude in our own pro-

fessional efforts several years ago and certainly have observed this position in others. How easy it becomes to see only what the hearing-impaired child cannot do rather than appreciate what he or she can do. For instance, we have often heard it argued that particular hearing-impaired children have no understanding of relative clauses. And yet, these same children show ability to understand and use the act of specification. These children often use single propositional sentences that act as a specifier for an argument (noun) in a preceding sentence such as: [I want ball. It red.]. Or, they might combine their propositions using a coordinating construction such as *and:* [I want ball and it red.]. Although these children do not evidence use of a mature relative clause structure, they have a clear understanding of one of the primary purposes of this form. This view of the child is a more positive one, a view that can lead to programs that build on communication strengths rather than emphasize areas of weakness.

Some researchers have suggested that the product problem can be solved by using tests which have normative data obtained from hearing-impaired rather than normal-hearing children (Quigley, Steinkamp, Powers, & Jones, 1978; Silverman-Dresner & Guilfoyle, 1972). For developing individual instructional plans, we do not support that alternative as viable. Even if one assumes reasonable homogeneity of language knowledge among hearing-impaired children — an assumption which is questionable — how is the individual child benefited by such comparisons? How is the teacher or clinician benefited by such information? If a group standard of language information or skill is needed for decisions on class placement or mainstreaming, then normal-hearing children's language achievement must be the standard, no matter how unfair this seems.

Process assessment. The underlying assumptions of process-oriented communication assessment are, first, that it is reasonable to compare the child's progress against his/her own baseline and, second, that it is crucial to view the child in real communication situations. In this way, the data base is the actual communication generated by the child as he/she engages in meaningful interactions. Literature on and experience with normal language acquisition serves as the yardstick against which the hearing-impaired child is measured if such comparison is needed to determine how well a child is progressing toward mastery of English. Using information both from the child and from the literature on normal language development, the teacher or clinician can plan learning experiences, observe changes, analyze the changes, and compare them to the previously observed behavior to see if progress has been made. Of course, the success of this procedure is dependent on the constructs one uses to make the initial evaluation. Based on contemporary child language/communication research, we would argue, of course, for an orientation that stresses pragmatic and discourse issues as focal points. All of us could benefit from observing and reporting on what hearing-impaired children *can* accomplish in communication situations. The majority of hearing-impaired children are competent

communicators, often in English, if we take the perspective that communication competence is defined by more than accuracy of syntactic production.

It has been suggested that process assessment does not yield information about a child's comprehension. If communication assessment focuses only on the child's utterances, then such a suggestion is valid. But, we urge that the child's productions be analyzed in relation to those of his/her communication partners. It is possible to deduce whether, and to a large extent what, a child understands (comprehends) based on how he or she responds. For instance, if a teacher says "What color is this?" while holding a blue balloon, and the child says "green," one would be hard pressed to argue that we know nothing about the child's comprehension skills. Obviously, the child does understand that a color name is required even if the correct name was not retrieved initially.

Estimating a child's knowledge of and ability in discourse formulation is particularly suited to a process type of communication assessment. We cannot adequately describe a hearing-impaired child's understanding of format schema, for instance, without observing the child's use of a particular format in context. That is, evaluating children's ability to use and recall story formats should be accomplished by having them tell stories they have heard before or by having them generate their own stories. How better to describe children's ability to topicalize than to engage them in conversation?

In the previous discussion on discourse/text-building, we argued that syntactic forms should be assessed as they fulfill specific functions within conversation. Even extended natural conversation may not guarantee the expression of all aspects of a particular form or of all the forms a child knows. Consequently, there is a role for formal tests to evaluate some syntactic forms. Peter de Villiers, in Chapter 3 in this volume, discusses techniques for assessing syntactic use. However, as he stresses, even formalized evaluation procedures should be pragmatically appropriate.

It can also be argued that process assessment requires both substantial time and extensive linguistic-analysis knowledge on the part of the evaluators, whether teachers, speech-language pathologists, or audiologists. Detailed language/communication assessment *does* require substantial understanding of how language functions in interpersonal and print communication. In order to provide the needed assistance to hearing-impaired children with a variety of communication strengths and limitations, however, persons helping these children must understand these issues thoroughly. Persons who assess hearing-impaired children must be language/communication experts if they wish to provide the full measure of support that so many of these children require.

PERSPECTIVE OF THIS MONOGRAPH

We have asked persons from the fields of communication disorders, hearing impairment, and linguistics to write about communication assessment from the perspective of a process orientation. The following two chapters deal with

issues of interpersonal communication assessment. In Chapter 2, Judith Duchan, as a prominent researcher-clinician in communication disorders, offers a thoughtful and highly readable chapter on contemporary issues in pragmatic assessment. She discusses the strengths and cautions of pragmatic research as it has been applied to this point in assessment and or description of the communication abilities of hearing-impaired children. Chapter 3 by Peter de Villiers explains the development of syntactic tests that are pragmatically relevant. He offers a critique of several current procedures for assessing syntactic knowledge in hearing-impaired children and contrasts such approaches with his own. The specific forms that de Villiers assesses are those that occur less often in conversation, but rather often in print. How better to develop an instructional plan than by combining informal communication assessment with formal tests, thus using the strengths of both product and process procedures? The chapter by Mary Pat Moeller (Chapter 4) does exactly that by explaining a clinical approach to assessing communication in children referred to a diagnostic clinic. She discusses the strengths and limitations of formal tests, and ways to combine formal and informal procedures in assessing both interpersonal and classroom communication.

In Chapter 5, Harold Johnson discusses some general features of sign language systems, and follows with strategies for assessing interpersonal use of sign systems from a sociolinguistic perspective. His use of computer technology to aid in coding and storing communication information is an intriguing aspect of these strategies. Chapters 6 and 7 deal with the assessment of children's understanding and production of print. To make the task more manageable, the issue of literacy has been divided, with Joan Laughton (Chapter 6) discussing the evaluation of reading, while David Conway (Chapter 7) focuses on the assessment of writing. Both these chapters operate from the premise that reading/writing share the same cognitive and experiential bases as interpersonal communication; that literacy, like interpersonal communication, is acquired in an interactive manner through exposure and modeling by communication partners; and that substantial self-discovery and reading/writing practice is necessary for the acquisition of literacy. That is, it should be understood that both those authors, and the editors, believe that literacy is best acquired if reading and writing are *not* separated, but rather are seen as two sides of the same coin. Laughton and Conway have both referred to this concept of "whole language" learning and both have provided references for the interested reader on this exciting approach to literacy development.

In Chapter 8, we collaborate with Sandra Tattershall in considering assessment of aspects of school communication. It is clear that communication in the traditional classroom is quite different from regular conversational exchanges whether in ASL or English. Any child must learn, not only how to converse in real life, but also how to understand and engage in school/print conversations. Exploration of three specific school related topics — namely, issues of school readiness, the differences between school and real-life dis-

course, and the language of textbooks — is conducted in this final chapter. The discourse organization of texts is stressed because it is different enough from other types of print to warrant consideration.

In conclusion, we believe that this monograph will provide readers with a greater understanding of, and appreciation for contemporary perspectives on communication assessment in individual children. Often, the most complete descriptions of the language abilities of hearing-impaired children have consisted of quantitative data on group performance, whether on formal standardized tests or researcher-designed informal tasks. We will continue to need those extensive group descriptions of hearing-impaired children's use of English to determine, in general, whether we are making progress in education (Osberger, 1986; Quigley & Paul, 1986). But, we also believe that the day-to-day problem of assessing and improving communication in the individual hearing-impaired child needs renewed attention. We have tried to develop a monograph that will help in this important task.

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Chapter 2

Assessing Communication of Hearing-Impaired Children: Influences from Pragmatics

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About fifteen years ago, those of us involved in assessing children's communication abilities entered a new stage in our development, a stage that has come to be called "pragmatics." Pragmatics, broadly defined, is the study of how linguistic, situational, or social contexts affect language use. The narrow and operational definition of pragmatics differs for different language specialists, and the assessment approaches which specialists use mirror their particular operational definition. While all proponents of pragmatics agree that the effects of context on language must be considered as paramount, they differ on what aspects of pragmatics need to be attended to.

Among the many areas of pragmatic theory and research are four which have become popular targets of language assessment. The first of the four research areas has to do with the uses which aspects of language serve. Re-

searchers who are studying *communicative functions* of language examine what communicators are trying to accomplish when they express themselves. Functionalists who study children's language have attempted to find out what types of communicative goals are expressed by children at different stages in their language development and the means the children devise for attaining their goals.

A second area targeted by researchers of pragmatics is *conversational interaction*. The goals of those researching conversational interaction have been to determine how interactants accomplish conversational turn exchange, how they go about introducing and maintaining topics, and how they repair conversational breakdowns. A third variety of pragmatist includes those who study how interactants tune their comments to their particular partner. Some of these researchers have concentrated their attention on how adults *fine tune* their language when they speak to children. The aim has been to determine whether the language that is addressed to a child provides a good context for that child to learn language and whether it is within the child's range of understanding.

A fourth area of study in pragmatics takes as its goal the discovery of the *discourse organization* of types of discourse such as narratives, expositions, arguments, or descriptions of everyday events. Those discourse analysts studying the language of children have identified differences in the acquisition of different discourse genres and have identified the ages and stages at which children typically acquire aspects of adult discourse structure.

Each of these four areas of research in pragmatics — communicative function, conversational interaction, fine tuning by adults, and discourse organization — has led to different assessment approaches. While all pragmatic

Table 1

Research Areas in Pragmatics and Associated Assessment Approaches and Areas Targeted for Evaluation

	Research Areas	Assessment Approaches	Targeted Areas
1	Communicative Function	Functional Analysis	intent agenda
2	Conversational Interaction	Conversational Analysis	turn taking topic breakdowns repairs
3	Fine Tuning by Adults	Fine Tuning Analysis	directive vs conversational mode
4	Discourse Organization	Discourse Analysis	macroanalysis discourse cohesion

assessment approaches are aimed at discovering the role of context in language learning and use, the approaches differ in the area they target for assessment. As can be seen from Table 1, the four areas of pragmatics contain within them different assessment approaches and the assessment approaches contain different assessment targets. In row 1 of Table 1, for example, the area of pragmatics research involving the study of communication function uses functional analysis to examine the intent and agenda behind the communicative acts of those who are communicating with one another.

This chapter discusses each of the four pragmatic approaches and their targeted areas of assessment. The structure of the chapter will be to describe the characteristics and targets of each approach, to review some research on how each area has been applied to the study of hearing-impaired children, and finally to offer both a negative and positive critique of each approach, evaluating it for possible pitfalls and for potential promise.

THE FUNCTIONALIST APPROACH

Characteristics

The mid 1970s brought with them the beginning of the pragmatics approaches to language assessment. Our earliest insights into how context might affect the way children learn, understand, and produce language came when we began to ask about what children might be trying to achieve by their communicative acts. In 1975 several researchers published the results of their study of goals or intents expressed in the nonverbal and verbal communications of beginning language learners (Bruner, 1975; Dore, 1975; Halliday, 1975). In these oft-cited and influential studies, the authors identified the different types of intents which normal preverbal and beginning language learners expressed through the use of gestures, vocal noises, and first words. Among the most popular lists of intent categories is that of Dore (1975). His list contains nine types of intents expressed by beginning language learners through their use of gestures, phonetically consistent noises, or words. The types are: labeling, repeating, answering, requesting actions, requesting answers, calling, greeting, protesting, and practicing.

The studies of the intents expressed by normal language learners continued into the 1980s as researchers carried out detailed analyses of children's behavior in order to find out when young normal-hearing children expressed their first communicative intents, and what sorts of intents they expressed. The researchers took certain behaviors to be evidence of intentionality such as whether the child exhibited a double attentional focus (between people and objects of desire) (Bates, 1976; Sugarman, 1984), showed consistency in the use of particular gestures and noises to express particular intents (Carter, 1979; Dore, 1975), waited for an adult response (Wetherby & Prutting, 1984), or expressed frustration or "detour" behavior when intent was not acted on (Scoville, 1983).

Functional Analysis of the Language of Hearing-Impaired Children

Building on such studies of normal-hearing children's acquisition of intentionality, researchers began to examine the beginning stages of intentionality expressed by hearing-impaired children receiving oral language input only. For example, Skarakis and Prutting (1977) and Kricos and Aungst (1984) both found the prelinguistic intents of severely hearing-impaired children exposed only to oral language to be similar to those reported in Dore; and Curtiss, Prutting, and Lowell (1979) and Day (1986) found that the intents expressed in the first oral utterances of severely hearing-impaired children were the same as those for normal-hearing children just beginning to learn oral language.

Similarly, Greenberg (1978, 1980a, 1980b) examined the communicative intents of preschool severely hearing-impaired children in order to determine whether different intents are expressed in different communicative modes (e.g., oral, sign, or gesture). He found no difference between the simultaneous (oral and sign) communicators and the oral communicators in the intents expressed, but he did find a difference in modes of expression for different intent types. For example, the simultaneous children used more oral and gestural communication during repetitions than they did for other intents.

A relationship between preschool hearing-impaired children's type of intent and the mode used to express that intent was also studied by Heider, Heider, and Sykes (1941). The children in the Heider et al. (1941) study were described as having no oral language, yet were using a number of vocalizations along with an elaborate natural gestural system. The study concluded that the children's vocalizations were used for emphasis and occurred more commonly when the children were expressing desires than when asking questions.

The conclusions drawn from these studies of communicative intents conveyed in the oral, gestural, and signed communication of hearing-impaired children are that hearing impairment does not negatively affect children's learning to create and express intents, even when those intents are expressed orally. Further, there is some evidence to suggest that communicative intents influence the mode used for their expression.

Critique

Assessment of communicative intents has been carried out in two main ways. One is to use the lists of intents found in the communications of normal-language learners as a checklist against which to evaluate a particular language impaired child's preverbal and beginning verbal intents (e.g., see Skarakis & Prutting, 1977, and Cole & St. Clair-Stokes, 1984). The other is to use the discovery approach to find out how the child being evaluated expresses intents, and which intents are most readily expressed (Prizant & Duchan, 1981).

The *checklist method* involves videotaping an interaction with a child and checking off communicative acts exhibited by the child on a preestablished list of acts which have been found to occur in normal-language learners. The sum-

mary report involves a description of the type and perhaps frequency of the acts observed in the sample, as well as an indication of which acts from the checklist were not performed by the child. For example, Miller (1981), using the Dore categories, offered a sample case history report which includes the results of an analysis of a 3-year-old child's communicative intents which occurred during a half-hour clinical interaction:

> The communicative intentions evident during the half hour were (1) verbal labelling "Here a cow."; (2) repeating adult utterance. "Drink Mr. Cow.", (3) answering "I no have hay."; (4) requesting action "Bring cow here?", (5) requesting answer. "Where sheep go?"; and (6) greeting: "Hi!" (Miller, 1981, p. 320).

Since the child did not express protesting in the half hour session, an intent which occurs on Dore's list, Miller recommends that therapy include a goal to: "increase number of verbal protests in conversation" (Miller, 1981).

The *discovery method* for analyzing communicative intents requires analyzing in detail each of the child's communicative acts and, on the basis of commonalities across acts, assigning an intent to the various acts. The discovery method, while more time consuming than the checklist approach, allows for the identification of intents underlying nonconventional acts and for this reason results in a greater likelihood of finding communicative acts which do not appear on a priori checklists such as Dore's. An example of a report resulting from a discovery analysis follows:

> When reaching indicatively towards an object, David usually uttered an [m] sound; when pointing an [l] or [d]; when slapping at an object to request its removal a [b]; when shaking his head negatively, an [n]; and when reaching to the receiver to give or take an object he produced an [h] or reduced glottal fricative (Carter, 1979, p. 77).

Both checklist and discovery types of assessing intents have been criticized recently. Some say that the coding procedures are being misused. For example the coding procedure tends to lead to a false assumption that there is but one intent per communicative act, eliminating the possibility that a single act can be accomplishing several purposes (Chapman, 1981; Lund & Duchan, 1988). The solution to this problem is for clinicians to recode the language sample, adding multiple classifications for the same intent when applicable. For example, if a child were to say or sign, "Johnny has a swing set," to his mother, his communication can qualify as a request for an object (the swing set), as interactive rather than self-directed, as a conversational opener, and as an indirect request rather than one directly expressed (e.g., he might have used a direct expression such as, "Get me a swing set").

There is a second criticism of intent assessment which challenges the desirability of viewing intents as individual and separable communicative acts. Critics presenting this "context stripping" criticism hold that communicative acts are part and parcel of the surrounding context, and that the significance of an

intent and its reason for occurring depend upon what is going on outside that particular communicative act (Frankel, Leary, & Kilman, 1987; Duchan, 1987a).

This context stripping criticism of intent analysis has been forwarded from different contextual orientations. Some argue for the need to include the overall agenda of the participants (Labov & Fanshel, 1977; Lund & Duchan, 1988); others say we must examine the influencing characteristics of the ongoing event (Garvey, 1977; Nelson & Gruendel, 1981); still others emphasize the effect of role relationships of the participating members in an interaction (Stubbs, 1983); and finally there are those who would recommend that the intent analysis include an assessment of how the interactant responds to the child's intent (Frankel, Leary, & Kilman, 1987).

In order to address the context stripping criticism, language evaluators will need to determine the effect of context on the intents analyzed. For example if a sample has few initiations, the analyst should include information about whether the child has opportunities to initiate. If the event casts the child in a role in which initiations are discouraged, the summary should not be one that treats the child as a noninitiator (Evans, 1987). In a report such as the one by Miller (1981) above, the fact that the child failed to protest in the half hour may be due to the role relationship between the child and the clinician-stranger, and to the event taking place rather than to the child's lack of ability to protest. Before prescribing intervention to teach the child how to protest, the clinician might create situations which would elicit protest or might interview adults who are familiar with the child about whether or how the child expresses protest.

Despite its problems, the functionalist approach to pragmatics assessment has, on balance, advanced our knowledge of language impaired children. It has led to the notion that children's acts, while linguistically not interpretable, may become pragmatically intelligible through intent analysis. It has created a means for analyzing and evaluating the nonverbal communications or actions of children who have no language. Finally, intent analysis has added a dimension to our linguistic approaches which asks what the children are trying to accomplish by their communicative attempts and how well they achieve their goals

THE CONVERSATIONAL APPROACH

Characteristics

The conversational approach to communicative assessment targets several assessment areas. *Turn taking* is a notion borrowed from the work of a group of sociologists, the conversational analysts, who have examined the ways in which normal adults carry out everyday conversations (e.g., Sacks, Schegloff, & Jefferson, 1974). Turn taking analysis involves examining how and when conversationalists begin and end a turn and ways partners signal one another

that a turn is beginning or ending. Conversations are also analyzable according to the *conversational topic* (Keenan & Schieffelin, 1976). For example a communicative act may be used to initiate a topic of interest, maintain it, finish it, or shift from an old to a new topic. In some interactions the participants share topic control; in others, one participant takes the lead in establishing topics, while the other assumes the role of topic follower (Blank & Franklin, 1980; Duchan, 1983). A last area of conversational analysis which has become part of the assessment procedures in evaluating conversational competence is that of *conversational breakdowns and repairs* (Gallagher, 1977). In this analysis pragmatists identify the site and source of conversational breakdowns such as those which occur when a language impaired child is not understood. Also included in the analysis is an inquiry into how conversationalists continue on after there is a conversational breakdown — that is, how they *repair* the breakdown.

Conversational Analysis of Hearing-Impaired Children

Hearing-impaired children have been found to have particular difficulty obtaining a speaking turn as they engage in oral communications, especially in conversations involving several people (Kretschmer & Kretschmer, 1986). Brackett (1983) elaborated on this issue:

> In multiparty conversations, the hearing-impaired person's attention is fragmented in the effort not only to follow the topic as it shifts from person to person, but also to determine who is speaking. It is not unusual for the hearing-impaired person to miss a portion of the content while searching for the speaker (p. 120).

Brackett (1982) administered a questionnaire to oral hearing-impaired teenagers and found that 48% reported that their only social difficulty with their normal-hearing peers was that they felt left out of peer conversations involving more than one interactant.

Baker (1977) compared the conversational turn taking of those engaged in signed communication and those engaged in oral communication. In signed conversation a speaker cannot initiate a turn until the desired addressee looks at the potential speaker. Thus, in signed communications, eye gaze and attention getters are used more often and differently as turn taking signals than they are in oral communications (Prinz & Prinz, 1985; Nellum-Davis, 1980; Wilbur & Petitto, 1981). Indeed, Baker's study as well as those of Prinz and Prinz (1985) and Wilbur and Petitto (1981), reveals an elaborate set of turn taking regulators used by young as well as adept hearing-impaired signers — some of which are not used by normal-hearing oral communicators. Thus, oral hearing-impaired communicators are at a particular disadvantage when communicating with normal-hearing partners who do not use visual regulators.

Topic initiations and maintenance have also been found to be different for oral hearing-impaired communicators than for oral normal-hearing commu-

nicators. McKirdy and Blank (1982) compared oral topic initiations and responses which occurred between pairs of hearing-impaired language users and between pairs of normal-hearing children. The children, all between ages 4 and 5 years were matched for age, sex, and level of intelligence. Their topic initiations were divided into those which required a partner to respond (obliges) and those which did not (comments). A majority (57%) of the hearing-impaired children's initiations were obliges to get another child's attention. Rather than use the attention-getting oblige, the normal-hearing children were more prone (57% of the time) to using comments to initiate interaction. Both normal-hearing and hearing-impaired children responded to obligatory initiations more appropriately and often than they did to initiations presented in comment form.

Nienhuys, Horsborough, and Cross (1985) used the same procedure as that used by McKirdy and Blank (1982). Nienhuys et al. examined the initiations and responses of normal-hearing mothers and their severely hearing-impaired and normal-hearing 2- and 5-year-old children. The 2- and 5-year-old hearing-impaired children were each matched in age with a normal-hearing child and the 5-year-old hearing-impaired children were each matched in language ability with a normal-hearing child. The researchers found that mothers, when speaking orally to their hearing-impaired children, used significantly more initiations than mothers of age-matched normal-hearing children. On the other hand the mothers of the hearing-impaired children did not differ significantly from those of the normal-hearing children of the same language age in the number of times they initiated an interaction or topic with the child. This would suggest that the frequency of initiations of mothers of both normal-hearing and hearing-impaired children depends more on the child's language ability than on the child's age level.

Nienhuys et al. (1985) also compared the initiations and responses of mothers and their children. All mothers used double the number of initiations over those produced by their children. Further, their initiations consisted of twice as many obliges as comments. When comparing the two groups of children on their responses to their mothers' initiations the researchers found the types of responses to be comparable for the two groups and varying with age and language ability, except that the hearing-impaired children failed to respond to initiations more often than did the normal-hearing children.

Researchers have also studied topic indicators of sign language users. They have found that indicators such as head nods are used to mark the introduction of a new topic and other indicators, such as a sign sustained on a left hand, are used by signers to indicate that a topic is being continued (Prinz & Prinz, 1985; Wilbur & Petitto, 1981).

What happens when hearing-impaired children and adults have difficulty understanding one another? One can easily infer from the studies of intelligibility and perceptual difficulties in oral exchanges with hearing-impaired children, and from the reports by parents of their difficulty understanding their

hearing-impaired children (Schlesinger & Meadow, 1972), that conversations with hearing-impaired children are likely to contain a high incidence of communicative breakdowns. Further, one can assume, almost by definition, that improvements in intelligibility and language comprehension would be inversely related to the degree to which communicative breakdowns are experienced. What cannot be predicted directly is what strategies the hearing-impaired speaker or listener uses to repair the experienced breakdown.

Donnelly and Brackett (1982) found that, when hearing-impaired children are listening to an orally delivered message and have difficulty with it, they offer the speaker feedback in ways that are similar to what is done by normal-hearing listeners. When young hearing-impaired children are speaking and are not understood by their listener, indicated by confusion or a request to repair (e.g., What? Huh?), the children have been found to repeat the utterance exactly rather than to revise what they said (Donnelly & Brackett, 1982; Givens & Greenfield, 1982). When Givens and Greenfield (1982) compared normal-hearing and hearing-impaired preschoolers' oral conversational repairs they found that the hearing-impaired children showed less revising than did their normal-hearing counterparts.

The repair strategies used by hearing-impaired children using American Sign Language were studied by Prinz and Prinz (1985). The sort of repair studied was that following conversational interruptions. The researchers found that young hearing-impaired ASL signers remedied the interruption by repeating what had been interrupted, while older signers used more elaborate devices such as holding off a partner's interruption by extension of one hand (signalling for a partner to wait), while continuing the message on the other hand.

In a comparable study of repair strategies of oral communications, Kenworthy (1986) found that the mothers of severely hearing-impaired children tended not to ask their child to repeat what the mothers did not understand. Similarly Brackett (1978, as reported in Weiss, 1986) found that hearing-impaired children showed a reluctance to request that their peers repeat something which was not understood.

Critique

The research of hearing-impaired children's conversational competence has taken as the norm the performance of normal-hearing children. Thus, if normal-hearing children signal and take up conversational turns in particular ways, hearing-impaired children are expected to do the same; if children with normal hearing initiate conversation by commenting, a hearing-impaired child who uses attention getters to initiate conversation is considered deviant; if mothers of normal-hearing children use a certain percent of topic initiations, mothers of hearing-impaired children are expected to use that same percentage; if normal hearing children repair conversational breakdowns by revising, hearing-impaired children's verbatim repetitions are evaluated as abnormal. The research assumes a deviance model, with any departures from normal

being devalued.

As an alternative to the deviance assumption that "normal is best," one can ask why hearing-impaired children do not follow the norm. In the cases of turn regulators, the difficulties experienced by oral hearing-impaired children in communications with normal-hearing peers probably occur because turn exchanges are often accomplished by auditory means such as use of intonation, oral pauses, and verbal interruptions — devices which are often not easily perceptible by the hearing-impaired children. Thus their problem is not that they have failed to learn to take conversational turns, but that the oral signals are not sufficient for them. Similarly, hearing-impaired children using oral language may fail to revise their messages in cases of conversational breakdowns because for them simple repetition of an almost heard message serves as a better repair strategy than rephrasing the message.

Another alternative to comparing hearing-impaired with normal-hearing children is to ask what it is that characterizes conversations with particular hearing-impaired children in areas such as turn taking, topic management, and breakdowns and repairs. The discovery of unusual features should then lead to the question of what functions those features are serving. Evaluation of the worthiness of the departures from "normal" can then be done from the point of view of the hearing-impaired child rather than from the basis of the naive and incorrect presumption that "normal is best."

THE FINE TUNING APPROACH

Characteristics

Recent studies of how adults communicate with children have attempted to discover how adult language directed to normal-hearing children affects the children's language learning. Researchers reviewing the various studies have discovered that children who are presented with language that is mostly *directive* and is pedagogic in tone do not learn language as rapidly as those who are presented with language that is *conversational* in style. The directive mode is one which contains features such as imperatives and test questions; the conversational mode, on the other hand, has a predominance of expansions in which the adult adds to what the child has just said or includes other utterances which are meaningfully related to the child's previous communications. The research findings have led to assessment procedures which evaluate the style of adult language to children. Adults are evaluated more positively when they have a minimum of imperatives or other sorts of "bossy" language and an abundance of expansions or other types of conversational acts which are related to what the child has just said or done.

Fine Tuning Analysis of Those Interacting with Hearing-Impaired Children

There have been a number of studies of language between normal-hearing parents and their hearing-impaired children to determine the degree of direc-

tiveness and the percent of conversational expansions. Many of the studies have concluded that the adults' language to hearing-impaired children is too directive. For example, Brinich (1980) found that the normal-hearing mothers who communicate orally with their prelinguistic 5- and 6-year-old profoundly hearing-impaired children used more attention related oral directives and verbal instructions than did mothers of age-matched normal-hearing children. Brinich concluded that the mothers of the hearing-impaired children were attempting to control their children more than were mothers of normal-hearing children.

Cheskin (1982) in a similar attempt to study the degree of control exerted by mothers of hearing-impaired children found that one-third of the utterances spoken by two normal-hearing mothers of verbal severely hearing-impaired 2-year-olds were controlling and distancing. A third mother in Cheskin's study was not as directive as the other two, with only 15% of her utterances being classified as controlling. Not emphasized in Cheskin's interpretation of her results was her finding that the mothers of all three of her hearing-impaired subjects used non-controlling descriptions just as often as they did controlling talk (26%, 30%, 36% of the time).

Nienhuys, Cross, and Horsborough (1984) compared the number of expansions and imperatives in the language of normal-hearing mothers to normal-hearing 2-year-olds and language matched severely hearing-impaired 5-year-olds. They found that the mothers of the normal-hearing children expanded on what their children said more than twice as frequently as those of linguistically matched hearing-impaired children. However, the authors found no significant difference in the number of imperatives which the mothers used to the language matched hearing-impaired and normal-hearing children.

Kenworthy (1986) reported that the normal-hearing mothers of oral hearing-impaired children used fewer utterances meaningfully related to the talk of their children than did the mothers of normal-hearing children. In this study examples of mothers' utterances which were scored as related or contingent were the following: Child says "Car go" and mother responds with (a) an *expansion* (The car is going), (b) an *alternative* (The truck is running), or (c) a *modification* (The car is going fast). Examples of noncontingent responses in Kenworthy's coding system are (a) self-repetition, (b) conversational device (Hmm. Okay, Uhuh), and (c) uncodable (mother's comment not understood by analyst).

Wendell-Monnig and Lumley (1980) concluded from their comparative study of mother's language to 1- to 2-year-old severely hearing-impaired and normal-hearing children that the mothers of the hearing-impaired children had higher rates of in tive attempts than those of the normal-hearing children (21.8 for mothers of hearing-impaired per session, vs. 9.6 for mothers of normal-hearing children). The authors interpret this to mean that the mothers of the severely hearing-impaired children are more directive than those of normal-hearing children.

Critique

A main problem with this series of studies on fine tuning of mothers to their hearing-impaired children is that the functions of the mother's directive language is not examined. For example, in the study by Brinich (1980), the attention-getting utterances were the behaviors which contributed most to the judged directiveness of the communicative style. While the attention of normal-hearing children can be attained by simply saying something you want to say, hearing-impaired children do not know they are being addressed unless their visual attention is first attained. Such attention-getting utterances, therefore, become a necessary condition for communicating with hearing-impaired children (Baker, 1977), and would be better regarded as a useful conversational opener than as a negatively valued directive.

Hidden in the results of these articles on directiveness in oral communications of mothers to their hearing-impaired children is the finding that the directiveness is correlated with the child's oral language competence. That is, as the hearing-impaired child develops proficiency in oral communication, the mother becomes less directive. The "more proficiency — less directiveness" correlation is also found for mothers of normal-hearing children. (For a review and discussion of this see Cross, Nienhuys, & Kirkman, 1985, and White & White, 1984). This finding about the influence of language competence on the parents' use of directiveness makes the results of studies comparing the age-matched normal-hearing and hearing-impaired children difficult to interpret, since the source of difference may be the oral language proficiency of the children rather than the ability to hear.

A third criticism of this research is its accompanying underlying assumption that conversation is always best. Directive style serves some functions better than conversational style. For example, it is a convenient means to carry out bids for attention, to indicate emphasis or seriousness, to establish power, and to explicitly teach or demonstrate something. Examples of events which might best be carried out through directive style are those which involve learning safety rules (e.g., Don't go in the street); or learning how to do something or what names to give things (Put the key in the hole; point to the X); or sustaining wayward attention (Wait; do this first).

A final criticism which could be levied at the negative value placed on mother directiveness in the literature on hearing-impaired children comes from the work of Goldin-Meadow and Feldman (1977). They found that six 1- to 3-year-old severely hearing-impaired children of normal-hearing parents invented their own sign language system containing linguistic features similar to those of normal-hearing children experiencing conversational style input. The inventiveness view of language learning supported by the Goldin-Meadow and Feldman (1977) finding runs counter to the more popular copying or imitative view that hearing-impaired children must hear conversationally couched language in order to learn language.

There are several ways to handle the criticisms of the false biases in fine tuning assessment approaches. The first is to evaluate a highly directive interaction in terms of what the adult is trying to accomplish. If the directive mode is needed to accomplish the adult's goals, then a negative value should not be placed on it. The eventual aim of the analysis is to design intervention programs aimed at increasing the number of occasions in the child's life in which the interaction is conversational, not necessarily to decrease the number of instances which may need to be conducted directively.

A second way to use the fine tuning approach is to create contexts to meet the particular language learning goals of a child. For example, Prinz and Masin (1985) had teachers and parents expand on children's single signs to include particular linguistic relations such as subject-verb relations and found the children were using the new forms productively five months later.

The value of the fine tuning approach to assessment is that it creates a sensibility that language learning is the responsibility of not just the language learner, but also of those with whom the learner communicates. The method, when used appropriately, can lead to individually designed language learning contexts which occur in the child's daily life.

THE DISCOURSE APPROACH

Characteristics

Discourse is a term which is usually used to mean the organization of language beyond the level of a single communicative act. Thus, conversations qualify as a type of discourse, as do event descriptions, classroom lessons, and stories (Lund & Duchan, 1988). Assessment of discourse has involved identifying what types of discourse the child can engage in and how they differ from one another. Discourse types are called *discourse genres.* Examples are: narratives, jokes, arguments, descriptions, expositions, and conversations.

Once the genre has been identified, analyses have involved identifying the overall parts or structural constituents of the particular piece of discourse being analyzed. This *macroanalysis* often entails examining the particular piece of discourse against an ideal of its type. So, one might examine a story told by a child against a typical story format or story grammar to see if the story contains all the parts it should (e.g., Johnston, 1982; Graybeal, 1981). Or one might examine the general structure of classroom discourse, such as that which is involved in typical lessons, to see if the child in question conforms to the "rules of classrooms" (Mehan, 1979).

A more intricate sort of discourse analysis has involved detailing how the particular parts of discourse fit together. For example, Liles (1985) examined *cohesion devices* such as conjunctions or pronouns which language impaired children use to tie their discourse together, and Mentis and Prutting (1987) have examined the cohesion difficulties experienced by head injured adults.

Conversations have been considered the prototypic sort of discourse genre,

and indeed the term "conversation" is sometimes taken to be synonymous with discourse. (See above for a review of the research on conversations with hearing-impaired children.) Besides conversations, two other areas of discourse have received research attention in the area of hearing-impaired children: stories and classroom interactions.

Analysis of the Discourse of Hearing Impaired Children

Gaines, Mandler, and Bryant (1981) had 12 orally trained severely hearing-impaired adolescents (mean age 14.5 years) and 6 normal-hearing children (mean age 11.0 years), matched for reading ability, read a story and recall it in writing. Their written stories were evaluated for the amount recalled and the degree to which the written version matched in detail the original. There was no difference between the two groups in the amount recalled, but the hearing-impaired children added information not in the original more than did the normal-hearing children.

An interesting comparison study with that of Gaines et al. (1981) is one done by Sarachan-Deily (1985) which involved written story recall of age-matched severely hearing-impaired and normal-hearing high school students. In the Sarachan-Deily study the groups were not matched for reading ability. The oral hearing-impaired subjects averaged fifth grade level and the normal-hearing, tenth grade level in their reading achievement performance. In the Sarachan-Deily study the normal-hearing superior readers recalled more propositions than did the hearing-impaired readers, but the two groups were equivalent in their ability to construct inferences from the read material. This finding, when taken along with that of Gaines et al. (1981) suggests that hearing-impaired adolescents have comparable or even superior ability to normal-hearing adolescents to extrapolate from the information provided and to go beyond what is given by the text.

Hearing-impaired children's ability to tell stories in sign has also been studied. The stories told by severely hearing-impaired signers have been found to follow the same story grammar organizational framework as for normal-hearing story tellers. The signers convey to their listeners that they are making a transition to a new part of a story constituent through the use of pause length. Gee and Kegl (1983) found that the adult signers they studied used longer pauses between major divisions in the story (e.g., introduction and story) and shorter pauses between the minor divisions in the story (e.g., between end of an episode and a conclusion).

Story cohesion markers of severely hearing-impaired speakers were studied by Yoshinaga-Itano and Snyder (1985). They asked 49 oral severely hearing-impaired children and 49 normal-hearing children between ages 10 and 15 to write a story about a picture of an accident scene. The two groups were matched for age, sex, and intelligence (and not for language level). The hearing-impaired children tended to use proportionally more word and phrase repetitions to indicate semantic cohesion than the normal-hearing children. The normal-

hearing children used more rephrasings such as synonyms and general category terms than their hearing-impaired counterparts. The authors concluded: "The lexical differentiation of the hearing-impaired children appears limited to single vocabulary words. They seem to have been unable to develop schemata that include a variety of words to discuss the same topic" (Yoshinaga-Itano & Snyder, 1985, p. 84).

Classrooms of hearing-impaired children have also been studied for their discourse patterns. One consistent finding is that, for classes of hearing-impaired students (as well as for classrooms of normal-hearing children), classroom discourse is heavily dominated by the teacher, both in terms of initiations and amount of language (Craig & Collins, 1970a, 1970b). Judging from the findings of Collins and Rose (1976) the degree of teacher dominance may depend on the teaching philosophy of the teachers. Collins and Rose (1976) studied what they called an "open environment" for hearing-impaired high school students in which much of the students' day was spent in individual study In this open school the conversation during group instruction was equally distributed, with teachers talking 41.59% of the time and students, 45.72%. This egalitarian pattern was contrasted with a more traditional high school group instruction session in which the teacher talked 76.64% of the time and the students, 9.52%.

A second area of investigation of classroom discourse is to determine how teachers and students assign speaking turns to one another. Mather (1987) studied how teachers of hearing-impaired children indicate who they are calling on for a turn. Mather found that teachers of hearing-impaired children used two types of eye gaze. One was directed at particular children and was used for calling on children one at a time. The second was a visual scanning of the group of students to call on a group as a whole. Mather's study compared the number of discourse breakdowns in two classrooms of hearing-impaired preschoolers and found that there were many fewer difficulties in classrooms where the teacher's use of the two types of gaze was unambiguous and consistent.

Kluwin (1981) has outlined an attention-getting system used by teachers of the hearing-impaired which involves a three-stage progression from distant hand waving, to closer taping or waving, to stamping feet and grimacing. In his study of teachers of hearing impaired children in manual communication classrooms, he found differences not in the use of the three-stage progression but in whom they directed the attention-getting devices to. One teacher addressed her attention-getting device to a group of children when trying to get a single child's attention; a second teacher focused on the individual child.

A third area of classroom analysis is the types of lessons which take place. Kluwin (1983) found two types of classroom lessons which occurred in all four manual classrooms that he studied. The first involved procedural instructions, and the second was a topical lesson. For the procedural instruction, the content was repetitive and predictable, and required little in the way of statements

explaining what was happening or was to happen. The topical lesson was more complex in content, and contained an abundance of "meta" statements such as, "Before we do that . . .," or "You will find out when . . ."

Lastly, Erber and Greer (1973) examined the styles of repair which 10 teachers used when they were not understood by a hearing-impaired child in their classroom. Of the four types of repair studied (repetition, emphasis, structural change, and supplementary information) the most used was emphasis and the second most frequently used was repetition. Teachers of hearing-impaired children, like hearing-impaired children themselves, tend to repeat rather than revise what they have just said in order to make themselves understood (see Donnelly & Brackett, 1982; and Givens & Greenfield, 1982).

Critique

The analysis of discourse as an assessment procedure for evaluating the language of hearing-impaired children is subject to the same sorts of criticisms as other areas of pragmatics analysis. Assessors should be cautious not to automatically interpret non-"normal" occurrences in classroom discourse between teachers and their hearing-impaired students as faults in a normal system. The attention-getting, turn taking devices and repair strategies may be more functional for hearing-impaired students who cannot make use of the oral communicative devices used by teachers in classes of normal-hearing students. Or if, during the course of an assessment, one finds an abundance of lexical repetitions used as a discourse cohesion device, the repetitions should be examined as to their communicative function. The oral hearing-impaired speakers may be better understood by their listeners when they use repetitions than when they use alternative devices such as pronouns or synonyms to revise what was originally not understood.

The advantage of discourse analysis is to allow the assessor to understand the nature and organization of communication engaged in by a particular hearing-impaired child. One can then improve on it, when appropriate, by making changes in the communicative context, the communication partner, or in the child being assessed.

SUMMARY AND CONCLUSION

Having wended our way through four areas of pragmatics assessment, we can now look back to draw some conclusions about the nature of pragmatics assessment in general, what to look out for in terms of its misuse, and how to adapt pragmatics to help us better understand communications with hearing-impaired children. The four areas of assessment, functional analysis, conversational analysis, fine tuning analysis, and discourse analysis, have been discussed separately with each being described and evaluated for its use with hearing-impaired children. Advantages and cautions in their application are summarized in Table 2. In practice the approaches are not separable, but are

Table 2

Advantages and Cautions in Four Approaches to Assessing Pragmatics

Functional Analysis

Advantages.

- Provides a way to assess linguistically opaque communicative acts
- Includes nonverbal communication in its procedure
- Focuses on what children are trying to accomplish rather than on what adult deems important

Cautions·

- Avoid confining assessment to items on checklist
- Discovery method can be time consuming
- Should not presume that each act has only one intent
- Should not ignore context

Conversational Analysis

Advantages

- Provides a system for analyzing uniqueness of conversations with and among hearing-impaired children

Cautions

- Should not assume deficit framework in which characteristics of conversations with normal-hearing children are taken as exemplary

Fine Tuning Analysis

Advantages

- Can be used as a guide for naturalistic intervention approaches
- Places responsibility for language learning on interactants as well as on hearing-impaired children

Cautions

- Should not assume that directive language is "bad" — it can serve positive functions
- Should not assume that conversational language is sole source and prerequisite for language learning - children can be innovative

Discourse Analysis

Advantages

- Provides a means for discovering how hearing-impaired children organize their discourse

Cautions·

- Should not assume that normal-hearing children's discourse organization and features should be adopted by hearing-impaired children

inextricably intertwined. Functional analysis yields information about what speakers or signers are trying to accomplish with their communications. If the agenda or group of utterances serving the same intent involves trying to teach a child something, the effect will likely be a directive interaction, probably

something like a classroom lesson in structure. Conversational topic control can be treated as an index of directiveness and breakdowns and repairs occur as part of an unaccomplished intent as well as part of a classroom routine.

Decisions about what to assess should arise from what needs to be answered about a particular child, and not from the predilections of the assessor or the interests of those doing research on pragmatics or on hearing-impaired children. Decisions about how to assess might take into consideration the pitfalls of the various sorts of pragmatics assessments. These can be categorized into several main themes. First is the *a priori category problem,* second the *context stripping problem,* and third the *difference-equals-deficit fallacy.*

The a priori category problem occurs when checklists of what will be looked for guide the analysis at the expense of finding something in the course of the assessment that is unexpected. Examples of a priori categories used in pragmatics analyses are the checklists for determining intent types, and lists of parts of a story grammar against which children's stories are evaluated.

The context stripping problem is one which involves looking for particular units or categories of behavior without examining the context governing their existence or nature. Intent analysis becomes context stripped if intents are looked at one at a time, without examining them in light of the ongoing event, agenda, and social interaction context.

The difference-equals-deficit fallacy is perhaps the most damaging of all the problems which come along with the pragmatics revolution. The pragmatics literature pertaining to hearing-impaired children is fraught with the deficit assumption. The literature which compares hearing-impaired with normal-hearing children finds the hearing-impaired different in the areas of turn taking, conversational repairs, use of attention getters, directiveness of parents, and lexical cohesion devices. This bias is particularly unfair when comparisons are made between hearing-impaired children and age-matched normal-hearing children rather than between hearing-impaired children and children who have comparable language abilities. Sometimes the differences found between hearing-impaired and normal-hearing age mates are the same as ones found between younger and older normal-hearing children, suggesting that the differences for hearing-impaired children are reflective of their level of language competence rather than being part of a syndrome of deafness. (For more on this issue see Duchan, 1987b).

What are we to make of the differences that are not developmental in nature? The proposition heavily represented in the research literature is to see the differences as problematic, and to presume a goal wherein the difference is eliminated. The plea being made here is to, first, find out why hearing-impaired children or their parents are doing something differently and not offhandedly to cast it in a negative light.

In conclusion, the new approaches to assessment emerging from the pragmatics revolution offer exciting new insights into the nature of communication. They are being used both appropriately and inappropriately to evaluate

the communicative performance of hearing-impaired children. Their promise will come to fruition if those doing the assessments as well as those reading the assessment reports recognize when ideas from pragmatics are being misused as well as when they are being used appropriately.

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Chapter 3

Assessing English Syntax in Hearing-Impaired Children: Eliciting Production in Pragmatically-Motivated Situations

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INTERACTIONS AMONG SYNTAX, SEMANTICS, AND PRAGMATICS

The last 20 years have witnessed major changes in the dominant psycholinguistic conception of language and language acquisition. The 1960s focused on the grammatical component (syntax) of language and how that was acquired by children learning a first language. Early multiword sentences were typically described in terms of the characteristic positions of the words (Braine, 1963), or the types of words that appeared or were missing. For example, Brown described children's early sentences as "telegraphic" — containing content

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words such as nouns, verbs, and adjectives, but leaving out grammatical inflections and function words like prepositions, auxiliary verbs, and articles (Brown, 1973; Brown & Bellugi, 1964). Grammatical analyses of these sentences applied traditional descriptive categories like noun, verb, determiner, adjective, noun phrase, and verb phrase, and focused on the order of elements and the elaboration of phrasal and clausal structures (Garman, 1979).

Accounts of syntactic development beyond the early stages, such as the mastery of grammatical morphemes (Brown, 1973; de Villiers & de Villiers, 1973) or the emergence of complex construction types like questions and negatives (Bellugi, 1967; Brown, 1968; Brown & Hanlon, 1970; Klima & Bellugi, 1966), typically adopted the transformational grammars being written by linguists such as Chomsky (1965) in order to explain the pattern of normal verbal development. In all of these analyses, the syntactic form of the sentence was considered independent of its meaning and apart from the situational and discourse context in which it was produced. These studies provided valuable descriptive information about the grammatical structure of children's sentences at different stages of normal verbal language development, and their legacy can be seen in many areas, including: (a) descriptive research on English syntactic development in hearing-impaired children (Quigley & King, 1980; Quigley & Paul, 1984); (b) assessment instruments for syntax, such as the Test of Syntactic Abilities (TSA) (Quigley, Steinkamp, Power, & Jones, 1978); and (c) language-intervention programs for hearing-impaired students, such as Apple Tree (Caniglia, Cole, Howard, Krohn, & Rice, 1972) and the Rhode Island language curriculum (Blackwell, Engen, Fischgrund, & Zarcadoolas, 1978).

However, by the early 1970s it became apparent that purely grammatical accounts of utterances underrepresented the richness of the language knowledge of the young child, particularly the relational meanings and semantic distinctions that early sentences express. Researchers began to stress the importance of sentence meaning (semantics) in language acquisition, and characterized the child's early word order rules in terms of semantic notions such as agents, actions, possessions, attributes, and locations rather than in terms of grammatical categories like subjects, adjectives, and verbs (Bloom, Lightbown, & Hood, 1975; Brown, 1973; Leonard, 1976; Schlesinger, 1974). This analysis used the linguistic and non-linguistic context to interpret the semantic notions communicated by the child, so it became known as the *rich interpretation* of sentence structure. It revealed a consistent order of emergence of the semantic relationships in two- and three-word utterances that appears cross-linguistically and can be tied to the cognitive development of the child (de Villiers & de Villiers, 1985). Subsequent research showed that the semantic relationships expressed in sentences interact with syntactic properties in determining the pattern of acquisition of later constructions such as negatives, conjoined sentences, and passive voice (Bloom & Lahey, 1978; Bloom, Lahey, Hood, Lifter, & Feiss, 1980; de Villiers, 1983).

In the latter portion of the 1970s and the early 80s attention turned to the pragmatic context or functional aspects of language. It became clear to many psycholinguists that the process of normal verbal language development is inextricably bound to communicative interaction, and accounts of language acquisition began to stress the notion of developing *communicative competence* (Bates, 1976; Bruner, 1983; Dore, 1977, 1979). Empirical studies focused on the acquisition of conversational and referential skills in young normal-hearing children, including interactional skills like initiating, maintaining, and ending topics; monitoring communication success and repairing communication breakdowns; and adjusting one's language to accommodate the state of knowledge and level of language ability of the listener (see Garvey, 1984, and Ochs & Schieffelin, 1979, for reviews). Others looked at the acquisition of major speech acts or pragmatic functions of utterances such as negating (de Villiers & de Villiers, 1979; Pea, 1978), referring (Bruner, 1983), and requesting as in requests for information, objects, actions, or clarification (Bruner, 1983; James & Seelbach, 1982). Most importantly, several studies demonstrated that various syntactic devices were not mastered in isolation from the pragmatic functions that they served and the discourse context in which they were used. In fact, the pragmatic function of constructions interacted with their syntactic complexity in determining the pattern and order of acquisition (see Bloom & Lahey, 1978; de Villiers, 1983; de Villiers & de Villiers, 1979; Greenfield & Dent, 1982; and James & Seelbach, 1982). Current descriptions of verbal language development in normal-hearing children therefore stress the combined contributions of grammatical, semantic, and pragmatic factors to the acquisition process.

A pragmatic analysis of language acquisition has also had its impact on research and recommendations for intervention with hearing-impaired children. As early as 1977, Wilbur noted that hearing-impaired students experience characteristic problems in learning when and how to use several devices in English that make discourse more cohesive. These include the use of pronouns in place of nouns, indefinite and definite reference (*a* vs. *the*), and ellipsis (the deletion of redundant words, phrases, or clauses). Wilbur argued that these difficulties arose from the relative neglect of extended discourse in language instruction. The focus of most English language curricula and methods of instruction for the deaf is on the grammar of single sentences (King, 1984), but the rules governing the use of discourse cohesion devices are essentially pragmatic and contextual, and can be acquired only from exposure to and practice with conversation and extended text. Similarly, Kretschmer and Kretschmer (1978) emphasized the importance of analyzing the hearing-impaired child's pragmatic skills in conversation, and organized their guide to English language instruction around discourse functions rather than syntactic patterns.

Implications for Assessment

In this chapter I argue that the central role of discourse and communicative function in language development has profound implications for assessment. Pragmatics is not just an additional aspect of English that must be assessed, but rather pragmatic considerations must be central to our techniques for assessing mastery of syntax as well as conversational rules. In-depth assessment of a hearing-impaired child's productive mastery of the grammar of English is of central importance for the development of effective educational plans and for evaluating the success of language teaching. We need to establish the stages children go through in their acquisition of particular grammatical forms and how well they can use them in communication at different points in development. However, existing methods for assessing syntax in language production have considerable limitations for these purposes. This is particularly true for assessing mastery of complex constructions in which the basic sentence or clausal patterns of English are transformed, conjoined, or embedded within each other (Blackwell et al., 1978; Caniglia et al., 1972). These include questions that transform the simple declarative sentence word order ("Where are we going to eat?" vs. "We are going to eat."); clauses linked by conjunctions such as *and, but, because,* or *while;* and embedded relative clauses such as "The farmer who washed the horse fed the cow." Two major methods currently used to assess syntax production are (a) analysis of spontaneous language samples and (b) elicited imitation.

CRITIQUE OF CURRENT METHODS OF ASSESSMENT

Analysis of Spontaneous Language Samples

Spontaneous language samples collected in a variety of discourse settings have the advantage of pragmatic relevance and contextual support, and several texts argue that language sample analysis should be the primary means of assessing expressive language (Bloom & Lahey, 1978; Kretschmer & Kretschmer, 1978; Miller, 1981; Muma, 1978). Generally, 50-100 consecutive, complete child utterances are subjected to grammatical (form), semantic (content), and/or pragmatic (function) analyses. Some of these analyses are quantitative and related to norms of spoken language development in normal-hearing children (e.g., Developmental Sentence Scoring [DSS], Lee, 1974); others are more qualitative and follow guidelines taken from psycholinguistic studies of language development (e.g., Bloom & Lahey, 1978; Chapman, 1981).

While much of our knowledge of the pattern and process of normal language acquisition (spoken and/or signed) comes from analyses of spontaneous conversations between mothers and children (e.g., Brown, 1973; Bloom & Lahey, 1978; de Villiers & de Villiers, 1985; Newport & Meier, 1985), the technique has some limitations for assessing the expressive language of individual language-delayed children. Collecting representative samples of a child's lan-

guage is time-consuming; analyzing them in terms of syntax, semantics, and pragmatics is still more time-consuming despite recent advances in computer-assisted transcript analysis programs (e.g., Systematic Analysis of Language Transcripts [SALT], Miller & Chapman, 1982). Furthermore, the open-endedness of spontaneous language in conversations poses a problem for assessment of grammatical knowledge. Some aspects of English syntax that may be central to a child's knowledge of the language and are important for fluent reading and writing above an elementary level (e.g., relative clauses, various types of questions, and passive sentences) are infrequent in spontaneous conversation. Many grammatical and semantic characteristics of a language sample are also influenced by the topic of conversation and by the relationship between the communicators (Gallagher, 1983). The problem for assessment is that, when a particular linguistic structure does not appear in a sample of a child's spontaneous language, it is unclear whether the child was *unable* to produce it or *chose* not to produce it, or whether a situation calling for its use simply did not occur. Clinicians have tried to circumvent this problem by informally manipulating the linguistic and nonlinguistic contexts to influence the child's spontaneous language. What is needed, however, is a more systematic set of materials that constrain the utterances to be produced while maintaining appropriate referential support and pragmatic motivation for the utterances in ongoing conversational interaction.

Elicited Imitation

In imitation tests the examiner models sentences of different types for the child to copy. Usually the child is asked to produce an exact match to the model sentence in immediate imitation, with the instruction, "Say what I say," as in the Northwestern Syntax Screening Test (Lee, 1969) and the Carrow Elicited Language Inventory (Carrow, 1974). For hearing-impaired students using a signed language or simultaneously signed and spoken language, the instructions to repeat what the examiner produces is simply changed to reflect the child's mode of communication. Sometimes the examiner uses a model sentence to describe a given referential situation and then prompts the child to produce a sentence of exactly the same structure but with different lexical items to describe a similar referential event as in the Grammatical Analysis of Elicited Language (GAEL) tests (Moog & Geers, 1979, 1980). Here the imitation is of the grammatical structure rather than of the specific words/signs. These tests have the advantage of constraining what the children are to produce, so examiners can systematically sample different syntactic constructions and be fairly sure what the children are aiming at when they produce a sentence. They are also relatively easy to score, since the children either do or do not produce the target features.

On the other hand, several characteristics of imitation make this method inappropriate for assessing hearing-impaired children's productive mastery of grammar or their communicative competence. Even when a supporting

referential context is provided, imitation relies heavily on the child's rote memory and, in the case of oral production, on speechreading skill. So, if children fail to imitate a particular feature of syntax, it need not mean that they do not have productive mastery of it in their spontaneous language; the failure could be one of memory or, in the case of oral stimulus sentences, one of incomplete reception (speechreading and/or audition). At best then, imitation is an indirect measure.

Secondly, elicited imitation is essentially non-communicative in nature and can easily overestimate or underestimate a child's ability to use a form in an appropriate pragmatic context (Bloom, 1974; Connell & Miles-Zitzer, 1982; Prutting & Connolly, 1976). For example, Bloom (1974) found that young normal-hearing children often could not accurately imitate sentences that they themselves had produced spontaneously in a conversational context the day before. Recently, Fujiki and Brinton (1987) compared inflectional morpheme production in spontaneous speech and elicited imitation in language-disordered subjects aged 5:6 to 6:6. The comparability of performance on the two tasks varied widely across the subjects. While the two procedures produced correlated results for nearly half the subjects, for the others there was no relationship between the production of the morphemes in spontaneous speech and in imitation.

Finally, existing tests of elicited imitation and prompted production do not provide sufficient number or variety of instances of various aspects of English grammar to provide an adequate assessment of an individual child's mastery of the different constructions. An example is discussed in the following section (see third criterion).

CRITERIA FOR IDEAL ASSESSMENT DEVICES

What properties, then, must a good device possess for assessing the production of spoken/signed English? The following points expand the criteria discussed by Engen & Engen (1983) in their introduction to the Rhode Island Test of Language Structure (RITLS).

1. The task must focus directly on the child's primary language knowledge and not depend on other skills such as reading, rote memory, or speechreading.
2. It must be pragmatically appropriate and communicative; that is, sufficient referential support and pragmatic motivation should be provided for the grammatical forms to be elicited. The procedures must provide the child with something to communicate, and someone to communicate with, in an authentic exchange of information.
3. The components of English grammar to be assessed must be theoretically motivated. There are two aspects to this requirement:
   (a) The tests should explore syntactic, semantic, or pragmatic pro-

cesses that are basic to the mastery of English and central to effective communication.

(b) A sufficient range of semantic and syntactic types of a given construction should be sampled, especially if these are of differential difficulty for normal-hearing children in the process of normal verbal acquisition. For example, *and* can be used to combine different grammatical components of a sentence: subject + subject, object + object, verb phrase + verb phrase, or sentence + sentence (see p. 49 for examples of these). These forms are not all acquired at the same point in development for normal-hearing children, and continue to provide differential difficulty in production for older children as well (Tager-Flusberg, de Villiers, & Hakuta, 1982). An appropriate assessment of the mastery of coordination in English must, therefore, sample across the various grammatical types in order to establish where the child stands in the course of development.

4. If comparisons are to be made to other hearing-impaired or normal-hearing children, the procedures must have been standardized on those populations. Measures of language production frequently used with hearing-impaired students do not provide norms for hearing-impaired children, so the scores that are obtained are not readily interpretable. Examples include Northwestern Sentence Screening Test (Lee, 1969), the Carrow Elicited Language Inventory (Carrow, 1974), and the Developmental Sentence Scoring for spontaneous language samples (Lee, 1974).
5. Finally, if the assessment is to be used for educational planning for a given child, sufficient examples of the different constructions should be tested in criterion-referenced fashion, that is, where the criterion is *complete mastery* of the linguistic constructions being sampled. This requires knowledge of the appropriate syntactic, semantic, and pragmatic analyses of the various features of English to be tested, as well as detailed descriptive information on the pattern of acquisition of those forms in normal-hearing and hearing-impaired children.

PRAGMATICALLY-BASED ELICITATION PROCEDURES

In the remainder of this chapter I describe elicited production procedures that provide in-depth qualitative information on the acquisition of three major syntactic processes and pragmatic functions in English. They attempt to approximate the above criteria for a good assessment procedure more closely than other available techniques. The aspects of English grammar elicited by these procedures are (a) coordinate sentences with *and;* (b) *wh-* questions; and (c) the use of adjectives, prepositional phrases, and relative clauses to specify a referent. The reasons why procedures were developed to elicit these particular aspects of English are several. First, conjunction, interrogation, and rela-

tivization are major syntactic processes in English (Brown, 1973; de Villiers & de Villiers, 1985). Second, they represent important pragmatic components of communication: conjunction and deletion of redundancy in discourse cohesion, gaining information, and identifying or specifying a referent. Third, there are considerable psycholinguistic data from studies of normal-hearing children to establish the pattern of normal acquisition of these forms in oral English (see de Villiers & de Villiers, 1985). And fourth, existing research on hearing-impaired children and youth (primarily from written English) suggests that some of the grammatical processes in these constructions provide particular difficulty for profoundly hearing-impaired students (Quigley & King, 1980; Quigley & Paul, 1984).

The procedures to be described have some commonalities. They all employ pictures or arrays of pictures to elicit the language from the child. Videotaped events or computer animations might be more effective than static pictures for some actions and activities, but they are also less convenient and far less available to clinicians and teachers. In each of the procedures, the person with whom the child interacts has information that the other does not have, so real communication takes place, even in the somewhat artificial context of the staged elicitation task. The pictures and communication situations are designed to strongly bias the child toward using particular syntactic forms in communication with the receiver of the message. Thus, although they do not constrain the constructions produced as much as an elicited imitation procedure, these materials elicit a large number of the target syntactic forms, provided that the child has productive mastery of them. Finally, a fairly wide range of grammatical forms of each construction is sampled, so that something can be concluded about the relative difficulty of those forms.

The data to be presented come from several studies of the acquisition of complex syntax in the oral language of profoundly hearing-impaired children at the Clarke School for the Deaf. In all cases the hearing-impaired subjects showed sensorineural hearing impairment with a pure tone average greater than 90 dB HL in the better ear (unaided pure tone thresholds averaged over 500, 1000, and 2000 Hz). They had no other apparent cognitive or emotional disability. All were prelingually hearing impaired and had always been in oral-only educational programs. English was the only language in the home. These data refer only to spoken English production, but we are currently using the same procedures to study the acquisition of these grammatical processes in hearing-impaired children using varieties of signed English. The referent specification task is also being used in research on the American Sign Language constructions used by hearing-impaired adults and children in communication situations that elicit relative clauses from native speakers of English.

Coordination

Coordination with *and* is the simplest and earliest complex sentence form to emerge in children's language, yet there are several types of coordinate sen-

tence and they vary in difficulty for normal-hearing children in both comprehension and production (Tager-Flusberg et al., 1982). In sentential coordination, complete sentences are combined with *and;* for example, "The doctor is examining the patient and the nurse is washing the thermometer" (SVO + SVO). In phrasal coordination, smaller constituents are conjoined. *And* can conjoin subjects, as in

The boy and the girl are jumping over the fence. (S + SVO)

or objects,

The policeman is holding a stopsign and a flag. (SVO + O)

or verb phrases,

The girl is brushing her hair and watching the TV. (SVO + VO)

In the sentence,

The woman is combing and cutting her hair. (SV + VO)

the verbs are conjoined, while in

The man is pulling and the boy is riding the horse. (SV + SVO)

a subject + verb clause is joined with a complete SVO clause.

Task description. In the coordination elicitation procedure the children looked at pictures in a portable slide viewer and were asked to describe "What was happening in the picture" for an adult listener who could not see the slides. In this way the children had to communicate information to which only they had access. The single pictures depicted agents acting on objects and each was designed to be most effectively described by a coordinate sentence. Pictures designed to elicit phrasal coordinations showed (a) a single agent acting upon two objects (for SVO + O and SVO + VO forms), (b) two agents acting on a single object (for S + SVO and SV + SVO), or (c) a single actor performing two different actions on the same object (for SV + VO sentences). Figure 1 shows three examples of pictures to elicit phrasal coordinations (panels 1, 2, and 3). Panel 4 was designed to elicit a sentential coordination in which two subjects of the same type are acting on two different objects.

For a study of coordinate sentence production in normal-hearing preschoolers and profoundly hearing-impaired 7- to 13-year-olds at Clarke School (Gross & de Villiers, 1983), sets of three pictures were created for each of the five phrasal coordination types defined above; S + SVO, SVO + O, SVO + VO, SV + VO, and SV + SVO. We call these single-referent pictures because they depict single subjects and/or objects. For each of the single-referent sets there was a corresponding double-referent set depicting two subjects and/or two objects of the same type, a context that pragmatically motivates sentential coordinations.

Results. Table 1 shows that the procedure was effective at eliciting an exten-

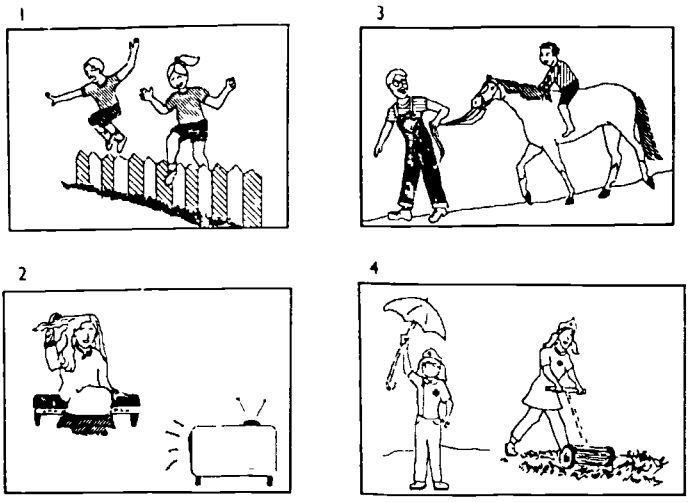

Figure 1. Examples of pictures designed to elicit coordinate sentences. Their target grammatical forms are: (1) The boy and the girl are jumping over the fence (S + SVO); (2) The girl is brushing her hair and watching the TV (SVO + VO); (3) The man is pulling and the boy is riding the horse (SV + SVO); (4) One nurse is holding an umbrella and the other nurse is mowing the grass (SVO + SVO).

sive number of coordinate sentences from both normal-hearing preschoolers and hearing-impaired children. On average, the group of normal-hearing 5-year-olds produced coordinate sentences for 78.8% of the sentential context pictures and 81% of the phrasal context pictures. Across 25 hearing-impaired 7- to 13-year-olds, 0-100% of the pictures elicited sentences conjoined with *and*, with a mean of 70.9% for the sentential contexts and 62.7% for the phrasal. Table 1 also shows the percentage of target *and* sentences produced in the sentential or phrasal form.

Several aspects of the results should be noted. First, with few exceptions, the coordinate sentences elicited from both the normal-hearing and the hearing-impaired children were produced in the syntactic form appropriate to the referential context. Sentential forms were far more frequent than phrasals in double-referent contexts and phrasals were usually produced in the single-referent contexts, so the children were sensitive to the referential constraints of the pictures. However, in phrasal contexts, particular types of phrasal coordinations proved difficult for both the normal-hearing and hearing-impaired children to produce. Very few sentences were produced in which an SV element was conjoined with some other constituent, as in the target form for the picture in panel 3 of Figure 1. Instead of,

The man is pulling and the boy is riding the horse. (SV + SVO)

the SV clause was expanded to SVO, thereby producing SVO + SVO senten-

Table 1
Percent of Pictures Eliciting Coordinate Sentences

Context	Group	
	Normal-Hearing[a]	Profoundly Hearing-Impaired[b]
Total *and* sentences		
Sentential Picture Contexts	78 8	70 9
Phrasal Picture Contexts	81 0	62 7
***And* sentences in target form[c]**		
Sentential[d]	66 9 (13 1)	74 2 (15 7)
Phrasal[e]		
SVO + O	68 8 (3 1)	73 8 (4 9)
S + SVO	55 2 (17 2)	88 9 (9 3)
SVO + VO	47 6 (9 5)	75 4 (7 0)
SV + SVO	0.0 (29 0)	7 0 (69.8)
SV + VO	14 3 (0 0)	7 8 (3 9)

[a] $n = 17$ Age = 5 yr [b] $n = 25$ Age = 7-13 yr [c] Target form refers to the grammatical form that the picture was designed to elicit and that was reliably produced by adult native English-speakers in describing it [d] Numbers in parentheses indicate percent of *and* sentences in inappropriate phrasal form. [e] Numbers in parentheses indicate percent of *and* sentences in redundant sentential form.

tials such as,

The man is pulling the horse and the boy is riding the horse.

Similarly, SV + VO phrasals such as,

The woman is combing and cutting her hair.

were expanded to SVO + VO,

The woman is combing her hair and cutting her hair.

The normal-hearing 5-year-olds reduced the redundancy in these expanded SV forms by substituting a pronoun the second time the object was mentioned, as in:

The man is pulling the horse and the boy is riding it. (SVO + SVPro)

and,

The woman is combing her hair and cutting it. (SVO + VPro)

In contrast, the hearing-impaired children were far more likely to repeat the redundant object noun. Similar problems of hearing-impaired children not knowing when to use a pronoun form to reduce redundancy were reported by

Wilbur (1977).

The pattern of difficulty of the different forms of phrasal coordination for both the hearing-impaired and normal-hearing children is in keeping with a constituent conjunction model of early coordination (Hakuta, de Villiers, & Tager-Flusberg, 1982; Tager-Flusberg et al., 1982). Sentences involving the conjoining of simple phrase structure constituents — for example, subject noun phrases or object noun phrases — are the easiest to produce. On the other hand, sentences that involve the conjunction of elements that do not normally act together as phrasal or clausal units — for example, SV units — are difficult to produce and usually avoided by the use of pronouns or redundant noun phrases.

The results of this study contrast in several ways with those of Wilbur, Quigley, and Montanelli (1975) in their research on profoundly hearing-impaired children's written production and judgements of coordinate sentences. In their production task, Wilbur et al. gave children two written. simple sentences without any supporting referential context and asked them to make them into one sentence with *and*. They reported that sentential coordination (SVO + SVO) was much easier than phrasal coordination, in keeping with a transformational grammar in which phrasal coordinations are derived from redundant deep structure sentential forms. For their hearing-impaired children, redundant sentential coordinations were much more frequent than phrasal coordinations, and the level of production of nonredundant phrasals by even the older hearing-impaired adolescents was still well below that of the normal-hearing 8- to 10-year-olds that they tested on the same task. In addition, erroneous deletions appeared in the coordinate sentences produced by the older hearing-impaired children that were not seen in the normal-hearing group. For example, in object-object deletions the hearing-impaired children deleted the wrong occurrence of a redundant object. In response to the two sentences:

The girl threw the ball. The boy dropped the ball.

the students sometimes produced

The girl threw the ball and the boy dropped.

They also tended to omit *and*, as in:

Joe bought ate the apple.

Wilbur et al. concluded that the hearing-impaired children were acquiring a transformational grammar of coordination with deletion rules operating on an underlying redundant sentential deep structure, but that in some cases the deletion rules were incorrectly formulated.

In our study there was no evidence for the primacy of sentential forms over phrasal forms in even the younger hearing-impaired children. Furthermore, no deletions of *and* and only one object-object deletion was observed. Instead, there were close similarities between the hearing-impaired and the normal-

hearing children in the pattern of difficulty of the different coordinate sentences.

Differences between the samples of hearing-impaired subjects in the two studies might account for some of the discrepancies in results. All of the hearing-impaired children in the Gross and de Villiers (1983) study were in one oral school for the deaf. The students in the Wilbur et al. study were part of a national sample of hearing-impaired students selected from residential and day school programs, many of them using both speech and signing.

Another possible explanation for the discrepancies lies in the different tasks used. The students in the Wilbur et al. study were given two written, simple sentences, frequently with apparent coreferential elements. In the absence of referential context, the child is likely to adopt a strategy of forming one sentence by putting *and* between the two given sentences and deleting elements that seem to be redundant. The primacy of redundant sentential forms results from this process, since it is easiest to just join the two given sentences with *and*. Erroneous deletions result from false hypotheses about what is redundant in the absence of confirming context. In contrast, the present task was much closer to spontaneous language in a natural communication situation with appropriate referential support for sentential and phrasal forms. It revealed close similarities between the hearing-impaired and the normal-hearing children in the relative difficulty of the different forms of coordination.

Finally, a measure of the validity of this elicitation procedure as a means of assessing the hearing-impaired children's productive mastery of coordinate sentence forms is provided by a significant correlation between the children's performance in this task and their use of various grammatical types of coordination in their spontaneous writing. For 10 of the hearing-impaired students, several uncorrected samples of their spontaneous writing in expository essays, stories, and letters were available. The correlation between the percentage of coordinate sentences that each child produced in target form in the elicited production task and the variety of coordinate sentence structures appearing in their written English was extremely high ($r = +.86$, $p < .01$). That is, the ability to produce a variety of phrasal and sentential coordinate sentences appropriate to the referential context in the elicitation task was highly predictive of those children's ability to use a wide range of coordination types in their spontaneous written language.

Wh-Questions

Wh-question forms are not only functionally important in effective communication as a major linguistic device for obtaining specific information. They are also a primary syntactic construction for demonstrating mastery of constituent movement rules and the auxiliary verb system of English. In *wh*-fronted question forms, the *wh*-word is placed at the beginning of the sentence, followed by the appropriate form of the auxiliary, then the subject noun phrase, and then the main verb. This varies from the usual word order in declarative sentences in which the auxiliary verb is placed between the subject noun phrase

and main verb.

Task description. In the elicitation procedure for *wh*-questions, the children were shown arrays of four pictures. In the central picture at the top of the array (outlined in a bold black), an activity was depicted about which something was not known. For example, a man was sitting in a chair reading something but the reading material was not shown, or a boy was crying but the cause of his grief was not represented. Below the main picture three smaller pictures depicted possible answers to a particular *wh*-question to be asked about the central picture, for example, three different reading materials to answer the question "What is the man reading?", or three possible mishaps to answer the question "Why is the boy crying?" The children were to ask the adult sitting opposite them the appropriate question in order to be shown which of the three possible answers was correct. When the question was asked, the adult showed the child one of the three answer pictures pasted on a separate card.

For almost any picture, a "what" question can replace other *wh*-forms, as in "What is the boy upset about?" for "Why is the boy crying?", or "What did the man use to cut down the tree?" for "How did the man cut down the tree?" Thus when each picture array was presented, the child was told to "Ask a _____ question" and shown a card with the *wh*-word written on it. In this way, *what, where, how, why,* and *when* questions were elicited in an appropriate supporting referential context. Figueres 2-6 give examples of the picture arrays used to elicit the various *wh*-forms. For each *wh*-question there were four picture sets: two depicting an ongoing activity to elicit the present progressive tense, and two depicting completed action to obtain the past tense form.

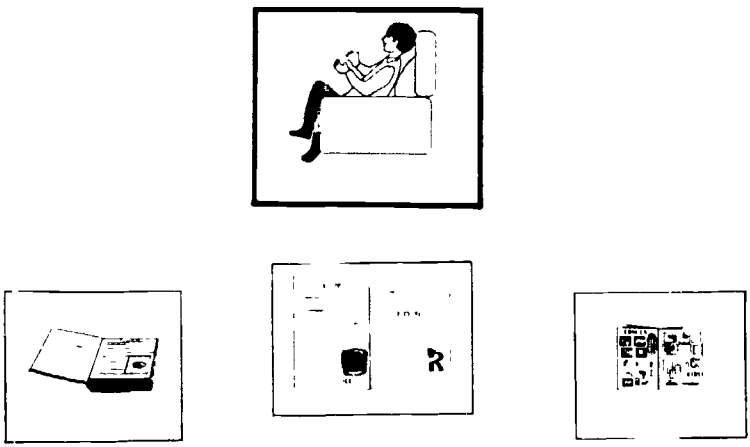

Figure 2. Picture array designed to elicit a *what* question of the form. "What is the man reading?" Child must ask the right question about the top picture to determine which of the bottom three pictures depict the missing reading material.

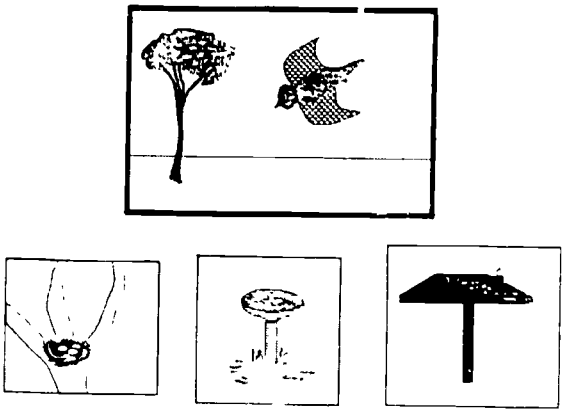

Figure 3 Picture array designed to elicit a *where* question of the form, "Where is the bird flying?"

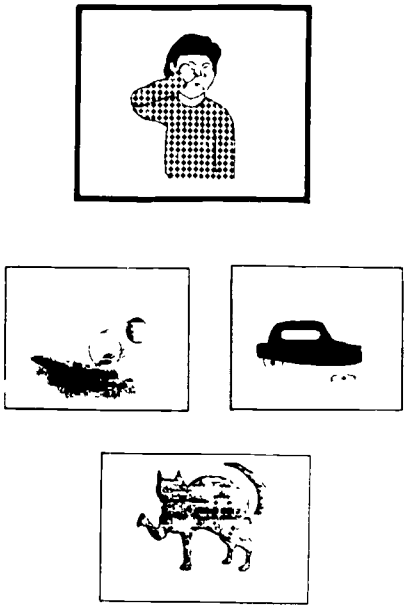

Figure 4 Picture array to elicit a *why* question of the form "Why is the boy crying?"

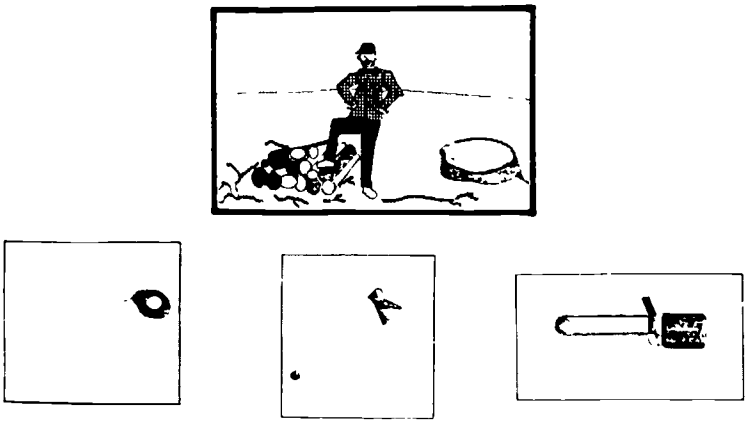

Figure 5 Picture array to elicit a *how* question of the form "How did the man cut the wood?"

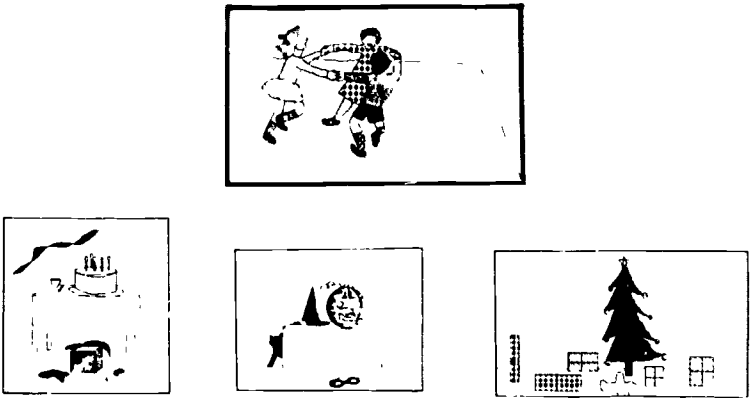

Figure 6 Picture array to elicit a *when* question of the form "When are the children dancing

Results. Both normal-hearing preschoolers aged 3 to 5 and profoundly hearing-impaired children aged 6 to 14 almost always produced pragmatically appropriate multiword questions of each type (see Table 2). This is not surprising since the children were told what type of *wh*-question to ask in this version of the procedure. In subsequent testing we have used the procedure in a less constraining way. The child was simply told to ask "the right question" to find out "which of these pictures is the answer," but was given no other infor-

mation as to which *wh*-question to ask. This reduced the number of *why*, *how*, and *when* questions asked by hearing-impaired children in this age range to between 70% and 80% of trials, but the *what* and *where* questions continued to be produced over 90% of the times that they were appropriate. Typically, *what* questions were substituted for other types of *wh*-questions. Optimally, the procedure can be used in a combination of the less and more constrained versions, with the child first being asked to produce "the right question" and, if they do not produce the target *wh*-form, then being prompted to "ask a _____ question."

Table 2

Percent of Picture Arrays Eliciting Pragmatically-Appropriate Multiword Wh-Questions

Group	*n*	Wh-Question Type				
		What	Where	Why	How	When
Normal-Hearing						
3-4 yr	13	90	83	84	85	83
4-5 yr	13	88	97	83	90	88
Profoundly Hearing-Impaired						
Lower School (6-10 yr)	10	100	98	100	90	98
Middle School (10-14 yr)	16	100	99	100	97	100

As Tables 3 and 4 show, the major difficulty with the various question forms was different for the two subject groups. For the hearing-impaired students, the overwhelming problem was omitting the auxiliary verb completely or failing to make it agree in number and tense with the main verb. For these students the correct auxiliary was supplied significantly more frequently in their *what* questions than in any of the other *wh*-forms, but there were no significant differences among the other four forms.

For the normal-hearing subjects, on the other hand, the primary problem was not a syntactic one. It was either a pragmatic problem of trying to answer rather than ask the question, or a semantic one of not being specific enough in the question asked. In the latter case the children either just produced the *wh*-word alone (e.g., "Why?"), or they used a generic catchall question like "What's he doing?"

Reference Specification and Relative Clauses

Task description. Adjectives, prepositional phrases, and relative clauses in English all serve to identify or specify a referent, to pick it out for the listener from among the possible set of things or events to which the speaker could be referring. This conversational function was studied in a referential communication task with 36 11- to 18-year-old hearing-impaired students and 20 normal-hearing 5- and 6-year-olds. The child (Sender) sat opposite an adult (Re-

Table 3

Percent of Pragmatically-Appropriate, Multiword Wh-Questions that were Grammatically Well-Formed

Group	Wh-Question Types				
	What	Where	Why	How	Whe
Normal-Hearing					
3-4 yr	90	83	90	80	90
4-5 yr	96	97	89	91	90
Profoundly Hearing-Impaired					
Lower School	40	27	25	20	25
Middle School	48	38	35	23	33
Percent of Wh-Questions for which Correct Auxiliary Verb was Provided					
Normal-Hearing	91	96	91	89	88
Hearing-Impaired	49	36	32	34	34

Table 4

Number and Percent of Error Types in Elicited Question Responses

Error Type	Group	
	Normal-Hearing	Hearing-Impaired
Grammatical		
No auxiliary	27 (5.2%)	338 (65%)
Aux placement errors	17 (3.3%)	5 (1%)
Number and tense agreement error	8 (1.5%)	52 (10%)
Redundant noun phrase copying	2 (0.3%)	15 (2.9%)
Semantic and Pragmatic		
Asked a non-specific question	75 (14.4%)	1
Produced the *wh*-word alone	28 (5.4%)	0
Answered rather than asked	22 (4.2%)	0
Asked inappropriate *wh*-question	7 (1.3%)	0

ceiver) with a low screen (about 6 in. high) between them. Identical sets of two pictures were placed in front of each of them. The two pictures depicted two everyday characters, animals, or objects (e.g., two cowboys, two horses, or two birthday cakes). The children were told, "Here are two -----s," as the pictures were placed in front of them, and it was made clear that the Receiver's two pictures were exactly the same as the child's. The children were then shown a third more complex picture propped up against the screen so that only they could see it but the Receiver could not. On the complex picture was an area surrounded by a red outline in which one of the two characters or objects was engaged in an action or having something done to it. The children were asked to describe to the Receiver "What is happening in the red box" so that the Re-

ceiver could pick out from her two pictures "Which _____ it is." When the children described the event, if they failed to specify which of the two possible referents was involved in the action, the Receiver asked "Which _____?" If the child did attempt to specify the referent, the Receiver pointed at or picked up the picture of that referent to indicate successful communication.

Some of the actions and referents in the red box were easy to specify using an adjective; for example, "The *black* horse is eating a flower" (where the Receiver has pictures of a black horse and a white horse in front of her), or "The girl is cutting the *round* cake" (where a square cake is also depicted). (See Figures 7 and 8.)

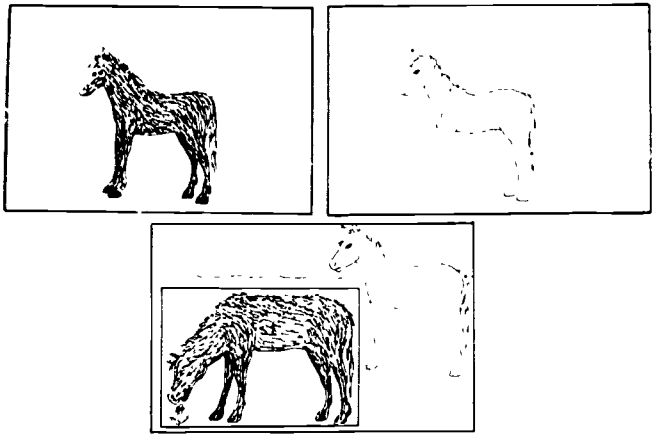

Figure 7 Picture set used in the referential communication task. Child (sender) and adult (receiver) saw top two pictures, only the child saw lower picture. Child was to tell the adult what was happening in the box in such a way that the adult could determine which of the top two elements was referred to. Target for this picture: "The black horse is eating the flower" (adjective modifying the subject noun).

In other cases the child needed to use at least a prepositional phrase to specify the referent in the red box; for example, "The policeman *on the horse* is eating an apple" (as opposed to the policeman in the car, who is also pictured for the Receiver), or "The boy is pulling the horse *with the saddle*" (not the horse with the blanket). (See Figures 9 and 10.)

Finally, and most importantly, in many cases the most effective way to distinguish between the two possible referents was by use of a relative clause; for example, "The cowboy who brushed the horse is washing the cow" (as opposed to the cowboy who fed the horse, who is also pictured in the complex picture outside of the red box, still feeding the horse). In these cases the pictures were so drawn that the child could not use an adjective or prepositional phrase to specify the referent. The only way to identify the characters was by reference to an action they were performing or had performed (or had been performed

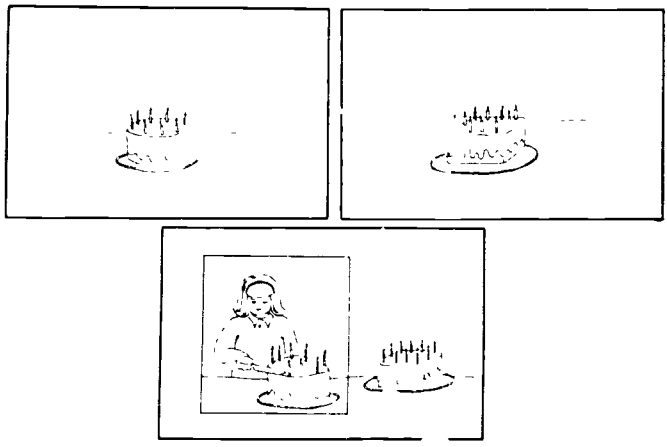

Figure 8. Picture set to elicit an adjective modifying the object noun, of the form "The girl is cutting the round birthday cake."

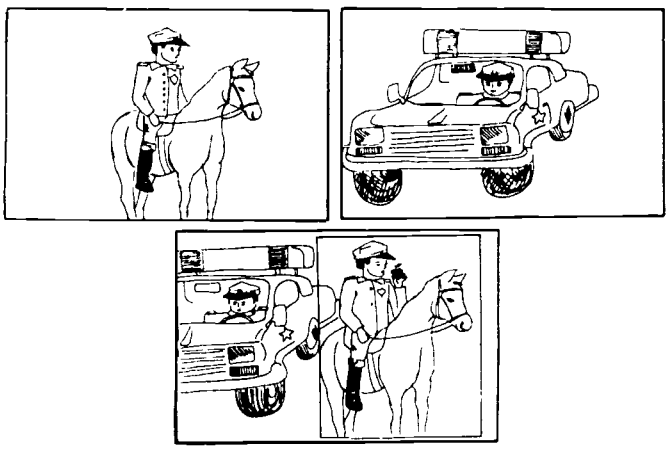

Figure 9. Picture set to elicit a prepositional phrase modifying the sentence subject, as in "The policeman on the horse is eating an apple."

on them). In English this calls for the use of a relative clause construction. Different syntactic types of relative clause are usually characterized by two grammatical variables, the role of the complex noun phrase in the sentence (embeddedness), and the role of the head noun (the referent modified by the relative clause) in the complex noun phrase (called focus). Thus in the sentence "The cowboy who brushed the horse is washing the cow," the complex noun phrase "The cowboy who brushed the horse" is the subject of the main clause predicate "is washing the cow." The head noun "cowboy" is also the subject of "brushed

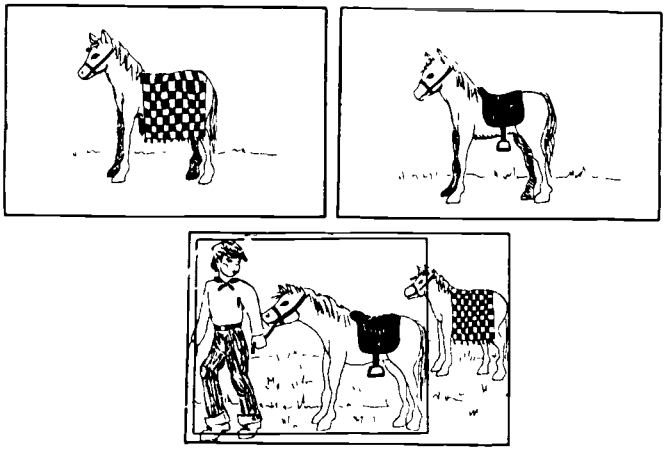

Figure 10. Picture set to elicit a prepositional phrase modifying the object of the sentence, as in "The boy is pulling the horse with a saddle."

the horse" in the relative clause, so this sentence is a subject-subject (SS) relative clause structure. In the elicitation procedure, four picture sets were drawn for each of four different relative clause types: embedded SS forms such as the sentence above ("The cowboy who brushed the horse is washing the cow."); SO forms like, "The cat that the boy brushed is chasing the mouse"; object-modifying (OS) relative clause forms like, "The policeman is grabbing the man who broke the window"; and OO forms like, "The farmer is kicking the pumpkin that the raccoon licked." (See Figures 11-14 for examples of the pictures.)

Figure 11. Picture set to elicit an embedded relative clause modifying the subject of the sentence in which the specified referent is also the subject of the subordinate clause verb, as in "The cowboy who brushed the horse is washing the cow."

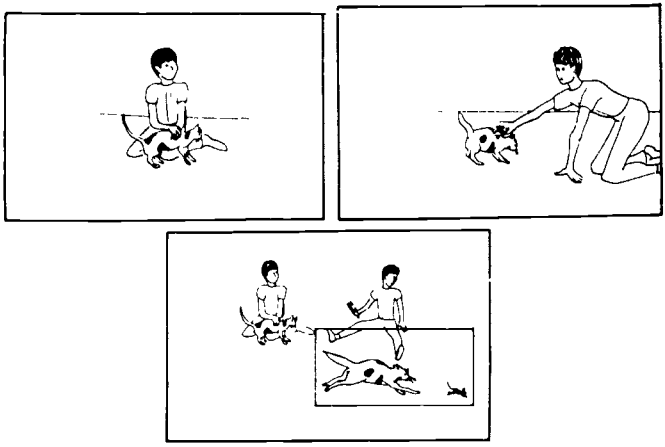

Figure 12. Picture set to elicit an embedded relative clause modifying the subject of the sentence in which the specified referent is the object of the subordinate clause verb, as in "The cat that the boy brushed is chasing the mouse."

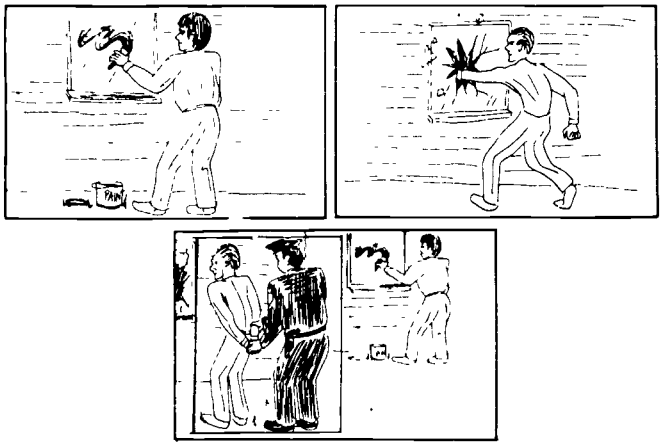

Figure 13 Picture set to elicit a relative clause modifying the object of the sentence in which the specified referent is the subject of the subordinate clause verb, as in "The policeman is grabbing the man who broke the window."

Results. Table 5 shows the normal-hearing and hearing-impaired children's performance on the adjective and prepositional phrase pictures in the reference specification task. Both groups of children were adept at giving specifying descriptions for these pictures. It should be noted that, especially in the prepositional phrase pictures, a relative clause can be used to identify the referent; for example, "The policeman who is riding the horse" as opposed to "the policeman on the horse." In these contexts, the normal-hearing children produced

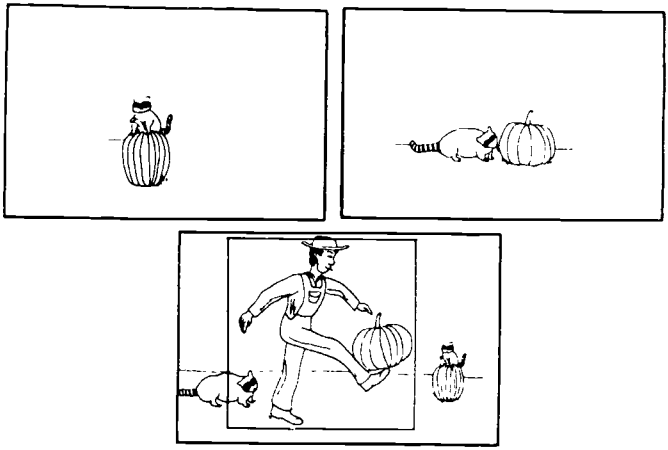

Figure 14. Picture set to elicit a relative clause modifying the object of the sentence in which the specified referent is also the object of the subordinate clause verb, as in "The farmer is kicking the pumpkin that the raccoon licked."

Table 5

Percent of Adjective and Prepositional Phrase Pictures Eliciting Reference-Specifying Expressions

Role of Referent	Grammatical Form Produced	Group: Normal-Hearing[a]	Group: Profoundly Hearing-Impaired[b]
	Adjective Pictures		
Subect	Adj	85	91 7
	Rel Clause	10	2 5
Object	Adj	85	93 3
	Rel Clause	7 5	3
	Prepositional Phrase Pictures		
Subject	Prep	40	71 4
	Rel Clause	47 5	15 7
Object	Prep	35	83 3
	Rel Clause	42 5	10

[a] $n = 20$ Age = 5-6 yr [b] $n = 36$ Age = 11-18 yr

relative clauses for almost half of the pictures, while the hearing-impaired students were far more likely to use the grammatically simpler prepositional phrase form.

Several things stand out about the performance of the children on the pictures designed to elicit relative clauses (see Table 6). First, the materials were

Table 6

Percent of Relative Clause Pictures for Which a Relative Clause was Produced

	Group	
	Normal-Hearing[a]	Profoundly Hearing-Impaired[b]
Before Prompt[c] (% of all trials)	64 6	47 9
After Prompt[c] (% of prompted trials)	71 1	55 9

[a]$n = 20$ Age = 5-6 yr [b]$n = 36$ Age = 11-18 yr [c]Prompt was "Which _____?"

successful in generating a large sample of attempted relative clauses from both groups of children. About two-thirds of the pictures elicited relative clause attempts from the normal-hearing children prior to "Which _____?" prompts. For the hearing-impaired students, relative clauses were attempted on an average of almost half of the trials ($M = 47.9\%$, with a range of 0-90%).

Following a "Which _____?" prompt (i.e., on trials in which the child failed to use a form that identified the referent for the receiver of the message), the likelihood of a relative clause being produced increased to 71% of the prompted trials for the normal-hearing children, and 56% for the hearing-impaired students. On these prompted trials, the normal-hearing children were most likely to use a truncated, elliptical relative clause form, as the pragmatics of the situation warranted. An example of such an interchange would be the following:

Child: (attempting to describe what was happening in the red square on the complex picture) "The cowboy is washing the cow."
Adult receiver: "Which cowboy?"
Child: "The cowboy who brushed the horse."

The main clause proposition is not restated after the prompt because it was expressed in the first statement by the child, and can now be presupposed. Of all their relative clause attempts after a "Which _____?" prompt, 83.8% were of this truncated form. The hearing-impaired students also produced these truncated sentences following prompts, but they were somewhat more likely than the normal-hearing children to restate the entire sentence. For them, 53.7% of relative clauses after the "Which _____?" prompts were truncated.

Relative clause *attempts* were distributed over the four types of picture contexts (SS, SO, OO, and OS) with equal frequency, but the normal-hearing and hearing-impaired students showed similar constraints on the *types* of relative clause constructions that they produced (see Table 7). Relative clauses describing pictures designed to elicit SS (embedded) relatives were most likely to be in SS form, but the other forms were much more difficult for the children to produce. For both groups of subjects SS relative clause sentences were often

Table 7
Types of Relative Clauses Elicited by Relative Clause Pictures

Clause Type	Group	
	Normal-Hearing[a]	Profoundly Hearing-Impaired[b]
Percent of Trials Eliciting Target Form[c]		
SS	63 3	40 7
SO	10	2 8
OO	16 7	9 2
OS	30	22 2
Percentage of Each Type Produced Regardless of Target		
SS	71 2	63 7
SO	5 1	2 9
OO	8 5	8 9
OS	15.3	24.4

[a] $n = 20$ Age = 5-6 yr [b] $n = 36$ Age = 11-18 yr. [c] The target form is the grammatical form that the picture was designed to elicit and that adult native English-speakers most often produced for that picture

produced in picture contexts designed to elicit the other structural types, so that 71.2% of all the full relative clause sentences attempted by the normal-hearing children and 63.7% of those produced by the hearing-impaired students were SS relatives. Next most frequent were OS forms, whereas SO and OO forms were very infrequent.

The high frequency of embedded, subject relative clauses is remarkable in the light of reports that hearing-impaired children have much more trouble comprehending and judging the grammaticality of embedded, subject relatives than thay have with object relatives (Quigley, Smith, & Wilbur, 1974). Once again the differences between the present results and the data of Quigley et al. could arise from differences in the populations of hearing impaired students sampled in the two studies (see the discussion of the study of coordinate sentences, pp. 52-53). Quigley et al. sampled both oral and signing hearing-impaired children from a variety of residential and day programs, whereas all of the students in the present study were from the same oral school.

There are also important differences in the two testing procedures. Quigley et al. asked students to judge the syntactic acceptability of attempts to join two simple sentences into one relative clause sentence with *that*, or to choose which one of several simple sentences corresponded in meaning to a complex relative clause sentence. The sentences were presented in written form and there was no supporting referential context. On the other hand, the referential communication task in the present study not only supported the use of relative clause structures, it also biased the children toward making the referent-to-be-speci-

fied the topic, and hence the subject, of the sentence. Therefore, embedded relative clauses were strongly motivated by the procedure. In addition, SS and OS relative clauses, the most frequent types produced by both the hearing-impaired and the normal-hearing children, preserve the canonical NVNVN order of sentence elements:

SS: The Indian who fed the horse is chopping the wood. (NVNVN)
OS: The girl is pulling on the woman who is picking the flowers. (NVNVN)

In contrast, SO and OO sentences stack up nouns or verbs in a sequence that makes the assignment of grammatical role more difficult:

SO: The witch that the cat scratched is eating the soup. (NNVVN)
OO: The mother is feeding the baby that the father is tickling. (NVNNV)

Many psycholinguistic studies have shown that non-canonical word order sentences in English are harder to process in comprehension and production (e.g., de Villiers & de Villiers, 1985). In fact, many of the normal-hearing children, and several of the more advanced hearing-impaired students avoided the non-canonical sentences (especially the SO forms) by passivizing the relative clause or the main clause and so producing SS (NVNVN) sentences in those contexts. For example,

The cat that was brushed by the boy is chasing the mouse.

would be produced in place of

The cat that the boy brushed is chasing the mouse.

The pattern of development of the normal-hearing and hearing-impaired children is shown in Table 8. For the younger, normal-hearing children, the major difficulty was a pragmatic one of failing to provide enough information to specify the referent. On 20% of trials, a single simple sentence was produced and the receiver of the message would need to ask "Which _____?" The pattern of responses for the hearing-impaired students shows a developmental sequence. Younger children produced two separate simple sentences before the receiver could prompt for more information, as in

The cowboy is washing the cow.... The cowboy brushed the horse.

Older children produced coordinate or multiclause sentences with other conjunctions, as in

The cowboy is washing the cow and he brushed the horse.

or

The cowboy is washing the cow after he brushed the horse.

Table 8
Types of Sentences Elicited by Relative Clause Pictures
(Percent of All Trials before Prompts)

Sentence Type	Group	
	Normal-Hearing[a]	Profoundly Hearing-Impaired[b]
One simple sentence	20 5	12 5
Two separate sentences	2 1	10
And sentences	7 5	20 6
Other multiclause sentences (e g , *while, because, after*)	5	8 5
Relative clauses	64 6	47 9

[a] $n = 20$ Age = 5-6 yr [b] $n = 36$ Age = 11-18 yr

Finally, the more advanced students in the upper grades (usually 15- to 18-year-olds) produced mostly relative clauses.

CONCLUSION

The most appropriate assessment instrument for a clinician or language evaluator depends on several factors. The most important of these concerns the objective of the assessment (Launer & Lahey, 1981). If the goal of assessment is to establish a child's general level of achievement on some global measure of primary or secondary language ability; that is, to compare the child's performance with levels of English language development in normal-hearing children at different ages, or with other children with similar backgrounds and hearing loss; then a well-standardized test that samples appropriately across important aspects of English grammar, semantics, or pragmatics is called for. Such a screening test must also provide norms for a fully representative sample of signing and speaking hearing-impaired students across varying degrees of hearing impairment.

On the other hand, if the objective of the assessment is planning the content and procedures for intervention with a particular child; that is, IEPs; then the method of assessment must provide the necessary depth of information in specific domains of language to establish where the child is in the mastery of those features of English. This requires criterion-referenced methods for which there are sufficient normative data to establish the mastery criteria and the pattern of development of the forms and functions being sampled.

The field of assessment finds itself caught between the use of informal language sampling and analysis techniques and formal norm-referenced tests of achievement. The former are ecologically valid and provide richer data for planning intervention, but are extremely time-consuming if large enough samples are collected. Spontaneous language samples also provide a better measure

at early stages of development when such measures as Mean Length of Utterance (MLU), or range of semantic relations and pragmatic functions expressed, are meaningful (Miller, 1981). Complex syntactic forms are often too rarely produced in ongoing conversation for such samples to provide adequate information on their course of development in a given child. Formal tests generally provide control over the items to be sampled, but the testing industry has stressed ease of administration and scoring without any expertise in psycholinguistics. This has led to predominantly multiple choice, fill-in-the-blanks, or imitation formats in tests of this type. These tests provide norm-referencing and quantification (It is always reassuring for an administrator or evaluator to have a number or language quotient to characterize a child's language achievement!), but they are poor measures of productive language knowledge and do not provide sufficient information about the pattern and process of acquisition for individual children to allow for effective IEPs.

The elicited production techniques and materials in the present chapter represent an attempt to develop communication tasks that generate the kind of data that are needed for criterion-referenced planning of intervention with hearing-impaired children in important syntactic and pragmatic domains of English. They can be thought of as semi-formal approaches to assessment, being controlled simulations of the communicative constraints that operate when these syntactic forms are used in natural conversation. They provide a rich sample of the child's expressive use of the target constructions in pragmatically-motivated situations. Analysis of these samples requires an adequate level of psycholinguistic knowledge on the part of the evaluator, but that is an essential prerequisite for effective assessment and educational planning in language acquisition. Our current research is directed toward extending the use of these and similar elicitation procedures to assess the primary language development of a more representative sample of both speaking and signing hearing-impaired students.

ACKNOWLEDGEMENTS

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Chapter 4

Combining Formal and Informal Strategies for Language Assessment of Hearing-Impaired Children

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This chapter examines the use of standardized and nonstandardized test protocols in the evaluation of language skills of school-aged, hearing-impaired students. School districts frequently require the inclusion of standardized measures of students' performance for placement decisions and the development and monitoring of individualized educational plans (IEPs). Yet, many norm-referenced test procedures are ill-designed for hearing-impaired students, provide minimal guidance for intervention, and/or may not reflect current models of language/communication development (Brackett, 1982; Leonard,

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Prutting, Perozzi, & Berkley, 1978) Can these problems be circumvented? What issues should be considered in test selection and use? These questions will be explored along with suggestions for supplemental informal strategies for comprehensive language evaluation.

PREMISES GUIDING EVALUATION

Three evaluation premises underlie the concepts presented in this chapter. They are discussed below.

Importance of Diagnostic Questions

First, evaluation materials (whether formal or informal) should be selected in response to theoretically-motivated diagnostic questions. Diagnostic questions are formulated on the basis of pre-assessment observations or questionnaires (Lund & Duchan, 1988), current theoretical models of communication, and knowledge of the unique characteristics of hearing-impaired language users; and their objective is to isolate features of the students' language that are priorities for intervention. The clinical tools of task and behavioral analysis allow the diagnostician to modify and refine diagnostic questions to gain the most relevant and representative information possible. Siegel (1975) described the best language evaluation instrument as an informed clinician or teacher, who applies current theoretical knowledge to the analysis of behaviors and modifications of established procedures.

Contexts of School Language Use

Second, the expanding contexts of language use by school-aged children need to be considered in evaluation. In a typical *evaluation* setting, a hearing-impaired child is seated in a well-lit, acoustically treated room, where he or she interacts with an adult about topics often removed from normal contextual support. In a typical *school* setting, the hearing-impaired child encounters discourse with teachers and peers, classroom communicative demands, and the need to use language to evaluate and seek information.

The academic environment places unique demands on the language user (Wallach & Miller, 1988; Westby, 1985). Academic tasks increasingly require that the student use language for reasoning, predicting, analyzing, and summarizing (Bereiter & Engelmann, 1966; Simon, 1981). In general, classroom language is mentally complex and performance is dependent on what is coded linguistically more than on immediate context. Classroom discourse also demands processing of lengthy input, rather than single conversational turns, and there are limited opportunities for conversational repair (Wallach & Miller, 1988). If a major goal of evaluation is the selection of intervention priorities, then consideration must be given to the student's language preparation for meeting the demands of the academic curriculum.

Determination of Strengths and Emergent Skills

The third premise relates to outcome of the evaluation. A goal of evaluation should be the determination of hearing-impaired students' strengths and emergent skills, not just linguistic deficiencies.

In the next section, considerations in the use of formal tests are discussed. This is followed by practical strategies for combining formal and informal evaluation procedures. The recommended strategies are a result of clinical experience with hearing-impaired students; many have not yet been validated. They are meant to illustrate a diagnostic problem-solving process, not a fixed, refined test battery. In fact, test batteries must be flexible and constantly changing in order to reflect new knowledge in the area of language acquisition.

STANDARDIZED TESTS: PROS AND CONS

Standardized tests are frequently used to evaluate students' language progress objectively and to identify areas of need. For many purposes these tests are necessary and appropriate (e.g., placement issues and service justification) if used cautiously by informed examiners (Stephens & Montgomery, 1985). Some authors argue against the use of norm-referenced tests for assessment of language (Duchan, 1982; Muma, 1981; Muma, Lubinski, & Pierce, 1982; Siegel & Broen, 1976) because they do not apply to intervention.

Advantages

Positive aspects of standardized tests include the following.

1. Norm-referenced, standardized tests allow hearing-impaired children's performance to be compared with that of their normal-hearing grademates. This information is needed when evaluating placement, achievement, and candidacy for academic mainstreaming
2. These tests provide a systematic framework for observing selected aspects of language behavior They may be efficient means of identifying features of the language profile in need of further evaluation (Leonard et al., 1978).
3. Standardized tests are designed for reliable administration across examiners and test sessions. Reliability is a measure of the consistency or stability of test results (Lund & Duchan, 1988). Standardized tests are also designed to provide valid measures of behaviors. Validity indicates how well a test measures what it purports to measure. However, Lund and Duchan (1988) expressed concern that most language tests do not provide impressive validity data, leaving the examiner to make judgments about the appropriateness of individual items.
4. Comparison of hearing-impaired children's scores with their own previous performance provides objective indicators of progress and can

document that a child is improving in response to intervention. However, McCauley and Swisher (1984a, 1984b) warned against the use of age-equivalent scores in making such determinations due to problems such as knowing the amount of expected variability in scores and assuming that equal age scores indicate equal qualitative performance.

Disadvantages

There are a number of general limitations inherent in standardized evaluation procedures. Test users need to be aware of these limitations.

1. Standardized tests rarely provide a comprehensive sampling of students' functional language skills. Children's skills are often tested outside of relevant communicative contexts, giving a distorted view of their language (Ivey, 1986). This may serve to over- or underestimate language skills, particularly in children with limited skill. A closed-set response task with controlled and predictable length of spoken utterances, for example, may elicit the desired comprehension response. Yet, in an academic communication context, teacher input is often decontextualized and somewhat unpredictable (Wallach & Miller, 1988; Westby 1985). Sole reliance on closed-set, structured comprehension tasks may give an overly optimistic view of the child's understanding. On the other hand, test designers purposely restrict contextual cues in items to assure that the child "knows" the answer based only on the language forms given (Lund & Duchan, 1988). This may result in underestimation of a hearing-impaired child's language (Moeller, McConkey, & Osberger, 1983).
2. Of major concern is psychometric validity and reliability of many standardized language measures (McCauley & Swisher, 1984a). Of 30 language and speech measures evaluated by McCauley and Swisher, only three met four or more criteria for well-standardized tests established by the American Psychological Association.
3. Norm-referenced tests, by nature, have too few items sampling each language behavior to be of prescriptive value (McCauley & Swisher, 1984b). Consequently, they give little information for selecting appropriate therapy goals or strategies (Leonard et al., 1978).
4. Many available instruments fail to reflect current knowledge of language development, theoretical models of language, or features of language that may be priorities for language intervention. For example, discourse skills, such as conversational repair, are critical to successful communication by hearing-impaired students, yet are not examined by formal tests. Similarly, standardized tests do not assess narrative ability, another important discourse skill, which is closely related to literacy development (Westby, 1984, 1985).

In addition to these general limitations, certain features of standardized testing are particularly difficult for hearing-impaired children. Some considerations are discussed in the following section.

USE OF FORMAL TESTS WITH HEARING-IMPAIRED STUDENTS

Moeller et al. (1983) described several concerns about the use of tests when applied specifically to the hearing-impaired population. In order to use materials designed for normal-hearing children, clinical experience suggests that the examiner must be sensitive to the unique needs/characteristics of hearing-impaired children. This requires careful test selection and task analysis.

Task-Related Issues

Some standardized tests provide a minimal number of practice items to establish the nature of the task. Many disallow item repetition. These constraints present problems when a sensory impairment interferes with message reception. The hearing-impaired child may understand the targeted relationship, but misperceive directions or critical aspects of the message. Tests that change the topic with each utterance (i.e., sentence repetition tasks) and/or provide little visual support to the topic can be physically taxing. Rather than providing information about the child, scores reflect test artifacts.

Hearing-impaired children's performance on nonsyntactic measures can be substantially affected by the syntactic complexity or length of a test item. When Moeller, Osberger, and Eccarius (1986) used standardized language measures with profoundly hearing-impaired residential school students, the children's responses to content items were skewed, solely due to syntactic complexity or item length. In part, this was attributed to their difficulty processing the heavily-inflected English signing required by syntactically complex items. This hypothesis was supported by the fact that these students improved when provided the same information in print. If the goal is to assess English syntax knowledge, then use of complex syntax is required. However, if the goal is to evaluate conceptual knowledge, control of item length and/or syntactic complexity should be considered (Moeller et al., 1983). This is not to suggest that test items should be arbitrarily simplified; rather, the potential for linguistic effects should be considered in selecting materials to assess certain pragmatic or semantic skills.

Auditory and speechreading confusions may interfere with student's performance on selected tasks. For example, one commonly used receptive syntax test requires a choice between "*He* is riding with them" and "*She* is riding with them." The correct response is dependent on auditory-visual discrimination of a high-frequency phoneme. Visually and/or auditorily contrastive response choices may be ideal for the oral hearing-impaired student; however, control of this variable is not an objective in tests designed for normal-hearing children. Task analysis assists the examiner in determining the potential influence

of auditory and visual confusions on measurement of language skills (Erber, 1982).

Student Response Issues

Tasks designed to assess the complexity of expressive language can be problematic with hearing-impaired students. Geers and Moog (1978) speculated that oral hearing-impaired students may reduce the complexity of their expressive responses in order to enhance their speech intelligibility for the listener. Similarly, users of American Sign Language (ASL) may code-switch to English in the presence of a normal-hearing adult (Hoffmeister & Moores, 1987) or in formal settings (Lucas & Valli, 1988). These attempts on the students' part to accommodate their communication partner indicate functional flexibility, yet may influence the sample obtained. Some researchers have developed elicitation procedures that specify the context to control for problems inherent in language sampling procedures (Moog & Geers, 1979; de Villiers, this volume).

Nonlinguistic comprehension strategies used by students during test-taking may also result in under- or overestimates of performance (McConkey-Robbins, 1986). Quinn and Thomblin (1985) found that their hearing-impaired, school-aged subjects sometimes relied on counterproductive or counterintuitive strategies in response to complex syntactic demands. Overly optimistic results have been obtained clinically when hearing-impaired students apply sophisticated comprehension strategies while taking tests designed for younger children. In these instances, students have been observed to process two key words in a signed message, associate he concepts with the stimulus picture, and give the appearance of understanding a complex syntactic principle (McConkey-Robbins, 1986). Informal observations of comprehension strategies are useful in determining the basis of students' responses.

Presentation Mode

Federal special education laws (P.L. 94-142; P.L 99-457) require that tests be administered in the native language of the individual being tested. This guideline is often used to support the presentation of language measures in simultaneous (signed and spoken) communication. Davis (1977) demonstrated no significant difference between reliability and validity measures for the Test of Auditory Comprehension of Language (TACL. Carrow, 1973) when it was signed and spoken versus when it was only spoken. Moog and Geers (1979) standardized the Grammatical Analysis of Elicited Language — Simple Sentence Level (GAEL-s) on hearing-impaired students and provided reliability and validity measures for oral and simultaneous communication administration. Aside from these efforts, however, little is known about the comparability of formal tests administered in oral versus manual/simultaneous modes.

Sign communication. In ASL and manually-coded English, many signs are iconic in that they are a picture-like representation of their referent. The effect of this iconicity on comprehension of vocabulary is not known. As observed

by Moeller et al. (1983), iconic cues from signs can inflate a child's performance on a closed-set vocabulary identification task. However, this issue is not straightforward. Clinical experience suggests developmental trends in children's reliance on such cues to derive meaning. Very young hearing-impaired children, for example, do not appear to make productive use of iconic information, as predicted by the developmental literature (Launer, 1982; Meier, 1982; Orlansky & Bonvillian, 1984). Early elementary students, on the other hand, have been observed in the clinic to derive additional meaning cues from associating iconic properties in the sign with the pictured choice (This frequently occurs with multiple choice tests when only one response item available resembles the signed motion.) Children older than 10 have been observed to abandon the "guess on the basis of visual cues" strategy in favor of asking that unfamiliar signs be fingerspelled. These issues are complex and, as yet, unresolved. In the absence of empirical support, task analysis and careful observation of students' strategy use are necessary.

When examiners present test materials in sign, two additional diagnostic questions need to be addressed: First, what is the student's native/primary language? If the student uses ASL or ASL-like structures, the examiner must recognize the inadequacy of tests designed for English-speaking, normal-hearing children. If the examiner relies solely on English language measures, and is naive to the features of ASL, the student's native language capabilities may be grossly underestimated (Geers & Schick, 1988). Clinicians and teachers need to be aware of the gross inadequacy of traditional language measures in evaluating students exposed to ASL

Second, are there aspects of the signed message delivery that influence student performance? Little is known about the effects of the examiner's sign rate, precision, lexical selection, or visual-spatial orientation on student performance. Clinical experience suggests that there may be considerable inter-examiner variability in these aspects of sign use. Johnson and Erting (1982) documented the insensitivity of some normal-hearing teachers to hearing-impaired children's linguistic visual/spatial needs and the effect on students' comprehension and production. The author once used a sign denoting a thin pole, when describing a fireman's pole. The student immediately began searching the picture for a long, thin object. This behavior alerted the examiner to the fact that she had chosen the inappropriate size and shape specifier/classifier (Klima & Bellugi, 1979) to describe the object, which caused the student's misunderstanding. Similarly, given that sign systems are not completely standardized, an examiner must be sensitive to the child's signs, even if they are idiosyncratic and non-conventional. Finally, the burden should be on examiners to alter their signing skills to match the child's signing system, whether it is ASL-like or manually-coded English. Otherwise, children's errors may be a result of unfamiliarity with the examiner's signs rather than language deficits.

Examiners should also consider the unique constraints of processing language visually during test-taking. Normal-hearing children taking tests via

oral directions, have the advantage of visually scanning and planning their choices, while auditorily attending to the examiner's input. Hearing-impaired children must attend to the signed or spoken input, and then separately evaluate the pictured items before them. For complex tasks, like directions, these task requirements are not comparable. Examiners must be sensitive to the need of hearing-impaired children for adequate time to process the test message, as well as the visual information/choices before them.

Oral or simultaneous communication. For a student using simultaneous communication (SC), the examiner should establish how effective the student is in understanding oral language, given that this mode is encountered in society and perhaps at home. Language measures such as the Assessment of Children's Language Abilities (ACLC: Foster, Giddan, & Stark, 1973) have been adapted to address this issue with systematic increments in length and complexity and accompanying visual support. Administration of this type of measure in spoken language to SC students provides information on their ability to process simple to complex oral descriptions.

Other comparisons of interest may be reception of new versus old information. Some hearing-impaired students readily comprehend familiar topics, but struggle in response to new information. Comparison of students' reception of paragraph length information in spoken versus written forms (for oral students) or simultaneous versus written forms (for SC students) may be helpful in determining whether or not the addition of print aids the student in reception of new information.

Observation Guide. Table 1 illustrates in informal scale used to guide the clinician's observations of modality effects across language measures. The examiner selects test items to administer in different modes. For example, an auditory/oral student may be asked to respond to alternate, balanced forms of an oral directions test administered in both auditory-only and auditory-visual modes. The results are interpreted informally to provide insight into the contribution of auditory input to the student's message reception.

The checklist can guide clinicians in answering a variety of questions: What is the influence of the input modality on students' understanding? What is the most and least efficient modality for message reception? What does this information suggest about the students' intervention needs? What modalities are used by the student for self-expression? Does modality use vary in different contexts or with different communication partners (Garr & Kuhns, 1988)? Does task abstraction affect modality use?

TEST SELECTION AND DIAGNOSTIC QUESTIONS

Leonard et al. (1978) outlined three rationales for supplementing formal tests with nonstandardized, clinician-constructed measures in language evaluation; namely, (a) to survey identified problems in enough detail to determine intervention priorities, (b) to examine a feature not assessed by formal instru-

Table 1

Clinical Checklist to Guide Observation
of Hearing-Impaired Students' Modality Reception and Use

Message	Receptive Modality (check appropriate categories)					
	Auditory-Only	Auditory-Visual	Manual	Simultaneous	Fingerspelled	Print
Understands						
Few single words or simple messages						
Single words with context						
Single words without context						
Simple messages in redundant context						
Simple message without context						
Sentences in context						
Sentences without context						
Contextually-supported discourse						
Context-reduced discourse						

Communication Context[a]	Expressive Modality (check categories that apply)							
	Speech	Gesture	Body	Mime	Sign	Sign w/ Speech	Sign + Speech Mixed	Fingerspelling
Examiner								
basic								
abstract								
Parent								
basic								
abstract								
Peers								
basic								
abstract								
Teacher								
basic								
abstract								

[a]Clinician judges the semantic abstraction in the discourse situation

ments, and (c) to analyze the scope of difficulty a child has with a particular feature of language. The author acknowledges that there are difficulties with informal measures, not the least of which are validity and reliability. Yet, clini-

cian-constructed measures may be particularly useful in answering diagnostic questions not answered s fficiently by administration of a standardized test.

Specific evaluation procedures should be selected in response to diagnostic questions formulated for individual students. In practice, tests are often chosen because of their availability rather than in response to theoretically-motivated questions. Effort spent in completing standardized tests may be worthwhile if the goals and limited scope of these measurements are kept in mind Formal tests may be most useful as indicators of features of the child's language that are of questionable status. Formal test results signal the need to probe identified concerns in more detail. It is at this point that informal measures may be most effectively recruited.

Table 2 illustrates a 5-stage process of evaluation leading to the selection of intervention goals. This model stresses the importance of securing input from

Table 2

A Step-Wise Process of Evaluation Toward Selection of Intervention Goals

Sequence	Action
A	Formulate diagnostic QUESTIONS based on case history review, teacher parent concerns, and preliminary observation of the student
B ↕	Select FORMAL INSTRUMENTS to address diagnostic questions that focus on determining educational significance
C	Probe identified concerns using INFORMAL STRATEGIES
↓	Develop informal measures of key aspects not addressed by tests Analyze language discourse samples and classroom communicative behaviors
D ↓	PRIORITIZE areas of concern in reference to student's communicative competence and language learning needs
E	SELECT intervention targets

several sources (parents, teachers, formal and informal probes, observations) and organizing strategies around diagnostic questions. Step D in the model, prioritization of areas of identified concern, is crucial. Diagnostic findings need to be applied within a framework of communicative competence. The clinician asks relevant questions such as: How will emphasis on this goal influence the student's performance as a communicator? Which language behaviors will enhance classroom discourse and learning if changed? From such a perspective the most obvious problem in a hearing-impaired child's profile (e.g., deletion of high-frequency phonemes representing morphemes, or failure to use *ing* on the verb) may have little effect on communicative and classroom performance, as compared with problems in being able to field questions, express a personal narrative in a cohesive manner, or understand that the topic of discussion has changed.

The following sections describe sets of diagnostic questions that have been used to guide the selection of evaluation procedures with hearing-impaired, school-aged students. The lists are not meant to be inclusive, but illustrative of a process approach to evaluation. In a comprehensive evaluation, diagnostic questions need to address the areas of syntax, semantics, pragmatics, functional auditory skills, speechreading skills, and phonological skills. Space limitations do not permit elaboration of each of these areas; rather, the process will be illustrated for word knowledge and school language use (listener/receiver and speaker/signer roles). These areas have been selected for emphasis because they are commonly areas of concern in intervention with hearing-impaired students, have often been ignored in test batteries, and are relevant to the determination of intervention priorities.

Evaluation of Word Knowledge

Delays in vocabulary and basic concept knowledge have been well-documented in hearing-impaired students (Davis, 1974; Davis, Elfenbein, Schum, & Bentler, 1986; Hamilton & Owrid, 1974; Schulze, 1965; Templin, 1966). Evaluation of vocabulary skills is a routine part of assessment for these children. Yet, quantitative accounts of specific lexical items (e.g., by the Peabody Picture Vocabulary Test, PPVT: Dunn & Dunn, 1981) give little insight into the skills that comprise word knowledge (Rees & Shulman, 1978; Ross, 1982). A student's ability to make semantic associations between new and old information, and to store words and experiences in information networks in memory, are viewed as critical to the comprehension and production of narratives (Johnson, Toms-Bronowski, & Pittleman, 1982; Yoshinaga-Itano & Downey, 1986). Children's comprehension has been described as a constructive process (Bransford & Johnson, 1973) whereby they link messages by inferring relations among them from knowledge of the world and prior experience (Wallach & Miller, 1988). For example, a language-competent fourth grader reads the words *neigh* and *gallop* in a lengthy paragraph and makes a logical inference that the topic of the story is *horse*, even though this is not explicitly mentioned. Johnson et al. (1982) stated. "Not only are individual word meanings important, but the entire conceptual framework elicited by key words interacts with text to produce comprehension in a reader" (p. 12). This process is often complicated for the hearing-impaired learner, who may have gaps in world knowledge related to reduced auditory/language experience.

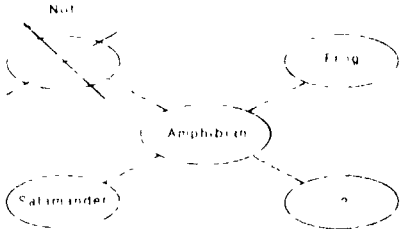
Hearing-impaired students are often found to produce inefficient narratives due to problems recalling specific lexical terms. Research suggests that such problems arise from weaknesses or gaps in categorically-arranged conceptual frameworks underlying word knowledge (Collins & Quillian, 1969), lack of background knowledge (Pearson, 1984; Wallach & Miller, 1988), and limited exposure to the word (Rubin & Liberman, 1983). This suggests that formal tests of vocabulary will yield a restricted view of word knowledge. Diagnostic questions should be designed to gain insights into the student's conceptual

organization and semantic networks

Table 3 contains examples of diagnostic questions developed to meet this goal. Recently-developed tests that fit within a word knowledge framework are suggested as options. Informal strategies to expand evaluation of this area are also described. Each question listed need not be pursued with every student. Rather, the examples illustrate techniques that may be selected if concerns exist in these specific areas.

Table 3

Diagnostic Questions and Evaluation Techniques Related to Word Knowledge

Diagnostic Question	Evaluation Options
I. How flexible is the student in associating and classifying words?	
	Formal Test Resource
	A. Language Processing Test (Richard & Hanner, 1985)
	1. *Associations*: What goes with a toothbrush?
	2. *Categorization*: Name three transportation items.
	3. *Similarities & Differences*: How are a house and a tent alike? Different?
	4. *Attributes*: Tell me about a telephone.
	B. Test of Concept Utilization (Conger & Spriggs, 1972)
	Explain how pictured items are alike or how they go together. A moon and a mirror both reflect.
	Informal Strategies
	A. Hypothesis testing tasks (Ceccanis, 1980)
	Shirt is not part of my group, but the word *sleeves* is. Find out what other words from the list belong in my group and why. What is the rule?
	List: tree, lion, shoe, grass, shirt, corn, milk, crayon, cow, hat, wee, cap, cat, eat, pen, sock, boat, dress, tent
	
	B. Grouping
	Form various groups with picture cards. Student chooses rule for grouping them forms own group.
	C. Completion of networks
	Fill in the blanks in the network.
	

Continued on next page

Table 3 *Continued*

2 Does the student understand analogous relationships? Does this aid in learning new word meanings?

Formal Test/Resource

Woodcock-Johnson Psychoeducational Test Battery (Woodcock & Johnson 1977)
Analogies subtest *Student* is to *teacher* as *patient* is to _____

Informal Strategies

Comparison Charts
Use academic content Have student fill in the empty cells to determine if analogy helps concept understanding

Omaha	NE	USA
Calinger	Ott	
Mayor		President

3 Is the student able to isolate relevant features of words to efficiently define them?

Formal Test/Resource

Test of Language Development Primary Oral Vocabulary Section (Newcomer & Hammill 1977)
Tell me what a forest is (One student responded "A place with green trees and animals like lions squirrels and zebras")

Informal Strategies

Semantic feature analysis chart (Johnson et al 1982)

	Wild Animals	Cages	Dangerous Animals	In USA
Forest	X			X
Zoo	X	X	X	X
Jungle	X		X	
Woods				X

4 Is the student able to infer or predict meaning within context?

Formal Test Resource

Language Processing Test (Richard & Hanner 1985)
Multiple meanings Tell me what *top* means in each sentence
The ice taking a trip to Europe
Don't trip on the rug by the door

Informal Strategies

A Multiple Skills Series (Boning 1976) Drawing conclusions
B Semantic Sandwiching
Look at this model What do you think *lukewarm* means?

Continued on next page

Table 3 *Continued*

5 Is the student independent in using context to determine meanings? Does the student show metacognitive awareness of what is unfamiliar?

Informal Strategies

A Using context clues
Present challenging oral or written paragraph. Ask student to identify unknown words. Determine ability to use context clues to derive meaning.

B Multiple Skill Series (Boning, 1976) Using context

6 Does basic concept knowledge support student's ability to follow teacher and text directions?

Formal Test/Resource

A Boehm Test of Basic Concepts Revised (Boehm, 1986) Concepts and applications

B Detroit Test of Learning Aptitude R Oral Directions (Hammill, 1985)

Informal Strategies

Following directions
Observe response to various directions taken from student's textbooks and workbooks

7 Is the student able to supply known concepts in verbal reasoning tasks?

Formal Test/Resource

Woodcock-Johnson Psychoeducational Test Battery (Woodcock & Johnson, 1977) Math concepts and applications

Informal Strategies

Word problems (Sharma, 1981)
Conduct diagnostic teaching tasks using word problems to develop comprehension

8 Is word recall efficient and supportive of formulation?

Formal Test/Resource

Test of Word Finding (German, 1986)
Use for serious problems

Informal Strategies

A Word naming (German, 1986)
See reference for comprehensive model of word-naming deficits

B Narrative production (Kail & Leonard, 1986)
Observe narrative production for overuse of nonspecific terms, lack of specificity, circumlocution

C Oral sign stories
Examine oral sign story length. Productivity measures are strongly correlated with word-finding difficulties (German, 1987)

The illustrated procedures have a common goal of gaining insight into how a student manipulates verbal concepts. The clinician attempts to understand the student's ability to make relevant associations, form concepts, and apply principles. For example, the first diagnostic question in Table 3 explores the

student's classification skills. Several subtests of the Language Processing Test (LPT: Richard & Hanner, 1985) are useful in surveying aspects of word classification. Yet, each subtest contains only 10 items. Hearing-impaired children often have gaps in vocabulary or experience resulting from reduced opportunities for incidental learning through audition. Errors on the LPT may result from the student's unfamiliarity with specific superordinate terms (e.g., *transportation*) rather than from a general lack of classification abilities. Diagnostic teaching with informal tasks then clarifies the nature and extent of the problem.

The Test of Concept Utilization (Crager & Spriggs, 1972) examines the flexibility of a student's attribute comparison skills. Pairs of pictured stimuli are presented with the challenge to the student, "Tell me how these are alike or how they go together." The vocabulary/linguistic processing demands in this task are minimal. Target associations vary with each item. The test scores themselves may not be as useful as observations of the student's ability to shift criteria and formulate explanations to justify a response. Such insights are useful clinically in determining if the student relates words/concepts to a broader schema, which Pearson (1984) and Leonard (1986) describe as critical to word acquisition and recall.

Depending on the concerns identified on the Test of Concept Utilization, informal tasks are then pursued. The hypothesis-testing task (Strategy 1A in Table 3) is one example of a task that has been useful clinically for examining the student's ability to formulate and test hypotheses based on class exclusion (Eccarius, 1980). For example, if the student sees that *slacks* belongs in the group, but *shirt* does not, then the rule for the grouping by inference cannot be *clothing* or words starting with *s*. The student may then rely on metalinguistic skills to hypothesize that the rule is "words rhyming with *slacks*." Such a task gives the examiner insight into the student's organization of word knowledge, and understanding of how schema overlap. How a student applies vocabulary knowledge to hypothesize or predict is relevant to the reading process (Blanchowicz, 1986).

In Strategy 1C of Table 3 the student uses available word cards or pictures to complete a network. Clinician modeling is used initially. This task explores a student's knowledge of relationships among words and is theoretically motivated by the work of Yoshinaga-Itano and Downey (1986) and Johnson et al. (1982). Blanchowicz (1986) discussed the importance of active learning on the part of the student during which new information is linked to established concepts and the student is encouraged to make connections by applying this information. These tasks may be devised by using material from the student's textbooks.

Language Skills and Academic Requirements

Bereiter and Engelmann (1966) discussed the important role language plays in intellectual and academic development. They described some of the cognitive uses of language, including the ability to explain, describe, instruct, inquire,

Table 4

Informal Observation Checklist of Cognitive Linguistic Skills at the Narrative Level

Task	Performance Level: High	Above Average	Average	Below Average	Low
1 *Explaining* Define terms by providing specific examples					
Student able to isolate specific features from classification system to provide adequate details					
Student able to compare and contrast					
Student formulates cohesive information relay					
Student infers predicts listener's needs					
Student prioritizes main ideas and sequences explanation					
Student plans information relay					
2 *Instructing* Provide specific sequential examples					
Student able to present steps in sequenced manner to the listener					
Student includes sufficient detail to obviate ambiguity					
Student considers listener's perspective thereby presupposing old vs new information					
3 *Describing* Tell about give necessary information to locate or identify					
Student isolates recalls critical semantic information					
Student focuses on relevant details					
Student makes relevant comparisons					
Student selects specific descriptive terms from semantic pool and organizes					
4 *Comparing* Show how things are similar or different					
Student focuses on relevant stimulus dimension					
Student able to consider multiple attributes class inclusion					
Student reasons about qualitative similarities and differences					
Student able to shift criterion flexibly					
Student able to reason through multiple alternatives					
5 *Analyzing* Break down a statement into its component parts					
Student able to focus on critical features					
Student able to discuss main ideas from information presented					
Student can reason about relationship between superordinate subordinate structures					
Student able to deduce meaning not explicitly stated					
Student able to predict outcomes on logical basis					
6 *Evaluating and Inquiring*					
Student able to reason how a specific instance relates to approximates a standard					
Student states opinion in coherent nonegocentric manner					
Student relies on a reference that exists independent of the isolated example being considered					
Student formulates questions to obtain more information than is immediately apparent or to clarify meanings not completely understood					

Continued on next page

Table 4 *Continued*

Note. From "Cognitive Approaches to Language Intervention" by M.P. Moeller and M. Quinn, 1985, Workshop presented at Convention of the Michigan State Teachers of the Hearing Impaired, Ann Arbor, MI.

hypothesize, analyze, compare contrast, deduce, and test. They noted that some children are able to establish basic language for having their needs met and maintaining social interactions, yet have not mastered the language for obtaining and transmitting information, monitoring one's own thinking, or reasoning verbally. Westby (1985) made a similar distinction between learning to talk (basic form, content, and use rules) and talking to learn (language used to regulate thinking or planning and to reflect, seek information, and learn). This distinction is relevant to the evaluation of school-aged, hearing-impaired students.

It is useful to determine how well students can apply language skills to the process of solving verbal problems. The ability to solve verbal problems is relevant to most academic subjects (e.g., math story problems and social studies) as well as daily living. As such, this area is considered a priority for language evaluation. Table 4 presents an observation checklist related to the cognitive uses of language. The examiner contrives tasks to elicit cognitive linguistic functions, such as instructing (e.g., student is to instruct a naive examiner in the rules of a popular board game), and analyzes student responses informally. Moeller and Quinn (1985) applied task analysis to delineate the cognitive linguistic skills underlying each of the functions described by Bereiter and Engelmann (1966) and Simon (1981).

Verbal reasoning skills may also be explored using commercially available tests. For young elementary-school students, the Preschool Language Assessment Instrument (Blank, Rose, & Berlin, 1978) has been useful. This test surveys children's responses to questions at four distinct levels of cognitive abstraction: matching perception, selective analysis of perception, reorienting percept on, and reasoning about perception. This test reflects the decourse demands typical of an academic setting. The majority of the items are supported by a pictured context, which is helpful with hearing-impaired children. For school-aged children, the Test of Problem Solving (Zachman, Jorgensen, Huisingh, & Barrett, 1984) provides useful information. Such a test might be selected if the teacher is concerned about the student's thinking skills in reading comprehension tasks (e.g., summarizing or predicting). To examine how a student solves interpersonal conflicts/problems, the Detroit Test of Learning Aptitude—Social Adjustment A subtest (Baker & Leland, 1959) may give useful informal insights. Materials from Simon (1981) and Boyce and Larson (1986) are useful for expanded probing of verbal problem solving skills.

The cognitive uses of language and verbal reasoning skills described so far require not only concept manipulation, but comprehension and use of narratives, which are story-like discourse structures with their own metagrammar.

Language users frequently express personal narratives to relay events and to engage in story telling. School-aged students encounter narratives in interpersonal communication, in instructional discourse, and in the literate language demands of the curriculum. Westby (1985) and Van Dongen and Westby (1986) discuss the role of narratives as a primary mode of thinking that is at a higher level than individual sentence structures and that acts as a bridge be-

Table 5

Diagnostic Questions and Evaluation Techniques Related to School Language Demands

Diagnostic Question	Evaluation Options
Listener Role	
1 Is the student able to rely on auditory skills for information reception in a distracting environment?	**Formal Test/Resource** Test of Auditory Comprehension (Trammel, 1977) Compare performance to hearing-impaired students on tasks such as identifying stereotypic messages, core vocabulary, and recalling two and four critical elements and story details in quiet and noise **Informal Strategies** Teacher questionnaire
2 Does the student retain facts from oral or signed narratives? Are visualization strategies useful in enhancing performance?	**Formal Test/Resource** A Clinical Evaluation of Language Functions (CELF) – Processing Spoken Paragraphs (Semel-Mintz & Wiig, 1982) Listen to short, factual paragraph Respond to questions B Durrell Paragraph Listening (Durrell & Hayes, 1969) **Informal Strategies** A Clinician-constructed narratives at various complexity levels B Observation of student response to teacher's use of visuals
3 Does the student attempt to secure clarification? How successful are these attempts?	**Informal Strategies** Observation of clarification and repair skills (See Table 6)
4 Does the student apply verbal reasoning skills in response to stated problems?	**Formal Test/Resource** A Test of Problem Solving Analyze student's ability to explain inferences, determine causes, answer negative *wh* questions, determine solutions, and avoid problems in response to pictured scenes B Detroit Test of Learning Aptitude Social Adjustment A (Baker & Leland, 1959) What would you do if you saw someone throwing stones at a house?

Continued on next page

Table 5 *Continued*

Informal Strategies

A Student is to visualize and discuss alternate solutions to a problem. Note missing steps in student's solutions

B. Use problem-solving pictures (Boyce & Larson, 1986, Simon 1981)

5 Is the student able to assimilate and learn from verbal explanations given?

Informal Strategies

Student is to provide directions for completion of a complex magic trick including new terminology

Speaker Role

1 Is the student effective in relaying personal narratives? Does student attempt to organize key information in a logical sequence to make the meaning clear? Does student avoid rambling, false starts, and extraneous details?

Informal Strategies

A Narrative tasks

Tell me about your vacation, about the movie you saw, about your pet

B Outlining of main ideas

Determine if planning aids student narratives

2 Does the student modify speaking style to accommodate different listeners and situations?

Informal Strategies

A Observation of student (a) in peer conversation, (b) in conversational response to teacher in class, and (c) in response to unfamiliar adult

B Role-plays using various speaking styles

Note polite versus colloquial language uses

3 Is the student able to clearly state an opinion and justify it logically?

Informal Strategies

A Ask student to judge validity of certain opinions (Simon, 1981)

B Ask for student opinion on current, relevant issues

4 Does the student take into account the listener's needs?

Informal Strategies

In discourse sample, note use of relative clauses to provide needed background Does pronoun use follow presupposition rules?

5 Does the student show evidence of cause-and-effect reasoning in attempts to convey a story? Does the story contain sufficient detail?

Formal Test/Resource

Detroit Test of Learning Aptitude R Story Construction (Hammill, 1985)

Invent a story about this picture

6 Does the student formulate efficient questions when seeking information, clarification, or assistance?

Informal Strategies

A Classroom observation

B. Role-plays

You don't know how to choose a topic for your project What will you ask?

tween oral and literate language use. Knowledge of story structure guides comprehension and facilitates predictions of cause-and-effect relations (Hedberg & Stoel-Gammon, 1986). These skills are critical to the process of reading comprehension (Bransford & Johnson, 1973). Ability to express well-formed stories serves as a foundation to effective written language and supports discourse participation (Westby, 1985).

Although clinical evaluation of narratives has only recently emerged, useful guidelines are available for informal assessment in Hedberg and Stoel-Gammon (1986) and Stein and Glenn (1977). Table 5 lists some general diagnostic questions related to this objective. At present, standardized language tests do not examine these critical discourse skills. (For further consideration of classroom discourse issues, see Tattershall and Kretschmer, this volume.)

One technique that has been useful clinically in eliciting narrative discourse in a semi-structured, repeatable manner has been the use of cartoon slide stories. Four pictures from a simple sequence story are presented via a projector such that only the child can see them. The child is instructed to invent a story about the pictures. A standard elicitation context is used in order to allow comparisons across all children who generate stories in response to these stimuli. The narrative samples below compare the performance of two 9-year-old hearing-impaired children. Child A had a moderate, bilateral sensorineural hearing loss and was an oral communicator. Child B had a profound bilateral sensorineural hearing loss and used signs and speech for self-expression. Both boys were asked to invent a story in response to pictures of a boy walking on a brick wall who jumps off, hurts his knee, and tears his pants.

Child A: The boy's walking up on the um thing. Yikes. Crash. Boom. There's somethin' comin' on his pants. Uh oh. A hole.

Child B: Once there was a boy, who wanted to be a tightrope guy in the circus, so everyday he practiced balancing on a wall. One day he wanted to go see the guy about joining the circus, but he fell and got hurt. So he decided to practice more before going to the circus.

Comparative analysis of these samples reveals a number of concerns for Child A and identifies strengths for Child B. Child A has difficulty using specific terms ("thing" instead of "wall"), does not use decontextualized language, and has obvious difficulty taking his listener's perspective. He does not link his ideas to a conceptual "center" or theme (Hedberg & Stoel-Gammon, 1986). Child A's attempt at storytelling is similar to an early-developing stage of narrative titled by Applebee (1978) as "heaps." At this level the child makes statements that only identify or describe aspects of the picture (Hedberg & Stoel-Gammon, 1986). Standardized language tests administered to this student did not require him to organize his language to produce narratives, and did not result in identifying this qualitative area of concern.

In contrast, Child B demonstrates a creative, well-formulated story. His story has a conceptual center (the boy who wants to be in the circus) and his

other ideas relate to this theme His story has a main character or protagonist who is striving to achieve a goal and responds in order to resolve a conflict related to that goal These types of features are among those necessary for a narrative to be considered a true story (Stein & Glenn, 1979) The guidelines of Stein and Glenn (1979) and Hedberg and Stoel-Gammon (1986) are useful in assessing children's story production attempts Elicitation of narratives from students A and B resulted in valuable insights regarding their expressive language abilities

Table 6 is an observation checklist to examine the sophistication of a student's clarification and repair strategies another aspect of discourse that may be observed informally during administration of formal measures The examiner may need to contrive opportunities for clarification and repair by purposely violating pragmatic rules (e g , introduce a novel topic without sufficient background) This informal tool may be used to compare a student's willingness to seek clarification in an individual versus classroom setting

Table 6

Informal Observation Checklist of Clarification and Repair Skills

Student Responses Observed	SITUATION	
	Clinical/Student Discourse	Classroom Discourse
1 Acknowledges needs to act but does not understand		
2 Fails to seek clarification when obviously needed		
3 Fails to seek clarification when vital information omitted		
4 Indicates nonunderstanding		
a) Nonverbally (puzzled expression shrugs shoulders)		
b) Verbally		
Asks repetition		
Asks relevant question		
States I don't understand		
Asks aggressively		
Asks appropriately		
5 Requests are specific		
What did you say about the ?		
What does mean?		
Other		

INTEGRATION AND PRIORITIZATION: A CASE HISTORY

The following case history illustrates the importance of integrating information from several sources prior to determining intervention priorities K was

referred for an evaluation at age 8 years, 9 months due to concerns for hearing aid fitting and the need for a psychological evaluation K., who had a moderate, bilateral sensorineural hearing loss, had been diagnosed as educably mentally handicapped on the basis of misinterpretation of his performance on a verbal intelligence test. After interacting with this student, the special education teacher questioned his reported intellectual status and the child's placement was subsequently changed to a regular first grade, mainstreamed classroom setting.

The audiometric results in Table 7 include K.'s aided and unaided thresholds.

Table 7
Audiometric Results for K in dB HL

	Frequency (Hz)								
Test condition	**250**	**500**	**750**	**1000**	**1500**	**2000**	**3000**	**4000**	**8000**
Unaided Right Ear	40	60	80	95	85	70	-	80	75
Unaided Left Ear	45	55	-	65		55		55	65
Aided Condition 1	25	40		45		40	45	50	
Aided Condition 2	25	30		30		25	20	30	-

[a]Dashes denote conditions which were not tested

Comparison of the first and second aided conditions reveals the marked improvement obtained as a result of hearing aid and earmold modifications. This underscores the importance of securing appropriate amplification prior to evaluation and intervention. Psychological re-evaluation, using appropriate nonverbal instruments, revealed average abilities.

A battery of traditional receptive and expressive language measures was administered with the following results: (a) PPVT — R: low average for grade, (b) Miller-Yoder Grammar Comprehension: average for grade, (c) Boehm Test of Basic Concepts: average for grade, and (d) Developmental Sentence Scoring (DSS): low average for grade. K.'s speech was easily understood, and he responded appropriately to superficial conversation. If no further diagnostic questions had been asked. K 's skills would have appeared to compare favorably to his grade mates.

In order to gain a clearer understanding of the language skills K. possessed for competing in an academic environment, nontraditional standardized tests were administered. These included oral definitions (Test of Language Development – Primary: TOLD-p; Newcomer & Hammill, 1977), the Test of Problem Solving, verbal analogies, and math concepts. Each of these tasks required conceptual manipulation and concept application. K. demonstrated significant problems on each of these measures. The examiner further explored K.'s language intervention needs, using informal strategies.

The examiner had concern for K.'s formulation skills, based on observations of his attempts at personal narratives. She asked K. to describe a past event, that of his cat having kittens. He produced the following oral narrative:

> Ma . . . we had . . . first we had four little kittens in the wintertime and one died — she had four of them and one died so three of them, then one summertime come then umum um our cat died. Um named . . . um Molly no Lukey — the one that died. Now that little cat call mommy and I named him baby Coal. He's not baby Coal anymore — a cat. Yeah. We got two black cats. Uh no we got a buncha black cats. One . . . and . . . uh lemme see have a whole buncha — you know my brother? Thirteen years old and he had a big cat — named him Coal. We got two baby Coals. Now its cats.

Analysis of this sample reveals numerous problems, including poor organization and formulation, lack of planning (indicated by false starts and revisions), difficulty monitoring for informativeness (failure to provide needed background; failure to note examiner already shared information about the cat that died), word finding problems (pauses and fillers, "umm," "and uhh lemme see"), and difficulty sequencing events and expressing time relations. These problems resulted in incoherent narratives. Investigation of K.'s word knowledge also revealed numerous concerns. He scored at the first percentile on an oral definitions task (TOLD-p). When asked to define "finger," he stated: "Um um wrench [similar-sounding substitution for "wrist"] and um um um this thing [while pointing at his elbow]." This response suggested weaknesses in ability to formulate definitions, in semantic associations, and in word recall. Diagnostic teaching using a semantic feature analysis strategy (Johnson et al., 1982; see Table 3) revealed confused word associations, lack of semantic elaboration of concepts, and difficulties comparing and contrasting attributes.

This case illustrates the limitations inherent in traditional formal test batteries. Diagnostic questions that targeted the demands of the learning situation were useful in identifying several areas which could impede academic growth. Because this child was placed academically with first graders, the educational significance of his language problems was not yet apparent to the school. However, he was experiencing significant problems making inferences, recalling information, and formulating cohesive narratives. These problems could be expected to interfere significantly with literacy development (Wallach & Miller, 1988). Their identification resulted in reappraisal of K.'s primary needs by the school.

Prior to the evaluation, K.'s speech therapist was working on articulation of /r/, /l/, and /s/, and on lipreading skills. Priorities for intervention arising from the evaluation included: (a) expanding semantic abilities through expansion of schemata; (b) developing associative networks for new and old information to support word recall; (c) developing cohesion in personal narratives through emphasis on listener needs, planning, organizing, and sequencing;

and (d) strengthening verbal reasoning skills. Re-evaluation, completed one year later, revealed significant growth in K.'s ability to formulate narratives and apply verbal reasoning skills during reading activities.

SUMMARY

This chapter has presented a case for the judicious use of standardized test materials with hearing-impaired school-aged children. Features to be considered in test selection include (a) psychometric characteristics, (b) relevance to classroom language issues, (c) ability to identify the extent of the problem, and (d) ability to translate results to teachers in terms of educational significance. Informal evaluations and observations are valuable supplements for determining intervention needs. Formal and informal results should be analyzed within an integrated perspective of the child's language and learning competencies. Integrated analysis leads to the determination of relevant, prioritized intervention goals.

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Chapter 5

A Sociolinguistic Assessment Scheme for the Total Communication Student

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In 1986 there were over 47,000 hearing-impaired students receiving educational services within the United States. Research by Jordan and Karchmer (1986) indicated that 31,490 or 66% of those students are taught through use of a strategy known as total communication (TC). Within that strategy speech, speechreading, audition, signs, fingerspelling, writing, and natural gestures are all used to facilitate the instructional process. The overriding goal of that process is to aid hearing-impaired students in their acquisition of communicative and academic competence. Unfortunately, TC students, like most students with significant hearing loss, experience great difficulty in achieving such competence. As a result, professionals must be prepared to identify, describe, and understand the communication problems experienced by these students.

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The purpose of this chapter is to present an assessment strategy that can be used to meet this need

SIGN LANGUAGE AND SIGN SYSTEMS

Many individuals hold the misconception that all signs do essentially the same thing in the same way. That is, they allow the signer to convey nonverbally what would otherwise be spoken. In reality, signing is a much more complex process. Within the United States there are three distinct types or classes of signs: (a) American Sign Language (ASL), (b) Pidgin Sign English (PSE), and (c) Manually Coded English (MCE). These sign classes differ from one another in both their function and their form.

Function and Form

American Sign Language. ASL is the third most common language in the U.S. with an estimated 500,000 users (Neisser, 1983). The work of Gannon (1981) and others (Higgins, 1980; Lane, 1984; Padden & Humphries, 1988) has documented that this use is essentially restricted to members of the deaf community and serves two functions. First, it serves to identify individuals who are members of the community. Second, it provides an effective and efficient language. Research by Bellugi and Fischer (1972) has established that it takes almost twice as long to sign *x* number of words as it does to say those same words because of the large versus small muscles that are required to produce signs rather than speech. However, the same research has found that both English and ASL take essentially the same length of time to convey the same message. ASL accomplishes this by packing twice as much meaning into half the number of words required in English. An understanding of how ASL accomplishes this requires a brief review of sign language research.

Stokoe (1960, 1972) is the individual most often credited with the initial research on the linguistic characteristics of ASL. His research lead to the discovery that each sign is actually composed of three distinct parts: hand configuration, placement, and movement. The sign for "girl" could therefore be described as an open *a* hand (configuration) placed on the upper jaw (location) that is moved in a downward direction along the jaw line (movement). Wilbur (1987) reported that later research by Battison (1973) and Battison, Markowicz, and Woodward (1975) identified an additional production element of sign, the orientation of the palm. The signs for two words can be produced in exactly the same way, with the exception that in the sign for one word the palm is down and for the other it is up (e.g., sign for "children" vs. "things"). While this research provided a good description of the citation or dictionary form of a sign, it did not capture how signs were actually used.

Studies of ASL use (Shroyer, 1984; Woodward, Erting, & Oliver, 1976) determined that the citation forms of signs are rarely if ever produced. This could be attributed to sloppy production such as that which occurs within

slurred speech, but this was later found not to be the case. As a result of the work of Friedman (1977), Schlesinger and Namir (1978), and Siple (1978), reoccurring patterns of sign production began to emerge. First, it was observed that signers systematically modify the manner in which they produce the movement component of their signs. Mandel (1977) has termed such modifications "incorporation." Thus, the meaning conveyed by the citation form of the sign for "work" could be changed to "drudgery" by simply altering the way that the sign is produced. Analysis of the movement component of signs led to the observation that sign meaning could also be varied through use of the direction in which a sign is produced.

Edge and Herrmann (1977) observed that signs can be divided into three movement classes: nondirectional, unidirectional, and multidirectional. Nondirectional signs, such as the sign for "love," are produced by simply making the sign on the signer's own body. As a result, the direction of this production does not convey any additional meaning. This is contrasted with unidirectional signs that are produced by a movement away from the signer. The sign for "see" is an example of this type of sign. Unidirectional signs can be used to indicate the recipient of the signer's action, as in the sentence "I see you." In ASL this sentence would be signed by looking at the person to whom one is referring and moving a *v* hand from the eyes towards the person with whom one is communicating. Finally, with multidirectional signs (e.g., the sign for "give") the sign does not have to start on the signer's body. The ASL sentence "You give to her" would be produced by looking at the first referent, forming the sign in her direction, and then moving it and one's gaze to the second referent. The use of directional signs enables signers to convey precise syntactic information without having to use the many word order conventions found in English.

Research by DeMatteo (1977) and Wilbur (1987) identified two additional efficiency devices that are used within ASL, namely, pointing and the use of space. One of the basic rules in ASL is that you never use a sign for something that you can point to. First, it takes longer to produce a sign for a referent than it does to point to it. Second, reference to the real thing will always be more communicative than its symbolic representation (i.e., a sign). Third, if the referent is not present within the immediate setting, it is more efficient to produce the sign for it once, point to a place, and then refer back to that place, than it is to produce the sign for the referent again and again. In this third situation, the use of pointing negates the need for English function words such as "he," "she," "it," "they," and "there."

Researchers have also investigated the simultaneous production of head movement, facial expression, eye gaze, and body position. Baker (1985) documented that native ASL signers use head movements and facial expressions to indicate affirmative and negative communications. For example, the ASL messages "I want you to hurry" and "I don't want you to hurry!" are made with the same sign (i.e., "hurry"). However, in the affirmative sentence the signer

nods and provides a positive facial expression in contrast to the negative sentence in which the head is shaken with a negative facial expression. While negative and positive signs are used, they most often reaffirm or further emphasize a message; thus, their use is optional (Liddel, 1978). In this same ASL sentence, "I want you to hurry," "you" is communicated, not by a sign, but rather by the direction of the signer's eye gaze (Baker & Padden, 1978). In addition, the vocal intonation that would accompany a written exclamation mark, as in "I don't want you to hurry!" is conveyed through the relative tension of the signer's body and the manner (precise or shaking) with which the sign "hurry" is produced (Stokoe, Casterline, & Croneberg, 1976). Use of these and other strategies, as outlined by Grosjean (1979) and Wilbur (1987), provide native ASL signers with the same level of communicative efficiency as found in all other languages. Unfortunately, the same is not true for the use of Pidgin Sign English (PSE) and Manually Coded English (MCE).

Pidgin Sign English. PSE provides hearing-impaired and normal-hearing individuals with a communication system that bridges both ASL and English. Whether or not the resulting system is a true linguistic pidgin or simply a "foreign talk register" is a matter of some dispute (Cokely, 1983). However, there is agreement that PSE is essentially composed of "ASL signs, used in English word order and with many English grammatical markers" (Reilly & McIntire, 1978, p. 85).

Studies of PSE use have found that two variables control its linguistic forms (Bornstein, 1978). The first variable concerns the interpersonal context in which it is used. The more formal the setting, the more English grammatical elements are incorporated into the interaction. Interactions between a student and teacher or employee and employer will contain more English-like signing than an interaction between two close friends. The second variable is the normal-hearing individual's signing competence. When normal-hearing adults first learn to sign, their ASL signing competence is very limited. As a result, their hearing-impaired interactional partners often modify their own signing to meet the normal-hearing individual's English language orientation. As normal-hearing persons' signing experience increases, they become more efficient in receptive and expressive signing skills. This change is recognized by their hearing-impaired interactional partners and is followed by an increase in the amount of ASL that is incorporated into the interactions. Thus, the amount of English and ASL used within PSE interactions is variable and tied to both contextual and linguistic constraints.

Research by Woodward (1973) and later Reilly and McIntire (1978) on PSE interactions found a number of recurring linguistic patterns. While English function words, such as articles (e.g., "a" and "the") and copulas (forms of the auxiliary verb "be"), are routinely produced, noun and verb morphological markers (e.g., *s* for plurals, *ing* for present progressive, and *ed* for past tense) are almost never used. Further analysis revealed that this lack of use of morphological markers was not limited to English. ASL markers that are effected

through the use of manner, directionality, head movement, facial expression, eye gaze, and body position were rarely observed to occur within PSE interactions. The net effect of these linguistic patterns is a reduction in the precision and depth of information that can be conveyed through PSE. As a result, while PSE does facilitate hearing-impaired signer-to-normal-hearing signer communicative exchanges, it does so with significantly less effectiveness and efficiency than either ASL or English.

Manually Coded English. MCE is neither a language nor a communication system. It is an instructional device that was specifically developed to provide a visual (i.e., sign) representation of English (Wilbur, 1987). The basic assumption was that hearing-impaired students' acquisition of English linguistic competence would be facilitated if they were consistently and meaningfully exposed to the most important elements of the language (Bornstein, 1978; Mitchell, 1982). Unfortunately, researchers have been unable to agree upon which elements of the English language are the most important. As a result, a variety of MCE systems have been developed, for example, Seeing Essential English (Anthony, 1971), Signing Exact English (Gustason, Pfetzing, & Zawolkow, 1975), and Signed English (Bornstein & Saulnier, 1986). These systems vary from one another in both the manner and number of English language elements that they are designed to convey. However, in spite of these differences, the primary function of MCE remains, that is, to assist hearing-impaired students in their acquisition of English language competence.

Wilbur (1987) identified Seeing Essential English (SEE 1) as the first MCE system to be developed in the U.S. SEE 1 was followed by Linguistics of Visual English, Signing Exact English (SEE 2), Manual English, and finally Signed English (Wilbur, 1987). Analysis of these systems identifies three common features. First they are all designed to be spoken and signed at the same time. Second, each spoken word is to have a corresponding sign. And third, English word order is to be used at all times. Unfortunately, the systems differ from one another in their use of ASL signs, the procedures through which they develop new signs, the manner through which they present English morphological markers, and their use of fingerspelling. Review of these differences will be limited to the two MCE systems most commonly used within U.S. educational programs for hearing-impaired students, Signed English and SEE 2 (Jordan, Gustason, & Rosen, 1979).

ASL provides the basic sign vocabulary found in both Signed English and SEE 2 (Wilbur, 1987). However, the systems differ in their use of those signs. Signed English relies upon a semantically based system in which the ASL sign is selected that most closely corresponds to the meaning of the targeted English word (Wilbur, 1987). In contrast, SEE 2 relies upon what is often referred to as the "two out of three rule" (Wilbur, 1987). Within this rule, the same sign is used for two English words if two of the following three criteria are met: pronunciation, spelling, and meaning. For example, in Signed English a different sign would be used to convey the English words "right" as in correct,

"right" as in the direction, and "write." In SEE 2 this would not be the case. The same sign would be used for "right" (correct) and "right" (direction) because they are spelled and pronounced the same. A different sign would be used for "write" because its spelling and meaning are different from the other two words. The SEE 2 application of this rule often results in the selection and use of signs that are dramatically different from those that are found in either ASL or Signed English.

Signed English and SEE 2 differ from one another not only in their selection of signs, but in the production of those signs as well. While Bornstein (1978) reported that MCE incorporates none of the morphological markers of ASL and all the markers of English, Wilbur's (1987) review of MCE systems revealed a somewhat different picture. Both Signed English and SEE 2 were found to use some ASL markers; however, the use of these markers was found to be arbitrary and inconsistent. In addition, where SEE 2 uses 14 prefixes and 83 suffixes to add English morphological markers to ASL signs (Gustason et al., 1975), Signed English accomplishes this same function with 9 prefixes and 3 suffixes (Bornstein & Sauliner, 1986). This difference in morphological markers is indicative of the wide range of linguistic elements that are found within written English and the arbitrariness with which those elements have been incorporated into MCE systems (Wilbur, 1987). The net result of these production characteristics is that, while the function of MCE systems remains constant, the forms that they use to accomplish this function vary widely.

Educational Use

In the early 1960s oralism was the dominant instructional strategy used within educational programs for hearing-impaired children (Connor, 1986). Within this approach, speech, audition, and speechreading are used as the primary modes in instruction, while signs and fingerspelling are expressly excluded. In 1979 Jordan, Gustason, and Rosen reported that a dramatic shift had taken place in education of hearing-impaired students in the U.S. Sixty-five percent of the 642 educational programs that responded to a 1978 national survey indicated that they used TC with their hearing-impaired students. The three most commonly identified sign texts that were used within those programs were those that presented SEE 2, Signed English, and SEE 1 signs. Within these programs TC was generally accepted to be the addition of signs and fingerspelling to their existing use of speech, amplification, and speechreading.

The shift to TC was further studied by Jordan and Karchmer (1986). Analysis of 1982-83 survey data on 46,000 hearing-impaired students indicated that 66% were enrolled in TC educational programs. The analysis also found that TC was used with approximately 50% of 6- to 8-year-old hearing-impaired students and over 85% of the 18- to 20-year-old segment of this population. In addition, it was determined that, while TC was used with only 10% of the fully mainstreamed hearing-impaired students, it was used with 86% of those students who received all of their educational programming within resi-

dential, day, or self-contained settings. These data established that TC was the dominant strategy used within U.S. educational programs for hearing-impaired students. However, they did not indicate how teachers of these students actually used total communication.

One of the goals of TC is the simultaneous production of English morphological structures in both signs and speech (Maxwell & Bernstein, 1985). The assumption is that simultaneous production will aid hearing-impaired students in their development of English language competence The validity of this assumption has been examined in several studies (Quigley & Paul, 1984; Schlesinger, 1986; Schlesinger & Meadow, 1972) in contrast to the relatively few investigations that have examined how TC is actually used.

Allen and Woodward (1987) surveyed 1,762 randomly selected teachers of hearing-impaired children to determine their patterns of sign use. Sixty-four percent (1,135) of the teachers reported that they used signs with their students. The teachers further reported that they were predominately "English-like" in their signing. Teachers who had 6 or more years of teaching experience and who taught at either the pre-primary or elementary level reported using the greatest amount of English. Crittenden (1986) surveyed 225 teachers of hearing-impaired students, the majority of whom reported that they preferred English-like signing over ASL. He further found that 46% of the normal-hearing and 18% of the hearing-impaired respondents did not judge themselves to be "fluent" in signing skills with their students. When the teachers were asked to judge their ability to understand their students' signing, 57% of the normal-hearing and 20% of the hearing-impaired teachers once again stated that they did not have "fluent" comprehension.

Marmor and Petitto (1979) conducted one of the first studies of TC use. Within that investigation, two experienced teachers of hearing-impaired students who were judged to have exceptionally good TC skills volunteered to be videotaped as they taught their students an academic subject. The videotapes were examined to determine the degree to which the teachers said and signed the same thing. The results were both dramatic and startling. Ninety percent of both teachers' simple declarative sentences and questions were found to have discrepancies between what was said and what was signed. In the case of the first teacher, the majority of these discrepancies occurred when he said, but did not sign, the subject, the main verb, and/or the auxiliary verb. This is in contrast to the second teacher who said, but did not sign, infinitives, articles, or plural morphological markers. Taken by itself, this study would appear to indicate that even experienced teachers who are "exceptionally" fluent in TC do not match their spoken and signed messages.

Kluwin (1981) extended the work of Marmor and Petitto (1979) in his investigation of 23 teachers who used TC in day-to-day instruction. The teachers varied from one another in their years of teaching experience, school setting, and the subjects that they taught. Videotapes of the teachers were analyzed to determine if the same morphological information was both signed and said.

Data analysis revealed that less experienced teachers incorporated more MCE and less ASL, while more experienced teachers did just the opposite. In explanation of his data Kluwin indicated that, as teachers gain experience, they become more concerned with the function, rather than the form of their signing. Kluwin's explanation is supported by Livingston (1986) who indicated that the complexity of many MCE morphological markers seems to interfere with the comprehensibility of signed messages.

Maxwell and Bernstein (1985) investigated MCE communicative effectiveness. Conversational exchanges between four hearing-impaired individuals (2 teachers and 2 students) were videotaped. The researchers found that 25-49% of all the words used during the conversations contained one or more sign/speech morpheme mismatches. Ninety-one percent of these mismatches occurred when a word was spoken, but not signed. In explanation of these findings the researchers stated that the "overwhelming number of these mismatches were structural (78%), rather than semantic (Maxwell & Bernstein, 1985, p. 73). The most common "structural" mismatch occurred when the pronoun "I" was spoken, but not signed. This was followed by the signed omission of spoken articles, conjunctions and verbs. In fact, the researchers found that only 44 (9%) of the 400 utterances analyzed in the study contained precise sign/speech morpheme matches. Still, this level of morpheme mismatch resulted in only 14% of the utterances being judged as propositionally "non-equivalent." Thus 86% of the utterances were judged to convey either exactly or essentially the same information, regardless of their morphological differences.

Implications

The research on TC use suggests that the language forms in TC exchanges are selected for their communicative functions and not because of MCE theory or design. In addition, TC forms are not limited to those included in MCE, but include forms from PSE and ASL. Consequently, it seems logical that the linguistic competence of TC students should be determined by how effective they are in accomplishing various communicative functions, and not by the number or type of language forms that they use. The optimum context in which to study communicative functions is the conversational exchange.

THE NATURE OF CONVERSATIONAL EXCHANGE

Tasks to be Accomplished

The basic context in which language is both developed and used is the conversational exchange (Bruner, 1977; Clark, 1978; Kretschmer & Kretschmer, 1979; Ling & Ling, 1974). Research by Condon (1979) and Kendon (1982) has determined such exchanges are actually composed of three parts or segments: (a) that just prior to the conversation, (b) the conversation itself, and (c) that just following the conversation. These segments are distinct in both the tasks which they are designed to accomplish and the behaviors that are demonstrated

within them (Erickson & Shultz, 1981; Keenan & Schieffelin, 1976). (The reader is also referred to the first chapter of this Volume for a discussion of the elements of conversation.)

The behaviors which occur just prior to the interaction are designed to accomplish two tasks; first, to initiate the conversation. This is accomplished when one individual gains the attention of another. Typical English attention-getting devices include calling out an individual's name, waving, and moving in the person's direction. The second task of the initial segment of the conversation is to mark when the interaction has actually begun, usually when the two interactants establish mutual gaze (look at each other) and produce some sort of recognition behavior (e.g., a head nod, smile, or vocalization).

During the second segment of the interaction the interactants must carry out five basic tasks, including: (a) establish the topic or focus of the conversation; (b) exchange information on the established conversational topics; (c) recognize and, when appropriate, repair communication breakdowns; (d) bring the conversation to a close; and (e) mark the end of the conversation. The patterns of interactional behavior that are used to accomplish these tasks are discussed in the next section.

Within the final segment of the conversation all that remains for the interactants to do is to move apart and continue with their separate activities. The most important point to keep in mind is that specific tasks must be accomplished within each segment of the conversation. Failure to do this will result in a disruption of the natural flow, give and take, or synchrony of the conversational exchange; and will probably cause a communication breakdown (Keenan & Schieffelin, 1976). A communication breakdown is considered to have occurred whenever a speaker's interactional behaviors fail to gain the expected outcome. For example, if an individual begins speaking to someone before having gained that person's attention, the outcome will probably be that the speaker's statements are ignored, misinterpreted, or only partially understood. Unless this is what the speaker intended, a communication breakdown has occurred.

Behaviors Used

The tasks of the conversational exchange are accomplished through three channels of behavior: visual, motor, and verbal (Condon, 1979; Kendon, 1982). That is, communicative intent is conveyed through interactants' gaze, gestures, and voice. The actual behaviors are both culturally dictated and contextually specific (Halliday, 1978) while the tasks of the conversational exchange remain constant. The within-culture use of these patterns is also determined by contextual variables (Gallagher, 1983). Thus, where an exchange is taking place, with whom, at what time, in which modality, and for what purpose all serve to determine which culturally acceptable pattern of conversational behaviors should be used.

The most basic type of behavior produced within conversational exchange

is reflexive (Givens, 1977). Such behaviors as a yawn, eye blink, hiccups, and scratching are examples of reflexive actions that might occur within a conversation. The common factor shared by these behaviors is that they are not intentionally produced to convey meaning. Instead, they are simply external manifestations of internal states of being such as the need for more oxygen, irritation in the eye, an itch, and so on.

The second type of behavior produced within a conversational exchange is signals (Harding, 1982; Newson, 1977). Signals differ from reflexive behaviors in that they are purposefully produced to convey meaning. Actions such as a wave, a prolonged stare, or a groan after a particularly bad pun are examples of this type of behavior.

Symbols are a third type of behavior produced during conversational exchanges (Bates, Camaioni, & Volterre, 1979; Clark, 1978). Like signals, symbols are purposely produced to convey meaning. The difference lies in the range of contexts and individuals with which the behaviors can be effectively used (Bullowa, 1977; Clark, 1978; DuBouse, 1976). Correct interpretation of signals is restricted to a more limited array of physical and interpersonal contexts than are symbols. For example, that "certain look," when produced in the right context, may convey volumes of information between two close friends, while the same behavior would probably be missed, or misunderstood, by someone else. The same message conveyed with words would probably be correctly interpreted by everyone in the context.

Implications

The structure, tasks, modalities, and behavioral categories of the conversational exchange provide a natural framework for the observation and description of language use. To apply the framework, one needs knowledge of students' current communicative skills. The following section reviews existing language assessment tests to obtain this information

CONVERSATIONAL BEHAVIOR OF TC STUDENTS

Very few studies have been conducted to examine the conversational behavior of TC students. Instead, most researchers have focused their attention either upon the impact that TC has on students' development of speech or their cognitive, linguistic, and academic performance (Greenberg, Calderon, & Kusche, 1984; Meadow, Greenberg, Erting, & Carmichael, 1981; Schlesinger, 1986). Quigley and Paul (1984), after review of the pertinent research, presented the commonly held position that hearing-impaired individuals develop, albeit at a slower pace, the same semantic and pragmatic skills as their normal-hearing peers. Studies of the communicative performance of hearing-impaired children reveal a somewhat more complicated picture in which performance depends on a child's age, the context, and the linguistic orientation of the researcher. (See also Chapter 2.)

Schreiner (1983) studied the initiatory behavior of 8 normal-hearing and 8 hearing-impaired toddlers. The investigation revealed that the hearing-impaired toddlers initiated more interactional attempts but used different initiatory strategies than their normal-hearing peers. Day (1986), in an extension of this research, investigated the communication between 5 hearing-impaired toddlers and their mothers. The investigation determined that the presence of a hearing impairment did not have a negative impact upon the frequency of interactional exchanges. The children developed the ability to convey a wide range of communicative intentions, relying upon "non-English communicative expressions" (Day, 1986, p. 383) as their primary discourse strategy.

The pragmatic skills of preschool hearing-impaired children were investigated by Curtis, Prutting, and Lowell (1979). They determined that young normal-hearing and hearing-impaired children demonstrate the same pragmatic skills; however, the hearing-impaired subjects relied primarily upon nonverbal discourse strategies. These strategies were further studied by Vandell and George (1981). During the course of their research it was learned that hearing-impaired children initiated more interactional attempts than their normal-hearing counterparts, but experienced significantly fewer successes in their initiatory attempts. The researchers attribute this lack of success to the informal, non-English discourse strategies used by the students.

Brackett and Maxon (1978) examined the conversational skills of elementary school aged hearing-impaired children. Their research indicated that these children had difficulty in adjusting their conversational strategies to meet new contextual requirements. McKirdy and Blank (1982) also found that such children had a narrow range of discourse strategies and that they frequently did not respond to the more complex linguistic behaviors of their normal-hearing peers. This finding is supported by the work of Brackett (1983) who, in addition, determined that hearing-impaired children of elementary school age had difficulty in carrying out effective conversational turn taking, topic identification, and repair of communication breakdowns. As did Vandell and George (1981), Brackett attributed these difficulties to the overly restrictive and simplistic discourse strategies of the hearing-impaired children. (See also Chapter 8.)

Hearing-impaired children, as they grow older, are sometimes thought to be increasingly ineffective in their conversational exchanges. While this may be the case for some, the research of Prinz and Prinz (1985) strongly suggests an alternative perspective. The naturally occurring interactional behaviors of 12 dyads of hearing-impaired children, ages 3:10 to 11:5, were studied. Nine of the children had hearing-impaired parents, one had a hearing-impaired grandmother, and the rest had normal-hearing parents. The children were videotaped as they played and carried on natural conversational exchanges with one another. Analysis of the videotapes focused upon the children's ability to effectively engage in conversational exchanges.

Prinz and Prinz (1985) found a steady progression of conversational skills;

as the age of the children increased, so did their ability to initiate interactions, establish topics, convey information, and repair breakdowns. In each case, the increased conversational competence was due to the students' expanding use of ASL discourse strategies such as hand height and eye gaze to signal turn taking; differential production of sign size, shape, and manner to repair communication breakdowns; and head movements to establish conversational topics. The use of ASL discourse strategies was consistent for all the children, regardless of the hearing status of their parents. In fact, the only difference that was found among the subjects was that hearing-impaired children of hearing-impaired parents proposed 60% of all the topics discussed during the observed conversational exchanges. The researchers concluded by stating that, contrary to previous studies, hearing-impaired children can engage in successful communicative exchanges. They also stated that effective assessment of such conversational behaviors requires an understanding of both English and ASL discourse strategies.

Existing Assessment Strategies

Kretschmer and Kretschmer (1978), and later Walter (1982) and Jones (1984), reviewed the language assessment protocols that are most frequently used in education of hearing-impaired children. These protocols are essentially designed to determine the extent to which students' linguistic performance matches that of their normal-hearing peers. Analysis is usually restricted to the students' use of English morphology, syntax, and more recently semantics in very controlled contexts. Students are expected to follow their examiner's directions to: (a) imitate, (b) manipulate objects, (c) identify objects or pictures, (d) judge the grammaticality of a sentence, or (e) complete a word or sentence (Kretschmer & Kretschmer, 1978).

The exception to controlled language assessment protocols is the "spontaneous language analysis procedure" developed by Kretschmer and Kretschmer (1978). Within this procedure, the student's natural conversational behavior provides the necessary data base to focus on description of language forms. The contemporary view expressed by these authors is that language function drives the selection and use of language forms. (See Chapter 1.) Issues of formal versus informal language assessment are covered thoroughly by Duchan, Moeller, and de Villiers in this Volume as well. It is the opinion of Jones (1984) that an inherent weakness of conversationally based methods is their high level of subjectivity and, while controlled methods can produce reliable information, examiners "... can not assume that the results are indicative of an individual's language behaviors in more naturalistic settings" (p. 205). The net impact of this information appears to be that individuals must choose between reliability and validity in the selection of language assessment protocols for use with hearing-impaired students.

Instructionally based language assessment of TC students has received scant attention in the literature which usually deals with issues other than the con-

versational competencies of hearing-impaired students. The work of Seal (1986) is indicative of this problem. The author presented a 5-point, 10-item assessment protocol for individuals in professional training who expect to work in TC settings; the goal is to determine the professionals' competence in the use of TC. Hatfield's (1982) assessment focused on hearing-impaired students, but the objective was determining their primary language, either ASL or MCE. Similarly, Luetke-Stahlman and Weiner (1982) and Luetke-Stahlman (1984) developed a vocabulary based assessment strategy to determine the most effective manual language/system to use with hearing-impaired students. While this is important information, it does not deal with the assessment of students' conversational abilities or limitations

Implications

Information on TC students' conversational behavior indicates that interpersonal context and the linguistic orientation of the examiner have a tremendous impact on the perceived competence of the students. Students who were observed from an English orientation, as they interacted with normal-hearing individuals, were described as using communication strategies that were both unconventional and restricted. The ineffectiveness of those strategies was argued to increase with the students' age. This is in contrast to those students observed from an ASL orientation, as they interacted with their hearing-impaired peers. In this second situation, the students were found to use established discourse strategies with increasing competence as they grew older. In reality, both observations are probably correct; that is, as TC students grow older, their conversational strategies may prove to be more effective with hearing-impaired, although not with normal-hearing peers.

This review of existing assessment strategies revealed a dearth of protocols that can be used to examine the conversational skills of TC students. It has been recommended that one use a controlled context with a focus on linguistic form, rather than linguistic functions. While the information that such assessments can provide has been explained elsewhere in this Volume, the present author advocates an alternative strategy to describe TC students' conversational strengths and limitations.

A SOCIOLINGUISTIC ASSESSMENT SCHEME

Overview of the Model

The following is an observationally based language assessment protocol to identify and describe the discourse abilities and problems demonstrated by TC students. It is generally consistent with the process analysis approach advocated in Chapter 1 of this Volume and is based upon a sociolinguistic model of language. Within that model, language is defined as a communication tool that is used to convey information from one individual to another (Bates, 1976; Clark, 1978) for the purpose of causing desired changes within the environ-

ment. The extent to which individuals can both comprehend and cause such changes is a measure of their communicative competence (Hymes, 1974). This competence can be measured by observing individuals as they use language during naturally occurring conversational exchanges. The individuals' ability to accomplish certain conversational tasks is observed and described in relation to contextual variables, modalities, and topics.

Data Collection Procedures

Effective observation of TC students' communication skills and problems requires that the examiner have a high level of receptive signing competence. While interpreters and many teachers possess such competence, many professionals who work with hearing-impaired students do not. As a result, it is recommended that the following assessment strategy be carried out as a team effort. One individual on the team should be responsible for the overall assessment design, data summary, and analysis. Other team members should carry out the actual observation and description of the student's communicative behaviors. In this way, the strengths of each member of the team are recognized and used to expand the assessment base over a larger array of interactional contexts than could be covered by a single individual.

The language assessment strategy begins with a choice of students. Usually these are individuals who: (a) have the most communication problems, (b) demonstrate the fewest communication skills, and (c) have communication systems that have proven to be an enigma to the instructional staff. Once a student has been selected, the team must identify the optimum contexts in which to observe the student's language use.

Naturally occurring conversational exchanges provide the best context for data collection efforts. Consequently, the team's next step is to identify those specific interaction situations in which they know the student frequently engages. Such interactions are most likely to occur during the less structured parts of the school day, for example, just before the start of a lesson, during lunch and recess, or free time within the classroom. The commonality of these settings is that students are free to engage their peers and other individuals in interactions on topics of their choice. Gallagher (1983), in an excellent review of language use and contextual variables, suggested observing students interact with at least two of their peers and one of their teachers, with a minimum of three observations of each context. Given the complexity of observing conversational behaviors, it is strongly recommended that assessment contexts be limited to dyadic interactions.

Observation in the selected interactional contexts is the third assessment step. This task can be facilitated through use of an observational recording form such as the one presented in Table 1. This form is based on the premise that the same individual will observe the student in the same context for a minimum of three sessions. Variations in any component of the observational context, or a reduction in the number of observational sessions, will severely reduce

Table 1

Observational Recording Form

Student: _____ **Observer:** _____

Date: _____

Contextual Information

Time: from _____ to _____ **Place:** _____

Interactional Partner: _____

Conversational Information

Task	Modality & Success/Failure
1 Gains the attention of the desired individual	
2 Responds to initiatory attempt	1/- 1/·
3 Proposes interactional topic	
4 Responds to interactional topic	1/·

Topic	# of Turns
a TV camera	IIII
b	
c	
d	
e	
f	

5 Conveys information on interactional topic	
6 Responds to information on interactional topic	1/·
7 Provides needed clarification and or additional info	
8 Signals the need for clarification and or additional info	
9 Cues a desire to end the interaction	
10 Responds to cues to end the interaction	1/·

Note: Speech = s Sign = i Combined = c Success = + Failure = -

the validity of the assessment results.

Five points of information are noted during the observation: (a) the conversational task in which the student is involved, (b) the modalities the student is using to engage in the conversation, (c) whether or not the student succeeded or failed in the task, (d) the topic(s) focused on in the conversational exchange, and (e) the number of turns that were taken by the student and his or her interactional partner on each of the topics. It is recommended that observers practice the observation and recording of the five categories of information before beginning the actual data collection to enhance reliability of the observation and recording process.

Observation should begin a few minutes before the student and the interactional partner enter the context. This is done to insure that the observer is in place to note the first interactional exchange. An interactional exchange is defined by Bromwich (1981) as that which "takes place between . . . two human beings" (p. 9).

The first requirement of the observational process is to note the conversational task in which the student is involved. These tasks are listed in Table 1 in the likely order of their occurrence. The expressive/receptive nature of the tasks is noted by brackets. For example, the student may initiate the interaction, task #1, or respond to an initiatory attempt, task #2. Once the interaction has begun, the student either proposes the interactional topic, task #3, or responds to the partner's topical proposal, task #4. This progression of expressive/receptive tasks continues until the interactants bring the interaction to a close (tasks #9 and #10)

Notation of the modality used by the student constitutes the second observational requirement. This notation is limited to the categories of speech, sign, and combined modes. Assessment teams may wish to develop their own operational definitions of these modalities. The author has used the following definitions. *Speech* is the use of vocalizations, plus natural gestures. *Sign* is the use of manual productions, plus natural gestures. *Combined* mode use is vocalizations and manual productions, plus natural gestures. Modality notations are coded and placed on the line of the conversational task in which the student is currently involved. Because the student may be involved in that task several times during the course of an observational session, subsequent modality use is separated by a slash (e.g., s/i/i/).

The observer determines whether the student succeeded or failed in each conversational task depending on the behavior of the student and the interactional partner. If that behavior accomplishes the identified task, it is marked a success (+); if it does not, it is marked a failure (-). How conventional the conversational behaviors are, or the extent to which they adhere to English or ASL linguistic process, is not the issue. The adequacy of the behaviors is determined by their conversational effectiveness within the context (Hymes, 1974). If the student's use of speech to gain the attention of an interactional partner results in that individual attending to the student, the observer marks s/+ on line 1 of the recording form. If the student's interactional partner uses sign to propose a topic and the student does not appear to respond to the topic, i/- would be marked on line 4 of the recording form.

The last two observational requirements concentrate on the topics observed in the interactional exchanges. Topics are defined by Keenan and Schieffelin (1976) as the proposition (or set of propositions) about which the speaker is either providing or requesting information. As such, topics form the informational focus of conversational exchanges. The observer's job is to record, in a word or a phrase, what the student and partner are conversing about on lines 4 a-f. Additional topics can be noted, as needed, on the back of the form.

Naturally occurring conversational exchanges often include the presentation and discussion of several topics. A conversation might first focus on an upcoming football game, then move to clothes that the interactants would wear to the game, and finally end with a discussion of who they would be going to the game with. Observation of this conversation would include a notation of three topics (football game, clothes, and dates).

Notation of topic focus is followed immediately by a count of the number of conversational turns that the student and interactional partner take on that topic. West and Zimmerman (1982) defined conversational turn as "consisting not simply of a segment of talk by one person bounded at each end by the speech of others, but rather a period of time during which one has the right and obligation to speak" (p. 522). Table 1 contains an abbreviated recording of an interaction between a student and his peer. Within that exchange the student first missed then responded to his partner's interactional initiations (#2: i/- i/+). This was followed by his response to the topic his partner proposed (#4: i/+) and a total of four turns on the topic. The exchange (written as a gloss) was as follows:

Peer: That camera is taking your picture.
Student: Yea.
Peer: The camera is looking right at you.
Student: Yes.

It was noted that the student responded to information (#6: i/+), but did not provide any information himself (#5: blank). The topic was described as "TV camera" and a total of four turns were recorded to have been taken on that topic. The interaction was brought to a close when the peer turned away from the student and returned to her school work. The student responded to this cue by turning back to his own work (#10: i/+). This short exchange suggests that, while turn taking is relatively easy to recognize and count, it may be both difficult and time consuming to describe.

Data Summary and Analyses

An observational summary form is presented in Table 2. This form is completed by the team leader and/or language specialist. Sections A and B are self-explanatory. Section C, Topical Data, is a summary of the topics that occurred during the observational sessions. Recurring topics are grouped into topical categories and their cumulative frequencies are noted, as are the average number of turns per category.

Analysis of the student's conversational abilities is carried out through use of an observational analysis form presented in Table 3. Information for this form is drawn from the observational summary forms completed for each context in which the student was observed. Review of the frequency and percentage data can be used to generate a wide array of descriptive information concerning the student's communication abilities and problems. However,

Table 1

Observational Recording Form

Student: _____ **Observer:** _____

Date: _____

Contextual Information

Time: from _____ to _____ **Place:** _____

Interactional Partner: _____

Conversational Information

Task	Modality & Success/Failure
1 Gains the attention of the desired individual	
2 Responds to initiatory attempt	I/- I/+
3. Proposes interactional topic	
4 Responds to interactional topic	

Topic	# of Turns
a TV camera	IIII
b	
c	
d	
e	
f	

5 Conveys information on interactional topic	
6. Responds to information on interactional topic	
7 Provides needed clarification and or additional info	
8. Signals the need for clarification and or additional info	
9 Cues a desire to end the interaction	
10 Responds to cues to end the interaction	

Note. Speech = s Sign = i Combined = c Success = + Failure = -

from an instructional perspective, it is most important for the assessment team to determine the answers to the following questions.

1. In which context does the student have the highest/lowest percentage of success?
2. In which modality does the student experience the highest/lowest percentage of success?
3. Which conversational task has the highest/lowest percentage of occurrence?
4. On which conversational task does the student experience the highest percentage of success/failure?

5. How many topical categories does the student use/experience within his/her conversational exchanges?

6. Which of those topical categories are most/least frequently used?

7. What is the average number of turns taken on the observed topical categories?

8. On which topical categories does the student demonstrate the highest/lowest average number of turns?

The answers to these questions identify the context, modality, task, and topic on which the student is most and least competent. This information, in turn, can be used to construct sociolinguistically based communication intervention programs. Such programs can be designed to increase the number of contexts, modalities, tasks, and topics in which students may experience a high percent-

Table 2

Observational Summary Form

Student: _____ **Date:** _____

Language Specialist: _____

A. Contextual Data

1. Setting A: (Subject/Peer 1 Interactions)

Time: *M* length in min _____ **Peer 1:** _____

Place: _____

Observer: _____

Observational Dates: Obs #1 _____

Obs #2 _____

Obs #3 _____

2. Setting B: (Subject/Peer 2 Interactions)

Time: *M* length in min _____ **Peer 2:** _____

Place: _____

Observer: _____

Observational Dates: Obs #1 _____

Obs #2 _____

Obs #3 _____

3. Setting C: (Subject/Adult Interactions)

Time: *M* length in min _____ **Adult:** _____

Place: _____

Observer: _____

Observational Dates: Obs #1 _____

Obs #2 _____

Obs. #3 _____

Continued on next page

Table 2 *Continued*

B. Conversational Data — Setting A B C (circle one)

	Frequency						
	Speech		Sign		Combined		
	+	-	+	-	+	-	TOTAL
1 Gains the attention of the desired individual							=
2 Responds to initiatory attempt							=
3 Proposes interactional topic							=
4 Responds to interactional topic							=
5 Conveys information on interactional topic							=
6 Responds to information on interactional topic							=
7. Provides needed clarification and or additional info							=
8. Signals the need for clarification and or additional info							=
9 Cues a desire to end the interaction							=
10 Responds to cues to end the interaction							=
TOTAL							=

C. Topical Data — Setting A B C (circle one)

Topical Categories	Frequency	*M* of Turns
1		
2		
3		
4.		
5		
6		
7		
8		

age of communicative success. Students' rate and level of success can be determined by periodic observation of their conversational behaviors. This information can then be compared to baseline data to determine the rate and extent to which their conversational competence changes during the course of a year.

SUMMARY AND CONCLUSION

Total communication is a reality within current educational programming for hearing-impaired students. A second reality is that communication development remains the primary focus of that programming. The third reality — one most demanding of our attention — is that, in spite of our best efforts, the average language skills of many hearing-impaired students are no better today

Table 3

Observational Analysis Form

Student: _____ **Date:** _____

Language Specialist: _____

	Setting A		Setting B		Setting C	
A. Contextual Data						
1 Interactional Partner						
2 Interactional Context						
3 Number of Observations						
4 *M* Length of Observations (min.)						
B. Conversational Data						
1 Modality						
Total Number (s + i + c)						
a Speech	#	%	#	%	#	%
occurrences						
successes						
failures						
b Sign						
occurrences						
successes						
failures						
c Combined						
occurrences						
successes						
failures						
2 Conversational Behaviors						
a Onset of Interaction						
Total Number (Expres & Recep)						
1 Expres - Gains attention of the desired indiv	#	%	#	%	#	%
occurrences						
successes						
failures						
2 Recep - Responds to initiatory attempt	#	%	#	%	#	%
occurrences						
successes						
failures						

Continued on next page

Table 3 *Continued*

b Topic Identification Collaboration						
Total Number (Expres & Recep)						
3 Expres — Proposes interactional topic	#	%	#	%	#	%
occurrences						
successes						
failures						
4 Recep — Responds to interactional topic	#	%	#	%	#	%
occurrences						
successes						
failures						
c Information Exchange						
Total Number (Expres & Recep)						
5 Expres -- Conveys information on topic	#	%	#	%	#	%
occurrences						
successes						
failures						
6 Recep — Responds to information on topic	#	%	#	%	#	%
occurrences						
successes						
failures						
d Repair of Communication Breakdowns						
Total Number (Expres & Recep)						
7 Expres -- Provides clarification or info	#	%	#	%	#	%
occurrences						
successes						
failures						
8 Recep -- Signals for clarification or info	#	%	#	%	#	%
occurrences						
successes						
failures						
e Bringing the Interaction to a Close						
Total Number (Expres & Recep)						
9 Expres - Cues desire to end interaction	#	%	#	%	#	%
occurrences						
successes						
failures						
10 Recep - Responds to cues to end interaction	#	%	#	%	#	%
occurrences						
successes						
failures						

Continued on next page

Table 3 *Continued*

C. Topical Data

1 Topical Categories Rate	#	%	#	%	#	%
a						
b						
c						
d.						
e						
f						
g.						
h						
2 Topical Categories *M* Number of Turns						
a =						
b =						
c =						
d =						
f =						
g =						
h =						

than they were approximately 70 years ago when early studies of their language performance were carried out (Pintner & Patterson, 1916) The majority of these students still leave school functionally illiterate after 15 to 18 years of education (Quigley & Paul, 1984). These realities point to one conclusion: A change is needed in communication programming for the majority of hearing-impaired students.

This chapter has stressed the idea of examining the language performance of hearing-impaired students within a different model than that which has been previously applied. That model is one in which language is seen as a communication tool. Language competence is measured by how effectively that tool is used to achieve an individual's communicative needs; the emphasis is on communication function, rather than language forms. The unit of analysis and intervention is expanded from the sentence to the conversational exchange.

The professional challenge for the application of the sociolinguistic model is to apply existing information and skills to a new context, the education of hearing-impaired students. This model expands the focus beyond what is linguistically correct English to the linguistic systems of all our students, including American Sign Language, Pidgin Sign English, and Manually Coded English. In the final analysis, the goal of all our work is to assist students in the development of effective communication abilities. What we must remember is that those abilities are not limited to English and that the primary proving

ground for communicative competence is not a formal test setting, but the conversational exchange.

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Chapter 6

Perspectives on the Assessment of Reading

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Current perspectives on spoken language acquisition stress the integration of pragmatic, semantic, morphologic, and phonologic knowledge into a functional system of communicative competence. The impact of hearing impairment on that emerging communicative system has been well documented (e.g., Kretschmer & Kretschmer, 1978; Ling, 1976; Quigley & Paul, 1984). The development of written language (both reading and writing) shares the impact

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of hearing loss. Reading, the focus of this section of the monograph, has many parallels with the emerging comprehension and use of the spoken language code (King & Quigley, 1985). Written language is not, however, simply speech in written form. Anyone who has tried preparing a written text from a taped spoken presentation can confirm this. Because schooling focuses on the development of literacy, the demands for proficient reading are inescapable throughout elementary and secondary school programs. Successful reading and writing have their base in knowledge and use of the language code.

This discussion will address the status of language and reading acquisition (achievement) of hearing-impaired individuals, new perspectives on the reading process, reading assessment of normal-hearing and hearing-impaired students, limitations of reading tests developed for normal-hearing students, and suggestions for alternative assessment procedures. While noting the variability in language development across hearing loss levels and the impact of even minimal levels of hearing loss on language acquisition, the discussion centers on reading assessment of the severely or profoundly hearing-impaired child.

LANGUAGE ACQUISITION AND HEARING IMPAIRMENT

The difficulties hearing-impaired individuals have in (a) learning to read and (b) using reading to learn are subsequent to their difficulties in language development (Kretschmer, 1982; King & Quigley, 1985; Quigley, 1982). Researchers have demonstrated that hearing-impaired youth by 18 years of age do not effectively comprehend or use the syntactic system (Quigley, Wilbur, Power, Montanelli, & Steinkamp, 1976). Deficiencies in semantic comprehension and expression have been reported by many investigators (Brenza, Kricos, & Lasky, 1981; Odom, Blanton, & Nunnally, 1967; Skarakis & Prutting, 1977). Although early semantic features have been observed in hearing-impaired children's language performance (Skarakis & Prutting, 1977), the system breaks down significantly beyond the two-word utterance level at the point where the child is required to code information into more complex syntactic forms. Vocabulary development has also been shown to be significantly delayed (Odom et al., 1967; Rosenstein & MacGinitie, 1969; Walter, 1978). Some aspects of pragmatic development have been shown to be adversely affected by hearing impairment (Brackett, 1983; Laughton & Jones, 1982; McKirdy & Blank, 1982), while other pragmatic aspects such as turn-taking and expression of communicative intent appear to develop appropriately (Anderson, 1979; Collins-Ahlgren, 1975).

In contrast, most six-year-old normal-hearing children have a well-developed language base which facilitates recoding printed forms. Hearing-impaired children approaching the written language task must learn language (English) as well as the written code for the language (written English) simultaneously, placing them at a serious disadvantage (Quigley, 1982). Given nor-

mal expectancies, some hearing-impaired children will learn English from reading; others will use their existing language base to learn to read; while, unfortunately, other children will lear either the English language nor its written code. Because of the difficulties of learning English and the written code simultaneously, some educators have argued that written language should be taught to hearing-impaired children using any language base they may have available to them. For example, it may be necessary to translate English literature into American Sign Language if that is the only language available to the profoundly hearing-impaired learner (Quigley, 1982).

READING ACHIEVEMENT AND HEARING IMPAIRMENT

Reading is a language process. Given the documented language learning difficulties of hearing-impaired children, reading deficiencies are expected. Researchers have repeatedly shown that hearing-impaired students rarely attain adequate reading performance (DiFrancesca, 1972; Furth, 1966; King & Quigley, 1985; Pintner & Patterson, 1917; Quigley, 1982; Trybus & Karchmer, 1977). For the past 70 years standardized measures developed for use with normal-hearing individuals have shown that profoundly hearing-impaired individuals up to age 21 score only at an average middle-fourth-grade equivalent on these measures. Fewer than 10% of 18-year-old hearing-impaired students read at or above an eighth grade level (Trybus & Karchmer, 1977). These findings may underestimate the problem because they are based on multiple-choice objective reading tests which were not developed for nor, in many instances, standardized with hearing-impaired individuals. Using more refined measures such as a cloze procedure (which will be discussed later), Moores (1967) determined that hearing-impaired students' reading vocabulary and comprehension were even more delayed than standardized reading tests indicate.

Is the lack of reading achievement a function of (a) testing using inappropriate instruments for hearing-impaired students and/or (b) the failure to attain English language proficiency necessary for understanding the written language codes? It is likely that both conditions interfere with written language acquisition. Additionally, the issue of how hearing-impaired students code information (i.e., via speech, sign, or other means) is critical in discussing reading development (King & Quigley, 1985; Lichtenstein, 1983). Quigley (1982, p. 95) summarized the status of reading achievement of hearing-impaired individuals in the following manner: "Most prelinguistically deaf students (defined as having sensorineural hearing impairment of 90+ dB suffered before age 2) do not attain even adequate ability to read and write English."

NEW PERSPECTIVES ON THE READING PROCESS: ASSESSMENT IMPLICATIONS

A dramatic shift in perspectives on the reading process has occurred in the

past 10 to 15 years. The chronology of interest in the reading process has paralleled spoken language research trends. Interest focused on phonetic/phonic concerns (a bottom-up approach) progressed to syntactic interest, and then moved to the pragmatic/semantic (top-down approach) concerns of modern day language studies. The model of reading acquisition which has permeated traditional reading assessment and instruction assumes a well-developed underlying language base which allows for recoding from written to spoken language, that is, speech recoding (Shankweiler, Liberman, Mark, Fowler, & Fisher, 1979; Smith, 1973). The basis of written language is assumed to be phonologic (i.e., contingent upon knowledge of sound/symbol relationships which are decoded, uttered aloud, recognized as known vocabulary words, and subsequently joined to form sentences, paragraphs, and longer texts). This process is referred to as a bottom-up approach focusing on building small units into words and sentences leading to comprehension. Acquisition of reading from this perspective is viewed as a collection of bottom-up skills to be mastered. Mastery of these skills is presumed to lead to successful reading.

A current view of the reading process considers many interrelated components and strategies with a greater focus on the reader's active role in construction of meaning (considered to be a gestalt, or top-down approach) and a de-emphasis on decoding the written text (a bottom-up approach). Hasenstab and Laughton (1982) portray the reading process as a psychosociolinguistic phenomenon, that is, a social, communicative interaction between an author and a reader. The effectiveness of this communicative interaction is based in the language competence and prior knowledge of the participants. Writing by an author followed by reading by a reader requires application of language (semantic, syntactic, graphomorphophonemic) knowledge during both reading and writing. The author has intentions for the reader. The reader must identify and respond to these intentions. The intentionality is an area of commonality between written and spoken language. The major issues and assumptions underlying the reading process should draw from the current perspectives on language because reading is a language process. While the relevance of the pragmatic revolution (Lund & Duchan, 1983, 1988) has been recognized by nearly all practitioners in communication sciences and disorders, less attention to pragmatic influences in written language has occurred at the consumer level.

An assumed relationship between spoken and written language exists. Unfortunately, the relationship incorporated into reading curricula has been at the level of sound-symbol relationships. It has been assumed that children must say sounds before they can read them, that is recode written forms to spoken language. Many normal-hearing children have heard stories read to them prior to their entry into school. From this experience, children learn about various text formats (e.g., "Once upon a time" signals a different kind of story than "Bears live in the woods"). Children also learn about communication between an author and a reader and, therefore, the beginnings of the

relationship between spoken and written language. Both reader and author have a body of knowledge about language which allows for coding of intents and meanings into language. This knowledge allows individuals to speak, read, or write. While spoken and written language share pragmatic, semantic, and syntactic language knowledge, there are differences in the two formats. However, it is assumed that knowledge of one format (e.g., spoken language) facilitates learning of the other format (e.g., written language).

Despite new perspectives and research about the reading process, the assessment of reading has not advanced significantly from the traditions of the past (Squire, 1987; Valencia & Pearson, 1987). Reading tests for normal-hearing children continue to focus on measurement of sound-symbol relationships, completion of sentences to demonstrate comprehension of syntactic information, vocabulary recognition, and the use of literal comprehension questions following a reading passage, the very areas known to be difficult for hearing-impaired students with language learning problems.

READER-BASED AND TEXT-BA D MODELS

With the current emphasis on the active role of the learner in the reading process has come more clearcut delineation of reader-based and text-based models of reading. An extension of the bottom-up/top-down theories of reading has emerged into text-based theories and reader-based theories (Harker, 1987). Text-based theories assume the individual learning to read must learn to decode specific meaning contained within the text. This information is sequential and hierarchical, ranging from letters to semantic units (Harker, 1987). The conventions of written language are related to spoken language via strategies such as decoding (Liberman, Liberman, Mattingly, & Shankweiler, 1980). The reading process is perceived as an overlaid language function. The reader must focus on features of the text until such time as he/she is able to process the text features automatically without conscious attention. In following this procedure, the reader assumes all meaning lies within the text.

In contrast, reader-based theories presume that reading is a natural language process not unlike speech and listening (Smith, 1972; Goodman, 1976). Reading and listening are considered parallel processes with no special decoding from one modality to another required. With reader-based theories it is assumed that meaning is actively constructed by the reader of a text. Meaning is based on the reader's existing language and experiential knowledge. The process involves formation of hypotheses about written text in a manner similar to any other cognitive hypothesis-testing procedure (Harker, 1987). The reader brings meaning and expectations to the text and then confirms or fails to confirm those expectations or hypotheses about the text.

Teaching approaches follow logically from the two perspectives. Teachers holding the text-based view focus on teaching the skills considered necessary to decode the text. Teachers with a reader-based perspective teach readers to

generate and test hypotheses about the text, thereby stressing meaning and communicative intent. Assessment, however, is less clearcut. There are many text-based, standardized reading tests. There are fewer tests assessing reader-based abilities. Such tests are more likely to be nonstandardized or informal measures.

The text-based and reader-based theories are integrated with bottom-up and top-down theories of reading. Attempts to reconcile the two positions on reading have evolved into an interactive theory of reading (Rumelhart, 1977; van Dijk & Kintsch, 1983). With the interactive theory it is assumed that readers make use of many sources of information, within themselves and within the text concurrently. Further, it is possible to generate and then test hypotheses by analysis at lower or higher levels, thus using both bottom-up and top-down strategies to construct meaning or comprehend a text. Neither the text nor the reader is preeminent. Both are critical to the reading process. The position taken here is an interactive one, that is, both text variables and reader variables are critical to successful reading. Text is never fully explicit and reading comprehension is never exclusively textual. Much knowledge of text is embedded in the context. The explicitness of a text falls on a continuum from that which is likely to be interpreted in the same way by everyone (e.g., a phone book) to that which has many possible interpretations (e.g., a poem).

In assessment of reading, it is helpful to understand the explicitness of a given text. For example, expository texts in the content areas (social studies, geography, or science) may be more or less explicit than narrative texts. In reading assessment the context of a text may be viewed as the surrounding letter boundaries (a bottom-up view). This type of knowledge is frequently assessed in standardized reading measures. In text analysis as suggested by Stein and Glenn (1979), context is viewed more as a textual variable (e.g., the grammar of the story) than a reader variable. In schema theory (Rumelhart, 1975), the context is viewed more as a reader variable, that is, the reader's cognitive processing of incoming stimuli.

If the reader is considered active, and reading comprehension is viewed as the reader using prior knowledge along with the writer's cues to infer the author's intended meaning, it should be logical to assess these reader-based areas. However, current reading tests do not assess such issues. It is uncommon for reading tests to assess the reasoning strategies used by the reader to construct meaning or the reader's knowledge of story schema for various forms of written language; but these cognitive-semantic aspects are critical to success in reading.

SIGNIFICANCE OF THE NARRATIVE AND SCHEMA THEORY

Study of the narrative and development of the schema for narratives has generated considerable interest in both spoken and written language domains.

Narratives have been studied from cognitive, communicative, and cultural perspectives. The narrative is a mode of discourse which has played a major role in transmission of culture through stories and dialogues (e.g., Aesop's fables or the dialogues of Plato and Aristotle). The narrative is viewed as a universal way of organizing and understanding information (Bruner, 1987). The development of narrative competence is observed in very young, normal-hearing children as they begin to understand and tell stories (Van Dongen & Westby, 1986). Bruner (1987) observes the use of storytelling to ourselves in order to make sense of experience. He suggests that children who can master the spoken narrative adjust more readily to their life problems.

Much of the current interest in reading also focuses on the development of narratives or stories. Written stories have traditionally preserved the social customs, morals, and values of a culture. Cognitively, there is evidence of a prototype for written narratives. This prototype serves as a model or schema used to aid comprehension and recall of information from the story (Mandler & Johnson, 1977; Rumelhart, 1975; Stein & Glenn, 1979; Thorndyke, 1977). Children and adults can determine when narratives violate this prototype. The schema is a set of expectations about the narrative structure which has a powerful effect on recall. Readers tend to remember what is important in a text on the basis of the schema they impose on that text. When readers have incomplete schema, they are unable to effectively comprehend and remember stories, textbooks, or other reading materials. An important assumption underlying application of schema and language comprehension theories to reading is that the written text itself does not carry meaning, but rather provides instructions for the reader to retrieve or construct intended meaning based on previously acquired knowledge (Adams & Collins, 1977).

The schema is a cognitive model which influences how the reader deals with incoming stimuli (Anderson, 1977; Bartlett, 1932). Schema theory assumes that "human memory is organized semantically" (Pearson, 1982, p. 26). A semantic network (Collins & Quillian, 1969) of related concepts, attributes, functions, and classifications helps define a schema. In order to select a schema, the reader must recognize a value that fills a slot in the schema, guess that the schema is appropriate and what the text is about, and fill in the slots (Pearson, 1982). An example is a face schema which has slots for eyes, mouth, and nose (King & Quigley, 1985). Encoding specific information is analogous with filling the slots. The face is recognized even when a drawing with a circle, two lines for eyes, a dot for a nose, and another line for a mouth are appropriately placed within the circle. It is possible to have knowledge of the dominant schema (macrostructures), but not the subschema (microstructures). For example, the schema of a face provides for eyes. What color the eyes may be or that eyes have pupils which dilate in the dark may be missing information although it is assumed all humans have two eyes (macrostructural information).

In reading there is a tendency to remember what is important in a text based on the schema which the reader imposes on it, with various embedded sub-

schema forming a hierarchy including macrostructures and microstructures. When schema knowledge is adequate and texts are predictable, recall and reconstruction of narratives or other forms of texts are improved. When this schema is absent or incomplete, interference with the hypothesis-testing procedure is expected. Readers using a top-down approach operate within their own schema, whereas readers using a bottom-up approach try to operate within the author's schema (Pearson, 1982). Schema theory stresses the role of the semantic base of language required for reading.

A schema or prototype of a narrative is frequently called a story grammar. Story grammars delineate different categories of information coded in stories and the logical relations connecting story components. Stein and Glenn's (1979) story grammar has been used frequently in research and instruction. Their story categories include a setting, an initiating event, an internal response of the protagonist, an attempt to obtain the protagonist's goal, a consequence, and a reaction from the protagonist. The story may consist of a single episode or multiple episodes. The prototype for a story has a specific form which relates to linguistic structure and provides meaning to the story. Research on story grammars has shown that better recall occurs with stories following a prototypic framework (Mandler, 1978; Thorndyke, 1977). Repeated exposure to stories is instrumental in helping to form a story schema. Failure to develop such a schema or story grammar may be a major factor in reading disability (Bruce, 1978). A student may have a schema for narratives, but lack a schema for various expository forms. While many researchers have addressed the importance of schema, story grammars, and narratives in reading comprehension, assessment of these areas is not included in any of the frequently used standardized tests of reading.

READING ASSESSMENT OF NORMAL-HEARING STUDENTS: AN OVERVIEW

Although new information on the reading process is available, reading assessment has not yet incorporated this information. Widespread interest in reading assessment dates from the educational accountability movement of the 1970s in which a need for improving reading achievement of all students was strongly emphasized. Standardized test scores have been utilized rather exclusively to measure reading achievement and program effectiveness (Valencia & Pearson, 1987). The focus on reading achievement accountability has resulted in statewide competency testing in 40 states, and a multitude of local testing programs (Valencia & Pearson, 1987). While large testing programs may be effective for evaluation of overall achievement, the primary concern in this chapter is diagnostic assessment leading to improved instructional programs.

Despite new information from research, much of the current reading assessment of normal-hearing children focuses on identification of a construct

termed "reading grade level" (e.g., a grade equivalent of 3.2 refers to third grade, second month) and the presumed skills associated with that level. Most adults do not have a clue what their reading grade level is because the construct is not used beyond secondary school. Most adults do, however, have opinions about their reading proficiency and their reading enjoyment level. That is, they love to read and do it all the time or they read because they have to read, without any joy associated with the activity. Generally, those who love to read are proficient. Often, the converse is true for those who dislike reading. Until recently, few reading tests have evaluated interest in or attitude toward reading (Brown, Hammill, & Wiederholt, 1978).

PURPOSE OF READING ASSESSMENT

Assessment is a process of gathering many types of data for diverse purposes. Assessment of reading is done: (a) to determine a student's reading achievement level, (b) to identify strengths and weaknesses in reading, (c) to determine eligibility for special educational services, (d) to monitor progress of a student who is receiving services, (e) to plan specific instructional programs for a student, and/or (f) to evaluate instructional programs (McLoughlin & Lewis, 1986). Because of the varied purposes of reading assessment, many types of assessment measures are available. Assessment measures may include informal, formal, standardized, criterion-referenced, diagnostic, achievement, and a variety of teacher-developed procedures.

Analyses of children's performance sampled across varied conditions (tests, tapes of reading, written language samples, interviews) and teacher observations of children reading are critical to comprehensive reading assessment to obtain a complete profile of a child's performance. The major components of reading tests include evaluation of word attack (phonic) skills, word recognition, comprehension, silent and/or oral reading, rate of reading, and ability to use reading for learning other subject matter (McLoughlin & Lewis, 1986; Salvia & Ysseldyke, 1988). Assessment should be ongoing rather than a once-a-year phenomenon. The role of the teacher in ongoing assessment in the classroom has been undervalued. Yet, teachers' informal evaluations and observations guide instructional decisions (Shavelson & Stern, 1981). This should suggest greater use of teacher observations or informal assessment. Instruments used for assessment should be appropriate for a child's cultural background and developmental level (Teale, Hiebert, & Chittenden, 1987). This is a frequently violated tenet in assessment of hearing-impaired children, especially when tests for normal-hearing students are used.

TYPES OF READING TESTS

Reading tests for normal-hearing students come in varied forms. They may be diagnostic, achievement, norm-referenced, formal, or informal because assessment is designed to serve different reading assessment purposes.

Formal Reading Measures

Formal reading tests are usually standardized, structured, norm-referenced, and have specific guidelines for administration, scoring, and interpretation (McLoughlin & Lewis, 1986). The purpose is to compare a student's performance to a normative group. The quantitative information from these tests is expressed in grade equivalents, percentile ranks, and/or standard scores. These tests generally take the form of reading achievement tests or diagnostic reading tests.

Reading Achievement Tests. Academic achievement tests have subtests for evaluation of reading mastery along with other kinds of subtests (e.g., math, spelling). Achievement tests may be group or individually administered, but are frequently norm-referenced. Achievement tests with reading components such as the Stanford Achievement Test (SAT) (Gardner, Rudman, Karlsen, & Merwin, 1984), Metropolitan Achievement Test (Balow, Farr, Hogan, & Prescott, 1979), Wide Range Achievement Test (Jastak & Wilkinson, 1984) and the Peabody Individual Achievement Test (Dunn & Markwardt, 1970) are examples of formal tests which have been used with hearing-impaired individuals. Only the SAT has standardization information for this population.

Diagnostic Reading Tests. Diagnostic reading test formats have been developed to give diagnostic information and compare students to their age and grade level peers (McLoughlin & Lewis, 1986; Salvia & Ysseldyke, 1988). They follow a similar pattern and include decoding and comprehension evaluation. These types of tests have been a popular way of assessing reading competency of children and adults since the early 1970s. Diagnostic reading tests are usually norm-referenced and measure a number of subskills with the intent of identifying strengths and weaknesses in reading performance. They are individually administered. Examples of frequently used tests which are comprehensive in their measurement of reading skills are the Woodcock Reading Mastery Tests and the Woodcock Reading Mastery Tests - Revised (Woodcock, 1973, 1987), the Gates-McKillop-Horowitz Reading Diagnostic Tests (Gates, McKillop, & Horowitz, 1981), the Durrell Analysis of Reading Difficulty (Durrell & Catterson, 1980), Stanford Diagnostic Reading Test (Karlsen & Gardner, 1985), and the Diagnostic Reading Scales (Spache, 1981). No standardization information specific to hearing-impaired individuals is available although some portions of these tests have been used with this population.

Informal Reading Measures

Informal reading measures are used frequently in assessment of reading. These measures are less stringent in administration and scoring and have fewer guidelines for interpretation. Examples of informal reading measures include informal reading inventories, teacher checklists, error or miscue analysis, criterion-referenced tests, cloze procedures, and clinical reading interviews

(McLoughlin & Lewis, 1986; Salvia & Ysseldyke, 1988). Observations, analyses of work samples, questionnaires, and interviews may also be used.

Informal Reading Inventories. Informal reading inventories frequently include: word lists, a set of passages (presumably graded such as first, second, third grade), questions designed to assess comprehension of the passage, and an examiner's copy of the materials allowing for marking of oral reading miscues (Henk, 1987). The grade level revealed by performance on the word lists suggests a starting point for the graded passages. Often levels for independent reading (easy), instruction, and reading with frustration (difficult) are then determined for silent or oral reading (Sucher & Allred, 1981).

Word lists utilizing real or nonsense words are included to evaluate (a) sight vocabulary or words recognized out of context and (b) phonetic approaches used for decoding unknown words (i.e., sounding out initial, medial, or final components). It is assumed that decoding strategies and a basic sight vocabulary are necessary skills required for proficient reading. The comprehension component of reading tests requires the reader to read a paragraph silently or orally. If the passage is read orally, the examiner notes all of the reader's errors. Questions about the passage are asked following the reading to determine the comprehension level (McLoughlin & Lewis, 1986).

Although reading inventories may yield significant diagnostic information about the reader to a trained evaluator, they typically fail to incorporate current reading research findings (Johnston 1983, 1987). For example, children continue to be assigned a specific grade level (usually based on number of words per sentence and specific vocabulary contained in passages) without consideration of other significant text variables (such as syntax) or reader variables (prior knowledge, interest, intentions) (Henk, 1987).

Teacher Checklists. Teacher checklists are another form of informal measure used to assess reading. Checklists generally consist of reading behaviors considered critical to proficient reading and may include decoding, comprehension, oral reading, and silent reading. Because teachers may vary significantly in their selection of critical reading behaviors, questions of reliability and validity have been raised of these measures (McLoughlin & Lewis, 1986).

Error or Miscue Analysis. Error or miscue analysis is another form of informal measure. The student's errors are examined to gain information about how the student processes the text. This procedure generally evaluates oral reading. Most systems analyze additions, substitutions, omissions, and reversals of words and sounds during reading. An alternative form of error analysis assesses qualitative miscues (Goodman, 1973; Goodman & Burke, 1972). The underlying assumption in miscue analysis is that all readers miscue and this does not make them poor readers. Some miscues do not hinder gaining meaning from the text. Error or miscue analyses may be used to evaluate comprehension as well as decoding. This is accomplished by having the student answer questions after reading the passage. Comprehension is influenced by the type of passage, expository, narrative, poetry, or plays. Therefore, it is important

to include a variety of passage texts in informal evaluation.

Criterion-referenced Tests. Criterion-referenced tests assess mastery of specific skills in the reading curriculum. Many of these types of tests are available commercially or they may be developed statewide or within school systems. Criterion-referenced diagnostic reading tests provide an analysis of strengths and weaknesses, but do not compare students to others (Salvia & Ysseldyke, 1988). These tests are closely related to instructional objectives and vary in type and sequence of reading skills they sample. Examples of such tests are the Standardized Reading Inventory (Newcomer, 1986) and the Prescriptive Reading Inventory System (CTB/McGraw-Hill, 1980). A question one must ask about these types of tests is that of validity and reliability since there are no standardization data and different individuals have different views of the skills of reading (McLoughlin & Lewis, 1986).

Cloze Procedures. The cloze procedure (Bormuth, 1968; Jongsma, 1971) has been used as an informal measure to assess difficulty level of materials as well as the student's reading competence. This procedure is accomplished by selecting a reading passage of approximately 250 words. The first and last sentences are left in their original form. In the rest of the passage, every fifth word is deleted. Students then read the passage. Students should supply 44 to 57% of the missing words if the passage is at their appropriate instructional level (Bormuth, 1968). Cloze techniques are also used to evaluate comprehension. These tasks require the student to rely on passage context for meaning. Cloze procedures may be used to evaluate the appropriateness of various texts for specific readers also.

Clinical Reading Interviews. The clinical reading interview is a type of diagnostic teaching procedure (McLoughlin & Lewis, 1986). The format includes observation of the students during reading and interviewing them about their reading strategies, comprehension of the material, and prior knowledge. The examiner/teacher asks the student to read and then offers a variety of techniques such as prompts, reading in unison, or reading the sentences prior to the reader. These kinds of assessments evaluate the interaction between the reader and the text in a way that is not accomplished with formal assessments. Questionnaires and interviews may be used to assess students' attitudes, views of the reading process, ideas on their reading ability, their preferences in reading topics and formats, work-study habits, attitude, views, and opinions. All of these variables are important to assess if one accepts the contemporary view of prior knowledge as a key to reading comprehension.

ASSESSMENT OF THE MATERIALS AND CLASSROOM

It is critical to go beyond reader variables and consider the contexts within which the student is required to perform. Therefore, the instructional environment should be assessed as well as the reader (McLoughlin & Lewis, 1986). Many programs use basal readers as the focus of their reading program. These

programs include a set of graded texts from beginning reading levels to sixth or eighth grade level. The focus of the basal readers should be assessed. For example, does the basal series stress a bottom-up, top-down, or interactive perspective? It is also important to know how the reading selections relate to the students' experiential background. The accompanying workbooks should be evaluated as well. Additionally, it is important to assess the skills emphasized (e.g., decoding, sight vocabulary, structural analysis, and contextual analysis). The instructional techniques and learning activities of the classroom should be evaluated as well as whether students are expected to read silently or orally.

In analyzing the materials, it is appropriate to consider the style, readability, and format of texts other than reading texts (Samuels, 1983). When topics are familiar to students, they can more easily relate them to prior knowledge. Text formats should be organized for ease in reading for inexperienced readers. Ease in text reading can be aided by use of summaries, headings, and questions.

Readability formulas exist to aid teachers in determining reading levels of texts. Generally, these formulas estimate readability on the basis of sentence length and number of syllables per word (Fry, 1968). Readability is generally stated as grade level. This can be helpful when selecting content area textbooks such as science, history, or geography although the organizational, semantic, and syntactic complexity are important in selections of materials as well. Unfortunately, the concept of reading grade level assumes an underlying English base and may be a less helpful construct for hearing-impaired students who often do not have the same competence in English as normal-hearing students.

The interpersonal environment of the classroom should also be assessed (McLoughlin & Lewis, 1986). This involves the student-teacher interactions within the reading contexts. How the students respond to their own reading competencies and those of others can contribute to a comfortable or uncomfortable reading environment. The amount of time spent in actual reading rather than reading skills development is also of concern. Investigators have found that students with reading difficulties spend less time reading in the classroom than do more proficient readers (Zigmond, Vallecorsa, & Leinhardt, 1980). The physical environment such as seating arrangements, lighting, choice and variety of reading materials, and availability of individual work space should be evaluated as well (McLoughlin & Lewis, 1986).

Research on the reading process shows the significance of the following: (a) active participation of the reader (Goodman, 1976; Harker, 1987; Smith, 1972), (b) use of background or prior knowledge to predict text content (Hansen, 1981; Hansen & Pearson, 1982), (c) use of explicit passage structure knowledge or text formats (Meyer & Rice, 1984; Taylor, 1982), (d) awareness and use of reading strategies which aid in the move from "learning to read" to "reading to learn" (Brown, 1985), and (e) effect of schema knowledge on comprehension and recall (Anderson, 1977; Mandler & Johnson, 1977; Rumelhart, 1975; Stein & Glenn, 1979). Assessment should deal with (a) the text

(content, structure, length, amount of new information, and the language used), (b) the reader (prior knowledge, motivation, interests, and strategies), (c) the task demands required by assessment and instruction, (d) the setting, and (e) the materials being used.

Despite recent research about the reading process, assessment of reading remains at the skills (bottom-up) level with attempts to "assess process-oriented learning with product-oriented measures" (Squire, 1987, p. 724). New data and theories about the reading process should make one question the validity of most existing reading measures. It is possible to discriminate performance differences between individuals, but the existence of skill hierarchies has not been validated (Johnston, 1981). Unfortunately, tests continue to test bottom-up skills and many instructional programs continue to use a skill format such as found in basal readers and accompanying workbooks.

READING ASSESSMENT OF HEARING-IMPAIRED STUDENTS

Much of the available assessment information about hearing-impaired children has reiterated their reading achievement deficiencies rather than delineated the specifics of their reading strengths and weaknesses. LaSasso (1978) surveyed U.S. programs for education of hearing-impaired students and determined that most assessment measures, reading approaches, and instructional materials in use were developed for students with normal hearing. Basal readers and language experience approaches were the most frequently cited teaching methodologies used. In a follow-up study, LaSasso (1987) determined that a large proportion (83%) of programs indicated that they calculated students' reading levels. Determination of reading grade level is based on an assumption of English language competence. Grade level is determined by strategies developed for normal-hearing children. These strategies do not take into account the language (especially syntactic/semantic) difficulties of hearing-impaired individuals and tend to inflate reading grade level. The majority of programs (86%) used standardized achievement tests (usually some form of the SAT) to determine reading level. The major purposes which programs gave for calculating reading levels were (a) to make instructional material selections, (b) to meet IEP requirements, (c) to measure reading improvement, and (d) to meet parent requests.

LaSasso (1987) suggested that poor reading test performance may be related to deficiencies in reading instruction. Her findings show:

1. Standardized reading test results are commonly used to make instructional decisions although nearly two-fifths of the programs surveyed considered these tests invalid reading measures.
2. Preparation of program administrators in reading was lacking.
3. A lack of coordination in programs using the language experience ap-

proach was common.

4. Basal readers (appropriate for 6- to 12-year-old students) were used with high school hearing-impaired students.

In the 478 programs LaSasso (1987) surveyed, the following were considered to be the most valid measures of reading level: (a) informal reading inventories (37%), (b) standardized reading achievement tests (25%), (c) teacher judgment (15%), (d) placement tests accompanying basal readers (10%), and (e) cloze tests (1%). An even higher proportion of respondents (39%) considered standardized reading achievement tests as least valid. While many programs considered standardized tests to be invalid, they were used frequently. LaSasso (1987) reported the following order of use of specific standardized tests:

1982 Stanford Achievement Test - Hearing Impaired (45%)
1974 SAT-HI; 1982 SAT (16%)
Woodcock Reading Mastery Test (24%)
Test of Syntactic Abilities (21%)
Wide Range Achievement Test (15%)
California Achievement Test (15%)
Gates-MacGinitie Reading Test (15%)
Metropolitan Achievement Test (9%)
Iowa Test of Basic Skills (8%)

Numerous informal reading inventories were identified as being used. Most of the programs which LaSasso surveyed also reported they did not use readability formulas. How these programs match the reading level of the texts to the reading level of the students was a puzzle.

LIMITATIONS OF TESTS DEVELOPED FOR NORMAL-HEARING STUDENTS

Obviously, there are major problems associated with using tests that were developed for normal-hearing children with hearing-impaired children. This issue is recognized and criteria for appropriate test selection are established by P.L. 94-142, Education for All Handicapped Children Act of 1975. The law established procedural safeguards to prevent inappropriate assessment. The specific areas of concern with regard to reading testing with hearing-impaired children are:

1. Nondiscriminatory testing by qualified personnel is mandatory to prevent bias. When English is not the native language, testing should be done in a student's native language. In some cases, this may be American Sign Language for hearing-impaired students. In other cases, no identifiable language can be considered the native language of the hearing-impaired student. Qualified examiners who are competent in the native language of hearing-impaired students are not plen-

tiful.

2. Assessment tools should be technically adequate, administered by trained professionals, and valid for the purposes for which they are used. This certainly raises questions about the frequent use of standardized tests developed for normal-hearing individuals. Only in rare instances do norms for hearing-impaired students exist (e.g., the SAT-HI). The technical quality of many tests is questionable and the underlying assumptions are not met. Because the yearly growth in reading and the standard error on the achievement tests are similar for hearing-impaired students, no year-to-year changes may be observed with confidence (King & Quigley, 1985).
3. Testing must be comprehensive and multidisciplinary with no single measure used to determine placement. Most research evaluating the reading achievement of hearing-impaired students has involved use of achievement tests with a reading component. These are not comprehensive, nor do they provide information about strengths and weaknesses to provide instructional directions.

As King and Quigley (1985) have observed, the paucity of assessment measures standardized on a hearing-impaired population has resulted in development of administration modification for some tests or specific test development for hearing-impaired individuals (e.g., the Test of Syntactic Abilities).

Most tests developed for normal-hearing students have a sight word vocabulary test. With these tests it is assumed that an individual should recognize common words, that is, match the representation of the word stored in memory with the printed form out of context (Ewoldt, 1982). Hearing-impaired students, because of their limited vocabulary (Odom et al., 1967; Rosenstein & MacGinitie, 1969) require more context, making this type of test problematic for this group.

Syntactic abilities tests such as the Test of Syntactic Abilities (Quigley, Steinkamp, Power, & Jones, 1978) are more commonly used with hearing-impaired individuals to demonstrate a relationship between language knowledge and reading as well as to select or devise reading materials based on hypothesized linguistic level (Ewoldt, 1987). While the test was developed to determine syntactic comprehension, Ewoldt (1982) questioned whether children who select correct answers really understand the meaning of the sentences, given the multiple choice format which allows guessing.

Oral reading tests such as the Gray Oral Reading Test (Gray & Robinson, 1967) or the Gilmore Oral Reading Test (Gilmore & Gilmore, 1968) are generally inappropriate for hearing-impaired students because the scores and, therefore, reading levels are determined by errors in reading aloud (Ewoldt, 1982). Additionally, the same author notes that these tests generally do not provide enough context for hearing-impaired students and comprehension measurement is inadequate. Many questions are designed to evaluate literal

rather than inferential comprehension. Ewoldt (1982) views these tests as tests of syntactic proficiency rather than comprehension of reading.

These arguments are not presented to conclude that hearing-impaired students' reading test performance should never be compared with that of normal-hearing students. These tests can be viewed as general gauges of reading progress. The significant issue is how to use assessment tools for the diagnostic purpose of identifying strengths, weaknesses, and reading strategies in order to improve reading performance. Generally, norm-referenced tests developed for normal-hearing students do not provide this information unless used by well-trained, experienced examiners. Tests developed specifically for hearing-impaired students such as the Reading Milestones Placement Test Battery (King & Quigley, 1984) are more effective in providing diagnostic information.

ALTERNATIVES TO STANDARDIZED TESTING

A logical alternative to the use of norm-referenced or standardized testing for hearing-impaired students is to emphasize greater use of informal measures which provide detailed information about performance without simply comparing hearing-impaired students to their normal-hearing peers. Ewoldt (1987) suggests several viable alternatives to standardized testing of reading of hearing-impaired individuals. Included in these alternatives are greater attention to prior knowledge which can be gained through parent and teacher reports of their children reading. Parents can provide information about whether children read at home as well as the type of reading materials most frequently selected, providing prior knowledge information for selection of topics at school. Teacher observations of children reading (outside scheduled reading instructional times) can be more revealing than a standardized test about a student's reading strategies as well as topic and format preferences.

Ewoldt (1987) also suggests the use of miscue analysis. Reading miscue analysis was originally developed for evaluation of normal-hearing readers (Goodman & Burke, 1972). This procedure involves observation of the child during reading. Miscues are judged in terms of whether the meaning or syntax of the sentence is violated. It is assumed that when a miscue occurs, the reader has made a hypothesis which does not match the printed forms. Ewoldt (1982, 1987) has developed an assessment strategy that incorporates several helpful features. The procedure is used after an interactive, well-constructed story on a familiar topic has been selected. The story should be complete and approximately one grade level above that of the student. The child reads the story (orally or signed), closes the book, and retells the story immediately while being videotaped. Questions may be asked after the retelling, but only on topics already mentioned by the student. The examiner then views and transcribes the videotape. Miscues from the reading are coded and a series of questions addressed to each miscue to evaluate syntactic and semantic divergence as well as sound, graphic, and sign similarities. The retelling is analyzed to deter-

mine whether the major story components are included (schema assessment). Follow-up cloze procedures may be used to evaluate the student's use of semantic/syntactic cues to make predictions about the print. This is but one example of how informal measures developed for normal-hearing students may yield valuable information about the reading process used by hearing-impaired students.

IMPROVING READING ASSESSMENT

It seems an appropriate time to move away from the traditional modes of reading assessment into contemporary frameworks based on current knowledge of the reading process for normal-hearing and hearing-impaired students. Paul (1985) observed that reading difficulties are not restricted to hearing-impaired students. Assessment should focus on the active role of the reader using print cues to construct a model of the text's meaning, a strategic rather than a skill view. This can take the form of teachers' observing and interacting with students as they read texts to evaluate how meaning is constructed (Valencia & Pearson, 1987).

Reading is a language process. Therefore, assessment in pragmatic, semantic, syntactic, and morphologic areas should be completed using tests designed for this purpose. Suggestions for areas to be included in improved reading assessments follow:

1. Because reading is considered a communicative act, more attention to literacy socialization such as knowledge of book parts and identification of letters, words, and function of spaces is advised.
2. Greater attention to the reader's prior knowledge should help in selection of topics and materials.
3. More investigation of the strategies the reader uses while reading should occur.
4. A combination of top-down and bottom-up assessment may provide more information than reliance on one to the exclusion of the other.
5. Generalization of learning from one type of text to another (e.g., narrative to expository) can be facilitated by the teacher (Henk, 1987; Schuele & Van Kleeck, 1987; Valencia & Pearson, 1987; Wittrock, 1987; Van Kleeck & Schuele, 1987; Paratore & Indrisano, 1987; Pearson & Spiro, 1980).

Assessment based on current research about the reading process could yield productive information in the design of reading instructional programs for hearing-impaired individuals. Kretschmer (1982) bemoaned the paucity of research examining successful instructional practices for hearing-impaired individuals. Reading instruction for both normal-hearing and hearing-impaired children has stressed form over function, sacrificing meaning for struc-

ture. As assessment procedures become more closely aligned with current knowledge, the impact on instruction will follow. When the author-reader relationship can be viewed as a communicative, social interaction with an implicit contract as in spoken language, perhaps it will be possible to find ways to assess and improve the reading competence of hearing-impaired individuals.

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Chapter 7

Assessing the Writing Abilities of Hearing-Impaired Children

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The print medium (writing-reading) is recognized as a hallmark of our culture. We live in a world in which the use of print abounds and impacts on all aspects of our daily lives. The ability to understand the printed word and the ability to produce written messages are crucial to effective participation in society. That is, writing-reading is one means of communication used to accomplish social interaction; to gain knowledge; to store information; to express personal needs, wants, opinions (Smith, 1977). Mastery of the abilities to use writing-reading are essential for the development of full communication systems.

Printed forms of language also have been recognized as prime sources of information about language. Because of this primacy status and because easy access to oral language is denied to hearing-impaired individuals, print materials have been, and continue to be, used in educational programs for the hearing impaired (Quigley & Kretschmer, 1982). Such use has a two-pronged goal: (a) to help stimulate, foster, and refine language acquisition and develop-

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ment in general (spoken and/or signed); and (b) to promote the development of writing-reading. Despite the acknowledged importance of writing-reading as a tool in language acquisition and as an end in itself, hearing-impaired children, by and large, do not demonstrate adequate writing-reading abilities (Kretschmer & Kretschmer, 1978; Moores, 1987; Quigley & Paul, 1984).

In order to develop educational programs which can increase the writing-reading abilities of hearing-impaired children it is necessary to assess their present ability levels, to understand the theoretical and knowledge foundations of writing-reading development, and to incorporate this understanding into instructional strategies. The purpose of this chapter is to examine the assessment of writing abilities of hearing-impaired children. This examination is divided into three sections. In the first section, the current process-based view of the acquisition and development of writing will be explained. The next section briefly reviews past and present information on the written language abilities of hearing-impaired children. Finally, a blueprint for assessment needs and practices (in classroom and clinical settings) will be presented in the last section.

THE ACQUISITION AND DEVELOPMENT OF WRITING

Writing is a socio-culturally based, linguistic means of communication which involves the creation and recording of messages to fulfill a variety of purposes (Smith, 1983; Taylor & Vawter, 1978). As a means of communication, writing shares features in common with other linguistic means of communication specifically, speaking-listening and sending-receiving sign language. That is, writing is a rule governed system that uses a specific set of agreed upon symbols to code messages. The rules which govern writing operate at orthographic, semantic-syntactic, pragmatic, and discourse levels (Frederiksen & Dominici, 1981).

In general, the rules at the orthographic level specify: (a) the nature of the coding mechanism (e.g., letters of the alphabet, numerals, punctuation marks), (b) production tolerance variations in forming the symbols, and (c) how symbols (letters) can be combined into larger units (e.g., syllables and words) (Read, 1980). The semantic-syntactic rules are concerned with the organization of content and meaning (semantic) and how this content can be expressed using standard syntactic structures (Olson & Torrance, 1981). The pragmatic level organizes the intents and purposes for creating messages (Lloyd-Jones, 1981; Smith, 1977). The discourse level describes macro structures for organizing written messages (Brewer, 1980; deBeaugrande, 1984; van Dijk, 1980). Figure 1 diagrams the relationships among the various means of communication and their common features.

While knowledge and understanding of the linguistic rule systems is necessary, it is not sufficient for the acquisition and development of writing in children. Beyond knowing linguistic rules, writing also involves interrelation-

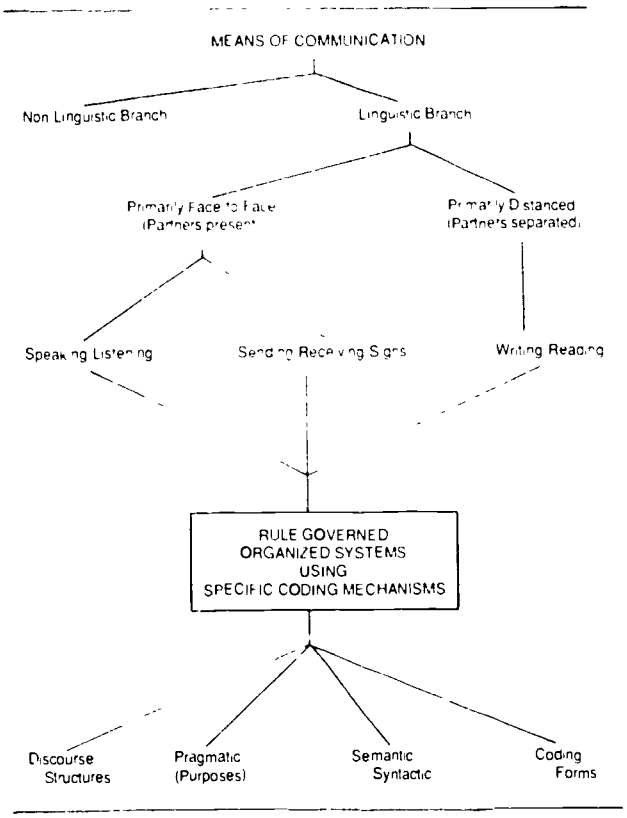

Figure 1. Tree diagram showing the relationships among the rule governed, organized means of communication. *Note.* From *Creating Stories as a Means of Communication* by R. Truax and B. Edwards, 1984, Short course presented at the International Convention of the Alexander Graham Bell Association for the Deaf, Portland, OR. Copyright 1984 by R. Truax. Adapted by permission.

ships in social and cognitive planes. In the social plane, children discover the place and value of writing within social contexts — home, school, community, commercial/business world — as well as the purposes served by writing (Taylor, 1983). The cognitive plane deals with learning, thinking, and organizing experiences, people, and things in meaningful ways. This occurs as a result of exposure to, explorations in, and experimentation with the environment (Bruner, 1978). The task of children acquiring writing, then, is to discover the interrelationships among the social, linguistic, and cognitive planes and to formulate the "rules of operation" for writing as a means of communication.

In general, children learn about writing through experiences. The key to this experiential learning is children's active involvement in the environment and their efforts to "make sense out of" their experiences (Bartlett, 1932). Ex-

periential learning is cyclic and subject to modifications as experiences and understanding of those experiences change (Flavell, 1977). In essence, children are juggling and balancing their knowledge *of* the world, their experiences *in* the world, and the world's actions *on* them (Bruner, 1978; Kagan, 1978; Piaget, 1969; Vygotsky, 1962). Moreover, this type of learning is most effective when it is self-motivated and when it is based on real life situations (Lefrancois, 1975; Mussen, 1973).

Taylor's (1982, 1983) accounts of the emergence of writing in preschool aged children fit the above description of experiential learning. She reported that children's early encounters with print allowed them to sort out the uses of print in their worlds and how it related to the users (producers and consumers) of print. Teale (1982) suggested that such encounters with print serve to stimulate interest and act as catalysts for development. Similar experiences with print in meaningful contexts and the subsequent pursuit of writing-reading are reported by Goodman (1982), Schieffelin and Cochran-Smith (1984), and Baghban (1984). Interestingly, no single pattern or course of writing development emerged from these studies. It appears that how children progress in the acquisition of writing is dependent upon the interplay among the social, linguistic, and cognitive planes (Goelman, Oberg, & Smith, 1984; King & Rentel, 1981). Despite this highly individualistic development, it is possible to identify certain behaviors in children which indicate progress in acquiring and developing writing-reading competence.

Early Writing Development

Many accounts of early writing behavior suggest that children find marks on paper and their ability to make such marks attractive as early as 14 to 18 months of age (Gibson & Yonas, 1967). Given a supportive environment in which writing is valued and used, progress from early accidental marking should evolve into more frequent random marking. These random markings have been variously referred to as "indeterminate scribbles" (Kellogg, 1970), "undifferentiated scribbles" (Gardner, 1980), or "disordered scribbles" (Lowenfeld & Brittain, 1982). As this random scribbling activity increases, children move to a level of controlled scribbling in which certain patterns of production begin to appear (Gardner, 1980). As controlled scribbling is established, children begin to name their scribbles. That is, the scribbles stand for something. While the label attached to the scribble may be idiosyncratic and not remain stable, the scribbled production takes on the quality of a sign or symbol (Vygotsky, 1978). This is a critical juncture for further writing development

Clay (1975) believes that once children develop this notion of symbol, they soon discover that these symbols can be used to create messages. Further, she argues that through such message creation children learn seven basic principles which reflect certain conventions of writing. These principles are enumerated in Table 1.

Simultaneous to this learning of conventions, children also discover that

Table 1

Clay's Seven Basic Principles Which Reflect Conventions of Writing

1 **THE RECURRING PRINCIPLE**
The essence of this principle is that children develop certain patterns which they use over and over again The repetition of basic form is important in letter formation.

2 **THE PRINCIPLES OF DIRECTIONALITY**
The cornerstones of directionality in the English writing system are left to right movement across the page and top to bottom progression down the page. At a more minute level, directionality is also important in letter formation.

3. **THE GENERATING PRINCIPLE**
This principle draws upon and extends recurring productions Children combine a limited number of forms to generate longer pieces of writing. This is an important step in building messages.

4. **THE INVENTORY PRINCIPLE**
This is akin to "taking stock " It is usually lists of letters, numbers, or even words

5. **THE CONTRASTIVE PRINCIPLE**
Entailed in this principle is the notion that children can note similarities and differences. This serves as a basis for distinguishing letter forms, words, and so forth

6 **THE ABBREVIATION PRINCIPLE**
This refers to the use of one symbol to stand for an entire word or sentence.

7. **THE PRINCIPLES OF PAGE ARRANGEMENT**
Page arrangement comes into play when children attempt to fit words and/or sentences into the confined space of a page or, more specifically, a single line. This ranges from finding an appropriate starting point on the page, to keeping on the horizontal, breaking words, dealing with leftover words, and setting margins

Note From *What Did I Write?* by M. Clay, 1975, Portsmouth, NH Heinemann

messages can be used to express feelings, to organize and recc iformation, and to shape behavior (Dyson, 1983). The children that Cl.. and Dyson studied demonstrated the conventions of writing and the purposeful use of messages by 5 years of age. Once children are creating messages to serve specific purposes it is important to look at the development of the composing process and dis course structures.

The Composing Process

In a study of 3- and 4-year-old children, Lamme and Childers (1983) noted that the type of writing session (personal communication vs recording information in book form) influenced the composing act. Writing for personal com-

munication (e.g., letters, cards) seemed to be a social activity. The children wrote to an identified audience using letters of the alphabet, words, and their own names. They also sought and gave help to each other. In book writing sessions, the children used more scribbling, traced letters, and sought technical assistance from the teacher. Harste (1981) noted similar composing differences in what he termed "stories" and "personal letters." Thus, it would seem that, even at very young ages, the composing process differs depending on the audience addressed and the overall demands of the writing task

Similar composing process differences in first graders and other elementary aged children have been detailed by Graves (1975, 1983) and Calkins (1983, 1986). The sophistication of the composing process in these children was linked to the children's awareness of audience needs (Graves, 1983), and their understanding and mastery of the rule governance systems of writing (Hansen, Newkirk, & Graves, 1985). The impetus for writing was the desire to share information, to express feelings, and to explore knowledge rather than a need for technically correct form. Technical refinement grew out of continued, self-generated writing efforts. By all accounts, the composing processes of children, at least through sixth grade, did not conform to the traditionally identified phases of pre-writing, writing, and revising generally associated with models of the adult composing process (Emig, 1971; Flower & Hayes, 1981; Nold, 1981). Children were more flexible, less restrictive in the ways in which they approached writing tasks. Selzer (1984), however, argued that adult writers also show flexibility in the composing process depending on the demands of the writing task. Beyond these general descriptions of composing processes, little is known about how children acquire and master the subtleties of discourse structures.

Discourse Structures

Information on children's acquisition and subsequent mastery of discourse structures (e.g., stories, poems, letters, and essays) in their writing is scanty. What is known is a result of naturalistic investigations of children as they write. (See for example: Calkins, 1986; Graves, 1975; Gundlach, 1982; Hansen, Newkirk, & Graves, 1985; Richardson, Calnan, Essen, & Lambert, 1975.) As early as kindergarten and first grade, young writers recognize that written texts have coherent structures. At first, this may be as simplified as a beginning-middle-end arrangement marked by stock openings ("Once upon a time") and closings ("The end.") (Gundlach, Litowitz, & Moses, 1979). As children age, their development as writers is reflected in their ability: (a) to recognize audience needs, (b) to write about more and more abstract subjects, and (c) to use increasingly sophisticated texts (Britton, Burgess, Martin, McLeod, & Rosen, 1975; Calkins, 1983; Emig, 1971; Graves, 1983). This progress is not necessarily smooth for any one child or consistent across same aged children. As Gundlach (1981) pointed out:

> There is often a great range of structural complexity among the compositions produced by children the same age, and sometimes considerable variation in the structure of compositions produced by the same child within what would seem to be a single *moment* of development (pp 140-141).

This sense of variation within and across children as they develop as writers is a common theme.

Another common theme is that children develop as writers by writing. That is, children learn about various discourse structures by using them in meaningful ways to explore topics of interest to them (Graves, 1983; Murray, 1982, 1984). This exploration, and thus development, is mediated and guided by more experienced users of writing (teachers, parents, mentors). Such views are consistent with a new rhetoric which sees writing as an activity for creating meaning. (See Laine & Schultz, 1985, for a concise summary of this new notion of rhetoric.)

On a more theoretical level, Halliday and Hasan (1976) identified structures which tie texts together into cohesive wholes. While this is valuable information, they did not indicate how children acquire competence in using such text cohesive devices. Similarly, Stein and Glenn (1978) and Mandler and Johnson (1977), among others, have developed detailed story grammars to describe the inherent structure of narratives. Shaughnessy (1977) provides suggestions for teachers of college level writers which incorporate much of Halliday and Hasan's information. Other guides for teachers of writing in elementary and secondary schools are available (e.g., Moffett & Wagner, 1983; Tchudi & Tchudi, 1984). In short, it is possible to describe discourse structures, to distinguish good from poor examples, and to devise instructional strategies for improving writing; however, a clear understanding of how children acquire mastery of and control in producing such discourse has not emerged as yet.

In short, writing should be viewed as a means of communication. It appears that children come to know about writing and come to use writing in much the same way that they develop other means of communication (especially interpersonal communication). Through dynamic involvement in their world, children discover the cognitive, linguistic, and social underpinnings of writing. Unfortunately, the details of how children acquire and develop competence in using written language remain largely undiscovered. More attention has been focused on the early development of writing. As a result, certain behaviors denoting progress can be gleaned from investigations of young children's writing. One possible organization of these "progress markers" is provided in Table 2.

Beyond these early progress markers, development, perhaps, is best noted in the emergence of certain discourse structures, awareness of audience, and in children's increased linguistic versatility in expressing thoughts, feelings, and information in recognizable fashions. Table 3 lists key hallmarks which signal continued development in children's writing abilities.

Table 2

Progress Markers in Early Writing Development as Seen in the Behaviors of Children

DISCOVERY OF THE IMPLEMENTS OF WRITING
ACCIDENTAL MARKING ON SURFACES
RANDOM MARKING
CONTROLLED SCRIBBLING
NAMED SCRIBBLES
WAVY LINE WRITING
LETTER-LIKE APPROXIMATIONS
RECOGNIZABLE LETTERS
CLAY'S (1975) PRINCIPLES See Table 1.
COORDINATION OF PICTURES AND PRINT Print may be wavy lines, letter-like approximations, recognizable letters, words, or some combination of these
DIFFERENTIATION OF PICTURES AND PRINT At this juncture children realize that the print carries the meaning

It is important to keep in mind that while development is sequential from less complex, less sophisticated usage to more sophisticated competence, no single course of development has been identified. The way in which children attain writing ability and the rate at which this occurs can vary from child to child. At present, the most fruitful lines of inquiry view writing as both process and product. That is, written products are created by concerted action(s) of the person producing the writing. This process-product marriage in writing creates unique issues for assessing writing ability. Prior to discussing assessment issues, a review of past and present information on the status of writing ability in hearing-impaired children is taken up in the next section.

HISTORICAL REVIEW

Not surprisingly, investigations (and assessment) of writing abilities in hearing-impaired children have paralleled investigations of similar abilities in normal-hearing children. In addition, these investigations reflect the theories and understanding of language acquisition prevalent at the time they were conducted. Thus, early investigations of the writing ability of hearing-impaired children were product oriented. The investigations tended to report numerical data. That is, the written productions of subjects were broken down into units which could be counted or quantified in some fashion. Early studies generally consisted of having hearing-impaired subjects generate a "spontaneous" written sample from a stimulus picture, researcher selected topic, or both. The

Table 3

Indicators of Continued Development of Writing
Which are Noted in Children's Written Productions

EMERGENCE OF STORY STRUCTURE
- Use of stock openings (e.g., "This is about", "Once upon a time")
- Use of stock closings (e.g., "The End"; "They all lived happily ever after")
- Sequencing of events
- True beginning-middle-end organization and sequencing

REALIZATION OF AUDIENCE
- Self as audience
- Immediate other as audience (classmate, teacher, relative)
- The "unseen/unknown" audience

USE OF TEXT COHESION DEVICES
- Within-sentence cohesion
- Anaphoric referring
- Between-sentence cohesion/referring
- Within-paragraph cohesion
- Across-paragraph cohesion
- Whole discourse cohesion

USE OF ADDITIONAL DISCOURSE STRUCTURES
- General
  - Letters
  - Signs/Posters
  - Lists (shopping, clothes, supplies)
  - Schedules
  - Forms
- Literary and School-Based
  - Essays
  - Poems
  - Expository texts
  - Science Lab Reports
  - Newspaper

SELF AND PEER CRITIQUE
- Self review-editing-revising
- Peer review-editing

completed products were then analyzed by determining word counts; by identifying word classes; and by quantifying various error classes such as omissions, substitutions, additions, and word order changes (Myklebust, 1965; Reay, 1946; Schulze, 1965; Thompson, 1936). Simmons (1962) and Tervoort (1967) used type-token ratios (TTR) to examine word usage flexibility in hearing-impaired children. A type-token ratio is determined by dividing the number of different words used by the total number of words in the sample collected.

As a counter-balance to these quantitative analyses, other investigators employed traditional grammatical analysis strategies. Heider and Heider (1940) used phrase structure rules to examine the compositions of normal-

hearing and hearing-impaired children. They reported that hearing-impaired writers tended to stick with subject-verb-object frames and were less flexible in their use of more complex structures than their normal-hearing counterparts. Walter (1955, 1959) charted a five-stage developmental sequence based on hearing-impaired writers' mastery, control, and use of simple(noun phrases) to more complex (compounding sentences) grammatical structures. While the Heider and Heider and the Walter studies were more descriptive of the writing abilities of hearing-impaired children they still were product oriented and focused on the errors or limitations in the written products.

The advancement of generative-transformational grammar (Chomsky, 1957, 1965), case grammar (Chafe, 1970), and propositional theory (Kintsch, 1974) signaled a change in how the written language of hearing-impaired children was examined. Taylor (1970) employed the T-unit as an index of complexity to examine the written language of hearing-impaired children. She followed Hunt's (1965) definition of the T-unit. That is, a T-unit is "one main clause plus all the subordinate clauses attached to or embedded in it" (Hunt, 1965, p. 141). Using T-unit measures, it was possible to analyze hearing-impaired writers' understanding of sentence generation and sentence combining rules. Kretschmer (1972) and Kretschmer and Kretschmer (1978) used generative transformational models to provide robust analyses of the semantic relationships, syntactic devices, and narrative structures found in the compositions of hearing-impaired writers. Both Taylor and the Kretschmers reported similar patterns of progression for hearing-impaired children in their mastery of syntactic rules. Their subjects progressed from less complex production rules (noun phrase/verb phrase) to more complex sentence combining rules. Taylor's and the Kretschmers' results were confirmed by Powers and Wilgus (1983).

In a slightly different vein, Yoshinaga (1983) applied clause development, propositional, and text cohesion analyses to the written narratives of normal-hearing and hearing-impaired children in an effort to examine the relationship between form and meaning. Her studies showed significant differences between the syntactic and semantic capabilities of the authors. For the hearing-impaired subjects, syntactic analyses (clause development) showed improvement with age similar to that previously reviewed. On the other hand, semantic analyses (propositional and text cohesion) revealed a fairly smooth progression between 10 and 12 years of age with a drop in performance beyond age 12 years. In all measures, the hearing-impaired subjects' performance was much lower than that of the normal-hearing children (Yoshinaga-Itano & Snyder, 1985).

Beginning in the mid 1970s, the focus on product-based analyses of written language of normal-hearing children began to shift to process-oriented approaches. Researchers began to examine not just the finished products, but also the processes which entered into the creation of those products (Calkins, 1983; Clay, 1975; Ferreiro & Teberosky, 1979; Frederiksen & Dominici, 1981; Graves, 1975). Slowly, a similar shift of focus in the investigation of the written

language of hearing-impaired children occurred. Ivimey (1976) conducted a longitudinal examination of one hearing-impaired child's written and interpersonal communication productions. He reported a mismatch between the two modes of communication. That is, there seemed to be an interaction between the syntactic structures used (product) and the discourse-pragmatic demands of the task (process). This process-product interaction was supported in Ivimey and Lachterman's (1980) broader based study.

Beyond these initial investigations, there is little process based information on how hearing-impaired children write. In case studies of different aged children, Gormley (1981) and Mason (1982) reported that increased emphasis on the process of writing rather than the syntactic correctness and mechanical (spelling, punctuation, letter formation, etc.) accuracy of the product resulted in more interest in writing and improved writing. Similarly, studio based approaches to writing produced increased enthusiasm for writing and resulted in improved writing skills (Truax, 1985; Truax & Edwards, 1984). Even at the kindergarten level it has been shown that hearing-impaired children attend more to message construction (process) than form (product) in their early writing (Conway, 1985b). In addition Conway (1985a) reported that young hearing-impaired children's acquisition and development of the conventions of writing parallels that reported for normal-hearing children. Moreover, it appeared that there was an interplay among why the children wrote (purpose), how the children wrote (process), and what the finished product looked like (Conway, 1985a).

Throughout the era covered in the preceeding review (the 1930s through the present), formal assessment strategies have been based on the data collection and analysis procedures reported in research studies. The most comprehensive and most widely recognized is the Picture Story Language Test (Myklebust, 1965). Despite its notoriety, this test has two major shortcomings. First, it is product specific and analyzes writing on the basis of word counts, syntactical correctness, and errors of omission and commission. There is no attempt to describe how the written products were created or what purposes writing could serve. Second, the product to be analyzed is a single sample produced in response to a stimulus picture and the direction to write a story about the picture. Multiple samples reflecting various discourse-pragmatic tasks are not available. Thus, only a limited view of writing ability based on externally imposed constraints is provided.

Given the expanding understanding of writing as a process, now is an opportune time to devise assessment strategies and procedures based on this knowledge. Guidelines for collecting and analyzing the writing of hearing-impaired children are presented in the next section.

ASSESSING WRITING ABILITY IN HEARING-IMPAIRED CHILDREN

Assessment is the systematic collection of data regarding student behavior, performance, skills, and abilities in a specific knowledge domain (Gronlund, 1985). The collection of data should include both quantitative and qualitative information. Thus, no single data collection technique will satisfy this dual role. Quantitative information includes the analyses of evaluation data which can be reported in numerical terms. Qualitative information includes those data (observational notes, anecdotal records, checklists, interview schedules, video and audio tape recordings) which, when analyzed, provide a narrative description of performance. The blending of quantitative and qualitative information has proven effective in examining linguistic and school related tasks (Hymes, 1977). In the case of assessing writing ability, quantitative evaluation is most suited for product-based analyses while qualitative evaluation provides more information on the process side of writing. Both types of evaluation and the information they yield are important to a full understanding of writing abilities.

As noted above, most research, and by implication assessment, of the writing ability of hearing-impaired children has been product based. Analyses of product data resulted in various "counts" — of words, morphological markers, TTRs, T-units, grammatical structures, and so on. Even attempts at qualitative interpretations of this numerical information have resulted in enumeration of what hearing-impaired children cannot do; how productions of hearing-impaired children differ from the productions of their normal-hearing counterparts; and, recipes for improving "errors" revealed by these product-based counts (e.g., Anderson, Boren, Caniglia, Howard, & Krohn, 1980; Quigley & Paul, 1984; Quigley & Power, 1979).

The importance of such quantitative information should not be devalued. Rather, it should be recognized that it provides a view of only the product-based side of writing ability. Additional assessment strategies are needed to provide the process side view. Because of the multifaceted nature of process-product interrelationships, assessing the writing abilities of children is difficult (Hillocks, 1986,. Within this section, a blueprint which includes both quantitative and qualitative stategies for assessing the writing ability of hearing-impaired children will be presented. Since teachers are on the front line of evaluation (and instruction), the blueprint will be geared to school-based assessment. However, the strategies can be adapted for use in clinic-based settings as well. School-based and clinic-based assessment will be treated separately.

School-Based Assessment

The accumulation of sufficient samples of writing is essential to process-product evaluations. Classroom settings allow for the collection of multiple samples of written productions created under a variety of conditions and in

response to varied task demands. As samples are collected, analysis should focus on different aspects of the process-product interplay.

Product Analysis Procedures. Product analysis should begin with a detailed accounting of the task specifications, that is, the conditions under which the writing pieces were created. Task specification establishes the frame for further analysis. For example, if the corpus of pieces to be analyzed were produced under free-choice writing conditions in which content, audience, and presentation format were at the discretion of the writer, task specifications and product analysis should focus on multiple aspects in response to questions such as:

What discourse structure(s) was chosen (e.g., story, letter, list, note)?
How many examples of each discourse structure were produced?
What content was contained in the writing piece(s)?
What semantic-syntactic forms were used to express this content? (This would include identification of: propositions (major and minor); case grammar usage; syntactic structures used to express the propositions; and how often, how appropriately, and how accurately they were used.)
What text cohesion devices were evidenced? (This would be appropriate for pieces containing more than one line of text.)
What word level characteristics are present? (This would include graphic forms used [scribbles, letter-like approximations, recognizable letters, words]; morphological markers, spelling, type-token ratio, mean length of sentence [if sentences were used].)
What mechanical devices were used? (This would include punctuation, capitalization, arrangement of text in the writing space, formation of the letters.)

With the exception of discourse structure and content issues, comprehensive analysis procedures yielding responses to such questions are contained in Kretschmer and Kretschmer (1978) and Yoshinaga (1983). Discourse structure identification and analysis could be based on questions posed by Hasenstab and Laughton (1982), while content/topic analysis could be founded on Graves (1983) with the addition of "networking" information as described by Long and Aldersley (1984).

If the writing pieces were produced as a result of transcription exercises in which the children were directed to copy passages from the blackboard, analysis should focus on the mechanical aspects of letter formation and accuracy of transcription only. Analysis of discourse structure, content, semantic-syntactic relationships, and word level characteristics would be unwarranted. Thus, task specification shapes the product analysis procedures. Task specification is important to the process analysis, too.

Process Analysis Procedures. Process analysis procedures are based on the premise that the acquisition and development of writing is observable in the behaviors of the writers. As a first step, then, it is important to know under what conditions the writing was produced. Beyond this, teachers must be keen

observers of what children do as they write. It is equally important that teachers have some means of recording these observations for subsequent analysis and interpretation. Three particularly potent recording strategies are: (a) observational notes, (b) videotape recordings, and (c) interview schedules.

Observational notes consist of narrative descriptions of children's activities while engaged in writing. Such notes might record the location of the activity, whether it is singular or as part of a group, whether the topic/content of the writing was assigned or self-devised, what type of writing materials were used, how the completion of the task progressed. From analysis (reflective review) of these notes, a picture of the children as writers emerges. This analysis is filtered by the teacher's understanding of the development of writing and children's pursuit of writing as a means of communication. Furthermore, review of these notes should lead the teacher to identify certain behaviors which merit further evaluation.

Videotape recordings are an excellent way of preserving teacher-directed and/or child-directed writing events in the classroom. Visual, auditory, and motor aspects of behavior can be reviewed and analyzed. One drawback of videotape data is the time commitment necessary to analyze the data which depends on how detailed an analysis is to be completed. Realistically, multiple viewings of videotapes in order to complete fine-grained analyses of all aspects of behavior cannot be expected from classroom teachers. However, questions such as the following should be posed.

What behaviors are seen?
What behaviors are not seen?
How do the seen and unseen relate to anticipated/expected behaviors?
How does this information fit with information gathered from other sources (e.g., observational notes, product analyses)?

More detailed information on the collection and analysis of observational, interview, and videotaped data gathered in educational settings can be found in Spindler (1982) and Hammersley and Atkinson (1983).

Both observational notes and videotape analysis are complc .d from the teacher's point of view and, therefore, may be biased. Teacher interpretations must be supported further and augmented with information directly from the children. Formal and informal interviews are means of collecting such information. Informal conversations and questions about writing can occur naturally in the classroom setting as the opportunities arise. At other times, more formalized interviews can be conducted. Questions to include in such interviews can be derived from the work of King (1977), *The Reading Miscue Inventory* (Goodman & Burke, 1972); Graves (1983); and Harste, Woodward, and Burke (1984). Examples of general questions to ask are:

Can you write? How did you learn to write?
Do you know anyone who can write?

Does anyone write to you?
When (What) do you like to write?
How does writing help you (your mother, your father)?
If you were going to teach someone how to write, what would you do?
Name somebody you think is a good writer? Why?

Questions about a specific piece or pieces of writing could also be asked of the child. Such questioning adapted from various sources (Atwell, 1987; Calkins, 1986; Conway, 1985a; Graves, 1975; King & Rentel, 1981; Rhodes & Dudley-Marling, 1988) might include:

Tell me about this piece. (the written product).
What does this say?
How did you decide to write about . . . ?
What did you think about when writing this?
What will you do with this?

More detailed questioning about text cohesion devices (Halliday & Hasan, 1976; Shaughnessy, 1977), discourse structures used (Truax, 1985), narrative forms employed (Yoshinaga-Itano & Snyder, 1985), editing strategies (Graves, 1983; Nold, 1981), and the purposes for writing (Conway, 1985b; Smith, 1977; Taylor, 1982) could be pursued based on the sophistication of the children's writing and their ability to talk about their writing.

In short, the aim of classroom writing assessment should be to determine children's needs as they strive to become more competent users and producers of writing. As a result, classroom assessment should be viewed as continuous, on-going efforts directed at determining students' level(s) of performance. Accomplishing this aim is possible only by examining both the written products and the processes employed by children to create their written products. The traditional, long-term nature of classroom placement lends itself well to the on-going procedures outlined in the preceding paragraphs. It also should be noted that both the product and process assessment procedures require considerable understanding and background in linguistics and the development of writing on the part of the teacher. Such may not be the case for many teachers. This shortcoming should not preclude the use of these assessment procedures, but rather should reinforce the need for preservice and inservice training in these areas.

Clinic-Based Assessment

While classroom assessment is on-going, clinic-based assessment must be regarded as a "point in time measure" of student performance. Time constraints pose two serious problems to the clinical assessment of writing ability in hearing-impaired children. First, clinicians (examiners) do not have the opportunity to collect writing samples over extended periods of time and under a variety of conditions. Secondly, as a result of the first constraint, most assessment of

writing ability (when it is even included in the assessment regimen) is confined to product-based/quantitative measurement of very limited output. On top of the time issues must be added the lack of suitable test instruments for soliciting writing samples. This is not to say that clinical assessment of writing should be abandoned. Alternatives to and adaptations of classroom-based assessment strategies can be used.

Alternatives and Adaptations. Prior to scheduled clinic testing, the child's teacher/school and the parents could be requested to send samples of the child's written work. Such samples should include pieces written under a variety of conditions. A narrative description of the conditions under which the pieces were produced would have to accompany the samples. Such prior collection of samples should not exempt the child from being required to complete writing tasks during the clinical evaluation. Depending on the age of the child (and predicted ability), samples could be collected in a free-choice writing session in which the child is given writing implements and left on his/her own to produce some written piece. Or, the child might be requested to write a story or essay, for example, on some preselected topic. Or, early in the testing, the child might be asked to write on a self-determined topic. This draft could then be returned to the child at other times during the testing for review, revision, and/or redrafting. In any event, the child should be given more than one opportunity to write during the testing. Collecting written samples prior to the clinic testing and during the clinic testing should provide a suitable quantity of material to carry out product analyses. Previously outlined product analyses are equally suitable for use in clinic-based assessment.

Of even more advantage than just collecting samples from the teacher/school and home would be to assemble short (3-5 minutes), videotape recordings of the child while engaged in various writing activities. These could be made at school, at home, or both places. Of course, assembling such data would be dependent on the availability of recording equipment at school and home, its compatibility with equipment at the clinic, and the taping skills of the equipment operator. These are logistical problems not to be taken lightly. If the logistical problems can be overcome, the combination of videotaped data and actual written artifacts produced by the child would provide a good corpus of information on the writing abilities of the child. If collection of such external sources of video recordings is not feasible, videotape recordings of the child engaged in writing activities while in the clinic testing situation should be collected.

The information gathered from outside and inside the clinic setting can serve as the initiating point for formal and informal questioning of the child regarding his/her writing. The questions posed and the parameters for determining what questions to pose would be the same as those described for formal and informal interviewing in the classroom-based assessment. Furthermore, depending on the age of the child, review of the videotape data with the child may be appropriate. Questions and comments based on what is seen on the

videotape can lead to better understanding of how the child approaches writing tasks. All of this information will provide insights into the writing processes of the child.

All information gained from clinic-based assessments must be interpreted with caution. Writing samples will be collected under artificial conditions subject to numerous confounding variables inherent in the clinic setting. Even if clinic generated data are supplemented with outside data, caution should still be exercised. The clinician/examiner will have no control over the conditions under which such supplemental data are collected. Furthermore, information on writing ability must be juxtaposed with information on overall ability and ability to use other means of communication (speaking-listening; sending-receiving sign). Even though clinic-based assessment will tend to be more product oriented, important information regarding a child's present understanding of rules of the writing system can be gained. This information, coupled with a careful classroom assessment program, should result in the designing of instructional strategies which will best meet the needs of the child.

SUMMARY

Assessing the writing abilities of hearing-impaired children is complicated by the fact that writing involves cognitive, linguistic, and social processes. Moreover, writing is a unique means of communication deriving from a process-product interplay. While product-based analyses are fairly well defined, analysis and description of the processes which go into creating the products are less evident. Even those process analyses which can be undertaken are postulated on understanding (and acceptance) of current theories of writing acquisition and development. Assessment practices must evolve and reflect new levels of knowledge and understanding gained through continued research into the acquisition and development of writing.

As an historical review has shown, the knowledge base regarding the acquisition and development of writing in hearing-impaired children is limited. Product-based analyses have focused on quantifying production variables and specifying limitations, weaknesses, and differences in the writing of hearing-impaired children in comparison to their normal-hearing peers. Attention to the process side of writing is in its infancy. In both product and process analyses, assessment practices continue to take their cues from research. Suitable, packaged materials for assessment purposes are not available. This may be a fortuitous situation. As a result, the focus of assessment can remain on observing what the child is doing rather than how the child performs under sterile conditions and in relation to some arbitrary standard.

At the present time, classroom-based assessment of the writing ability of hearing-impaired children offers more flexibility than does clinic-based assessment. The nature of classroom placement allows for the collection of writing samples over extended periods of time and under different writing task condi-

tions. Clinic-based assessment is restrained by time variables and, when undertaken, usually focuses more on product analyses. In either setting, classroom or clinic, the assessment procedures outlined above should be viewed, not as recipes, but as an accumulation of starting points from which to further define and refine understanding of the acquisition and growth of writing in hearing-impaired children. Thus, the challenge is to keep assessment dynamic and to pursue understanding through continued investigation.

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Chapter 8

Assessment Issues for Three Aspects of School Communication

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School entrance and school attendance are significant events in children's lives. For hearing-impaired children, school, or at least a group experience away from home, may begin at a very early age, and continue as a substantial proportion of their lives until at least age 21.

This chapter deals with three aspects of school communication as these aspects impact on hearing-impaired children, namely: readiness and success in school, classroom communication interactions, and the language of textbooks. These topics overlap naturally with issues of literacy acquisition, that is, the development of reading and writing. (See Laughton, Chapter 6,

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and Conway, Chapter 7, in this monograph for specific discussions of these latter two areas.) As will be explained, however, there is more to school in the way of social, cultural, and communication experiences than just reading and writing.

READINESS AND SUCCESS

Most parents have strong feelings about their child and his/her role in the classroom as the time for school entrance approaches. Those feelings will depend, in part, on the quality of the parents' own social and educational experiences, and on the value of education in their culture. For parents of hearing-impaired children the age of identification of the child's auditory problems and the parent/child management that follows may shape the parents' views or expectations about school in new ways.

In large urban centers in the United States — centers with a multitude of languages, cultures, and socio-economic levels — children with significant hearing loss are still not routinely identified at early ages. (Neither do rural and suburban areas escape the problem of lack of early identification.) These children's school readiness may be severely limited by their lack of an interpersonal communication system, experience with print, and knowledge of school routines. The parents or caretakers of many of these children may have no expectations regarding school performance since they may believe that children with significant hearing impairment cannot succeed in school anyway. The question of how to help culturally- and linguistically-different families with deafness is a critical one. Unfortunately, space limitations force us simply to acknowledge the issue, and to urge that we turn our research efforts in the direction of helping to examine these issues. The reader is directed to Bolen (1981), Chinn (1984), Chu-Chang and Rodriquez (1983), Cummins (1987), Delgado (1984), Fredd and Tikunoff (1987), and Luterman (1979) for further discussion.

Happily, in urban, suburban, and rural areas, many hearing-impaired children are identified early and receive parent/child education so that interpersonal communication is initiated prior to the child's entry into more formal public or private education programs. Parents of early-identified hearing-impaired children may suppose a strictly educational or informational role for school which results in their teaching the child numbers, colors, the alphabet, and other routines as a school "readiness" activity. Other parents may understand the extent of their own responsibility for developing and maintaining interpersonal communication and literacy in their child, and do not surrender these tasks to the school. More commonly, they are persuaded that school personnel are better equipped than they to help the severely or profoundly hearing-impaired child learn how to communicate, read, and write. In this latter case, the whole of educational and communication development may occur in a school context.

It is not possible to discuss the implications of all these attitudes about school and school readiness in this chapter, so we will focus on some aspects that are known to be critical to school success; aspects that we think must be considered when any hearing-impaired child enters a formal educational system.

We begin with the premise that success in literacy acquisition is dependent on a well-developed sense of interpersonal communication. Wells (1986) in a longitudinal study of normal-hearing children observed that children who are exposed to environments where they experience and practice a variety of communication functions — especially story telling, describing, giving directions, and persuading — have a head start in the acquisition of reading and in understanding print discourse functions. Ability to predict what will be said, to identify topics (main ideas), to anticipate when one's conversational partner will understand you, and when you may need to revise an utterance are all critical in interpersonal communication and, as it turns out, just as important in deciphering print (Teale & Sulzby, 1986).

What are some simple but important ways to influence school readiness and success? First, encourage early identification of hearing-impaired children and use of parent/child support programs that lead to the development of a mature interpersonal communication system. Second, ensure the development of an effective communication system among family members and the hearing-impaired child. Third, enhance the child's world knowledge. And fourth, provide a variety of experiences with print before and during school attendance.

From the school discourse perspective, it is important that communication interactions with the family extend beyond one or two turns. Michaels (1981) refers to the *collective exchange* between teachers and children in which an idea is elaborated over several conversational turns. This type of discussion is a common school communication experience. Fortunately, such collective exchanges can enrich the child's world knowledge outside of school as well, while enhancing school readiness. The issue of enhancing world knowledge requires consideration of the concept of schema, a concept discussed already by Moeller (Chapter 4), Laughton (Chapter 6), and Conway (Chapter 7).

Schema

Rumelhart (1984) suggests that we store our memories in collections of related information, or schema, which serve as a basis for active comprehension in conversation and in reading. He presented a sentence — "Dear little thing." — to adults and asked them to predict who was talking and under what circumstances. Their predictions were presumably based on existing schema which allowed them to suppose it likely that the speaker was an adult talking to a child, or perhaps a child talking to an animal. These same adults were given another sentence — "It was so nice to feel it again." — and asked to search for a new map consistent with both this sentence and the previous

one. The process was repeated until predictions were confirmed.

This schema searching and revising process seems to explain something about how the comprehension process works. We presuppose certain ideas in order to understand an event, and we change our presuppositions when they do not fit with new information. If Rumelhart is correct, and his explanation seems logical, it is important to help children acquire schema knowledge to help with school readiness and success. The more hearing-impaired children know, and the more schema they have to draw upon, the more they will comprehend what teachers and authors have to communicate. This is important, given the recent work by Yoshinaga-Itano and Downey (1986) that suggests that schema elaboration may be much less extensive in some hearing-impaired children compared with their normal-hearing peers.

Traditionally, an important aspect of school preparation has been vocabulary development. This seems to be the primary focus of most Headstart programs, as well as many school programs for hearing-impaired children. If one appreciates that words are not just labels stored for one-to-one association with their referents but reflect, instead, full schema of related information, then learning words in a context of action and meaning is far superior to a preschooler's drilling on definitions of words or sorting pictures into categories such as clothes or food. The child whose language is learned and stored with related information, and is based on broad real-world experiences, will have the best preparation for school.

For hearing-impaired youngsters, in particular, the area of schema knowledge will be an important issue throughout school (Yoshinaga & Snyder, 1985). For example, the senior author worked with a mainstreamed, severely hearing-impaired fourth grader who had satisfactory social skills and relatively good communication abilities, but whose schema base for school topics was seriously limited. A program that could be called "Checking and Fleshing Out Schemas" was instituted with this student. A topic from one of her textbooks was presented and she was asked to list all the words she knew that were associated with that topic. This served as a pretest to determine what information she had to facilitate comprehension of class reading and discussion. Then, she was immersed in the topic through field trips and discussions arranged by her parents, through reading to her and with her, and through gathering related objects to discuss. After this immersion, she again was asked to offer all the words she could on this topic. She had added substantially to that original vocabulary list, suggesting a broader base for comprehension of this particular school topic. Apparently, she had broadened her schema base and should now be a better predictor of information when that topic is encountered again.

Literacy Set

Another issue important to school readiness and success can be described by Holdaway's (1979) term, "literacy set." This is a collection of character-

istics of children who have had a wide variety of experiences with print. These children, according to Holdaway, show high expectations of print They notice, ask about, and experiment with print. They also show knowledge of the special language used in books. They have learned to attend to story-length language sets and show a developing awareness of plot, sequence, and central ideas. They know that the message in books is in the print on the page. In English it is read from top to bottom and left to right. They know where the front of a book is and where the story begins. In other words, they have schema for stories in books, schema that allow them to attend to and comprehend print discourse. The presence of a literacy set does not necessarily mean that the child's family owns a large number of books, but rather that the child has had and has seen quality interactions with print in all its forms (Teale, 1986) These interactions may take the form of seeing others read and write, of engaging in pretend reading and writing oneself, and, most importantly, of sharing books with one's caretakers.

Reading. The process of joint book reading between mothers and normal-hearing children is a particularly rich source of information for the child and has been carefully described (Snow & Goldfarb, 1983). During this process, a variety of behaviors occur that are valuable for the child. Mothers generally point out the language that is unique to print. They discuss important aspects of plot development, the various sound-letter and sound-word relationships (the orthographic links of print to sound), and the more general rules for handling books. Mothers do this by reading to children, by stopping to talk about what they have read, and by encouraging children to participate in reading through sentence completion. In addition, mothers often fingerpoint as an instructional technique. The power of reading to and with hearing-impaired children seems to be largely untapped in many clinical and educational programs. It also seems to the authors that it is too infrequently encouraged among parents of young and not-so-young hearing-impaired children.

Early literacy experiences also help children learn that print can fulfill various functions and that there are a variety of text genres, each with its own set of linguistic conventions. For instance, stories begin with "Once upon a time...," poems have words that rhyme, letters begin with "Dear someone," and so forth. With regard to function, children who are exposed to print come to understand quite early that print can be used to control the behaviors of others (through traffic or restroom signs), that print can be used for interpersonal reasons (name tags to identify personal property), that print can be used to create fantasy and imagined experiences, that print can be used to encode information and offer explanations, and that print can be used to help remember (notes to jog one's memory) (Goodman, Smith, Meredith, & Goodman, 1987). Having a wealth of print experience prior to school equips the child with ways to succeed in reading beyond the phonic decoding, word/sentence identification exercises, or basal reading systems

used as the exclusive reading program in too many schools (LaSasso, 1987).

Although clinician-researchers such as Browns (1979) suggest that many hearing-impaired children do not have the benefit of activities to enhance literary set before entering school, there is beginning to be evidence to suggest otherwise. Plapinger (1985) observed that some parents of hearing-impaired children do indeed provide their children with print experiences that are very comparable to those of normal-hearing children. In an analysis of book reading activities, Bishop and Gregory (1985) found that mothers of hearing-impaired children, regardless of communication mode, were able to initiate and sustain conversation about all aspects of print. In contrast to many school conversations, the mothers in this study provided their children with ample response time, so that their conversations around books tended to be balanced between mother and child contributions. Whitesell, Prendeville, and Hayward (1988) showed that the nature of book-centered conversations in several dyads of normal-hearing mothers and their hearing-impaired children was similar to that observed for interactions in which both participants have normal hearing.

It is important, of course, to recognize that even families from the same geographic area may have very different attitudes about literacy, attitudes which influence the types of interactions they have with their children around print. Brice-Heath (1982), for instance, observed three primary perspectives concerning print in one southern community. In one segment of the community, she found an attitude compatible with that already described of active interaction between children, parents, and print. In a second segment of the community, the parents seemed to believe that a shared book experience meant direct teaching of basic sound-to-letter decoding skills and literal interpretation of print. Such parents emphasized alphabet recognition and single word learning more than story understanding. As a consequence, those children often came to school with good decoding skills, but without a real appreciation for the whole reading process or the variety of purposes and functions for reading. In a third segment of the community, the emphasis for preschool children was on oral literacy rather than print. Parents told stories in preference to reading to and with their children. These latter children came to school with a good sense of higher order reading/communication processes but with little or no knowledge about print or book organization.

Each of the traditions observed by Brice-Heath was valid within its respective segment of the community, but only the first approach provided the background necessary for immediate success in that community's school system. The second and third approaches were less well matched to school expectations. Unfortunately, the latter two groups came from the less affluent sectors of the larger community, sectors whose social/cultural organization is often quite different from the background of the classroom teacher. To do well in school, these children will have to learn a second set of reading readiness knowledge, one that matches more closely with expectations of

the school.

Writing. Besides pre-reading activities, children also need pre-writing experiences. In a description of her daughter's writing development, Taylor (1983) reported on how the family provided writing materials and encouraged the child to generate various types of print. Taylor's daughter wrote letters to family members, wrote lists of things to do, composed poems and captions for pictures, and so on. Harste, Woodward, and Burke (1984) also documented writing development and noted that, in their earliest writing attempts, children do not distinguish between print and drawing. Eventually, they begin to separate the two by drawing a picture and adding written text by its side, underneath, or within the drawing itself, which apparently signals an important first discovery about the difference between these two means of expression. The acquisition of writing follows a developmental sequence, from randomized scribbles that become interspersed with actual letters, to finally only letters with punctuation and capitalization appearing. Harste et al. observed that the earliest scribbles of English-speaking children looked like English with an up-and-down quality, as contrasted with Arabic-speaking children whose earliest scribbles resembled Arabic in its flowing quality.

Children assume that their early scribbles convey meaning. If asked about a particular scribble, they will "read" it as if it were conventional print. Of course, subsequent readings may be entirely different from the first, but in each case the children assume that their print has meaning.

Similar development in writing abilities of hearing-impaired children was noted by Conway in his longitudinal study of a group of pre-schoolers who had been provided with ample opportunities for exploring writing (Conway 1985; Chapter 7 of this Volume). They too proceeded to differentiate print from drawing and to generate random scribbles that gradually led to more conventional representations of words. When given experience, these hearing-impaired preschoolers showed meaningful uses of print for various communication functions.

Spelling acquisition also has interesting developmental aspects. The reader is referred to Beers and Beers (1981), Clay (1975), Ganschow (1974), Read (1978), and Zutell (1981) for further details on this topic. Although there are no available longitudinal studies on the development of early spelling patterns in hearing-impaired children, there are suggestions that parallel development can occur if hearing-impaired children have ample opportunities to explore print (Manson, 1982; Staton, 1985).

Summary. If it is true that the more successful students are those who come to school with ability to decipher and generate print, it is important to ensure that exposure to and practice with print is part of every hearing-impaired child's school readiness experience. In summary, we would like to emphasize once again that a flexible and mature *interpersonal communication system* is the best single hedge against school communication problems. Obviously, exposure to and experience with reading, writing, and print discourse

functions and organization are critical as well.

Diagnostic Questions — Readiness

To complete this section, we have listed below examples of some questions that might be used to assess a particular child's school communication readiness level.

Conversational Skills.

(a) Does the child initiate comments or just respond? With parents? Other adults? Peers?

(b) Does the child attend to and comment on notable aspects of a situation? Or, does the child seem to note the irrelevant?

(c) Does the child's vocabulary seem adequate? Does the child grope for the needed word or sign? Does the child seem to lack specificity and make indefinite references? Does the child's vocabulary reflect a range of world knowledge?

(d) Can the child discuss a topic over several conversational turns (collaborative exchange)? Or, does the child only engage in short exchanges which do not develop a topic?

Schema.

(a) Does the child have the world experiences, language, and information needed for comprehending early reading books?

(b) Has the child been read to on a regular basis?

Literacy Set.

(a) Does the child ask about print?

(b) Does the child experiment with writing?

(c) Does the child seem to know that the print tells the story?

(d) Does the child seem to anticipate what is coming next in a story?

(e) Does the child "pretend" to read books with a different style than that used in conversation?

(f) Can the child relate a story?

(g) Can the child answer questions following story reading sessions?

If more specific information is needed to answer the diagnostic questions above, the following list of informal diagnostic procedures may help.

Diagnostic Procedures

Conversational Skills.

(a) Refer to the chapters in this Volume by Duchan (Chapter 2), Moeller (Chapter 4), and Johnson (Chapter 5) for a discussion of assessment of interpersonal communication.

(b) Observe the child's general conversation, participation, initiation of comments, and ability to extend and elaborate topics. Use the foregoing diagnostic questions when viewing videotaped conversations between parent and child, between child and a peer, and in unstructured group activities. An

observational technique such as that suggested by Johnson in Chapter 5 may be of help.

Schema/Literacy Set.

(a) Look through a kindergarten or first grade reading book with the child and initiate a discussion of the pictures from several stories. Ask questions about the pictures using the targeted vocabulary in the Teacher's Manual. Note whether the child seems to have the background information necessary to predict what the print will say. Does the child seem to understand and want to tell about the pictures, but lack the vocabulary or language forms to express ideas? Does the child: Spontaneously use any of the teacher's targeted vocabulary in discussing the pictures? Seem to comprehend the targeted vocabulary in your questions? Seem to notice/comment on pertinent aspects of the picture? Acknowledge cause and effect in the problems that are pictured?

(b) Ask the child to read a book to a younger child or to "pretend" to read to a doll. Notice whether the book is right side up and if the child skips the title page to start "reading" on the first page of the story. Note whether the child's story corresponds to the pictures and matches the genre (e.g., story, explanation, directions). Does the child indicate through gaze or finger-pointing an awareness that the story is in the print? Note whether communication style is changed in any way to indicate an awareness that reading is different from conversation.

(c) Ask a family member for a favorite book that the child often requests. Ask the child to "read" this book and contrast specific knowledge of that book with reactions to an unfamiliar book.

(d) Observe the mother and father reading to the child, if this is part of their normal activity with the child. Note whether the child seems to anticipate familiar parts of the book, and whether the child participates actively in story-reading.

(e) Provide writing materials and ask the child to write a story about a picture or object. Demonstrate first, and then read your story to the child Present a picture or object, or use the favorite book mentioned above, and ask the child to write about what happened to a specific character.

(f) Have a conversation on paper. Write your part of the dialogue and read it to the child while pointing to the words. Ask a question which requires a response. Then hand the pencil to the child and indicate where the child's comment is to be added. This is also a good activity for assessing the child's ability to maintain or elaborate on a topic in print.

(g) Give the Test of Early Reading Ability (Reid, Hresko, & Hamill, 1981) to assess awareness of print in environmental contexts, knowledge of relations among vocabulary items, and awareness of print in connected discourse.

(h) Use Clay's SAND — Concepts about Print Test (1972) to assess knowledge of the layout of books; that the print is what we read; what the directional orientation of print is on the page; the concept of beginning and end,

top and bottom; metalinguistic knowledge of the terms "word" and "letter"; capital and small letters, and the role and function of punctuation. Goodman et al. (1987) has suggested adaptation of this procedure to use with trade books.

CLASSROOM INTERACTION AND COMMUNICATION

There is accumulating evidence of a clearly identifiable social structure that makes for "classroom-ness." That is, there are rules for being in a classroom and there seems to be a critical period for learning these rules. For instance, Shultz, Florio, and Erickson (1982) suggested that this period may be as short as one month from the time the school year begins, or when reading groups are formed. Similar arguments have been proposed by McDermott, Gospodinoff, and Aron (1978) and by Mehan (1979). After that time, the classroom social communication rules for a particular set of students and a teacher is well established and it may be difficult for later-entering students to fully participate in this society. In this initial period, students' roles are assumed, with some students established as alert and others as inattentive or uncooperative (Shultz et al., 1982). The class clown and the teacher's pet will also be well known and these early stereotypes will color those students' subsequent experiences in that class. For the teacher, the first month is a diagnostic period during which she makes specific instructional plans and begins academic work. All her subsequent decisions about student roles and classroom communication may well be based on these early impressions of the students.

Features of "Classroom-ness"

It is clear that classrooms are organized social units that have jointly constructed rules of conduct. To be successful in school, the child must become a member of this mini-society by following the rules that govern the social interactions there. Mehan (1979) has suggested that classrooms are made up of events established by the teacher such as large group meeting, followed by a reading lesson event, followed by small group work, followed by another large group meeting, and so on. Teachers plan a specific amount of time for each event, but flexibly extend the event and shorten others as needed. They usually manage, however, to complete the full array of events each day. How is this management task accomplished? Even though there may be a time line on the chalk board, teachers are observed to consider many other factors besides time when ensuring that all events occur each day (Bremme & Erickson, 1980). The organization of the classroom events themselves has been studied as well. There is evidence that children need to appreciate both which events are occurring as well as what the structure of those events is. Indeed, preschool and primary aged children do have such knowledge (Nelson, 1986).

Each event or lesson in the classroom has a lead-in phase and a lead-out

phase which are signalled both verbally and nonverbally by teachers (Mehan, 1979). It is important for children to know that behaviors permissible within these two phases of the lesson may be very different from behaviors permissible within the lesson itself. Students must quickly learn to recognize the transitions from one event to another even though these transitions are rarely stated in an explicit way. Indeed, it will be our contention that some hearing-impaired students may need explicit instruction about the occurrence and organization of classroom events.

As an example, we turn to Bremme and Erickson (1980) who described a first grade classroom. The day begins with children being transported to school either by bus or by parents. They filter into the room, remove their wraps, and go to various parts of the room to play with toys or other objects of interest. The teacher usually remains seated at her desk until the bell rings. She initiates the first event, a large group activity, by getting up from her desk and walking over to the large group area. Even before she begins to speak, children have started putting toys away, and some have already entered into the large group area along with the teacher. The teacher usually says, "It's time to begin," sits down, and leans back in her chair with her arms crossed. The children already in the area talk among themselves and occasionally address questions or comments to the teacher which she will readily answer. As the last child seats him/herself in the large group area, the teacher leans forward and the children quiet and turn toward her. By the time she says "What will we do today?" the children are focused on her and many have begun to raise their hands to obtain speaking time. If a child speaks without raising his/her hand, a behavior permissible just moments earlier, the teacher usually notes, "We don't talk in this class unless we raise our hands." What she means is that the formal lesson had begun and the rules have changed. There was a time for interacting more casually during the transition, or lead-in period, but a different phase is now in progress. Various researchers have noted this type of structure of events in classrooms from preschool to high school (Doyon & Genishi, 1982; Edwards & Westgate, 1987; Garnica, 1981).

Another way of stating the task is that each child needs to learn the General Event Representation (GER) or schema for school (Nelson, 1986). For very young children, the first classroom is the model for school. As they have more experience, however, they will begin to extract the distinct features of "school-ness" which transcend particular classrooms. Transitions into and out of a lesson versus the lesson itself, for instance, must be recognized and responded to accordingly in most classrooms. Knowing this makes school more predictable for children. When they have this GER, they can predict what typically will happen in lessons as contrasted with exceptional events within the classroom.

School Language Versus Home Language

In addition to recognizing the event structure of school in general and their

classroom in particular, children must learn that the way one interacts in classroom is significantly different from the way one interacts in real life (Shultz et al., 1982). Within most Western-oriented families and social communities, children learn how to communicate as somewhat equal partners. In school, however, all conversations are dominated by teachers. Teachers have control by virtue of their authority and by their role as transmitters of new information. Stubbs (1976) suggested that teachers exercise control over lessons using a variety of strategies. They make statements that attract attention ("No, don't start now, just listen!"), that control the amount of speech ("I could do with a bit of silence."), and that summarize and monitor ongoing conversations ("The rest all seem to disagree with you."), among other things. It is clear that, for children to be successful in the classroom, they must recognize these various forms of control and plan their behavior accordingly.

In discussing communication skills required for success in school, Cazden (1988) has made the following observations. First, timing of conversational contributions is critical to school success. To be successful, the student must comment at appropriate junctures within the teacher-student exchange. Thus, one of the critical skills children must learn is how to obtain the floor when one has a response or comment. Second, when children are addressed directly, there is an expectation that they will answer immediately. Any delay in replying will result in some sort of censure, either by the teacher's making a negative comment or by addressing the question to another student. It is true that even incorrect responses are generally tolerated if timed correctly (French & MacLure, 1981). Third, the child must also understand the language of various academic disciplines, as well as how to use this language effectively. In many cases, children's preschool experiences have included some of this academic language, but, for others, school may be their first encounter with "school talk" in all its varieties.

Indeed, one of the major differences between school and home language is the use of question forms. At home, caretakers and peers use questions to obtain information they do not already have, or to clarify misunderstandings. At school, questions serve entirely different functions. They may be preformulators, so-called because they introduce an instructional event or set the topic and tone of a lesson (French & MacLure, 1981). For instance, a question such as "Did we all see the movie we were supposed to see last night on T.V.?" would be a preformulator. This question is not meant to be answered but, instead, serves as a means of introducing the topic for the lesson. After the topic is established, most instructional interactions involve a sequence in which the teacher asks a question, the child answers, and the teacher evaluates the response (Mehan, 1979). If the answer is acceptable, the teacher asks the next question; but, if it is unacceptable, the teacher may rephrase the question, simplify it to facilitate a correct response, or ask another student. Teachers' questions can range from specific content questions, to inferential questions, to questions linking contet and personal experi-

ences. The child must identify the level of information required, must determine how to formulate the answer to meet the expectations of the teacher, and must time the response appropriately. A juggling act requiring considerable ability!

In summary, there are critical differences between school and home with regard to various aspects of culture and communication. Many children learn these differences in formal preschool experiences, but many children do not. Several researchers suggest that children who are perceived as slow or disruptive by teachers are children who have not been exposed to or, for whatever reason, have not learned these differences (Shultz et al., 1982). Children whose responses in school are poorly timed are generally viewed negatively by their teachers. Children's predictions about appropriate behavior are inaccurate and they are often misjudged as deliberately disruptive when they may simply not know the classroom communication rules, or have not grasped the classroom schema, so to speak. This lack of understanding has been explained in several ways. First, these children may simply lack formal classroom experience (Shultz, et al., 1982). Second, there may be a clash between the child's cultural expectations and those of the school and teacher (Michaels, 1981). Michaels observed, for instance, that in some segments of the community where oral story telling is prized, side discussions that seem irrelevant to the story are employed as an emotional bonding device between the story teller and listener. In school, such digressions are generally seen as off-topic remarks and would be censured by the teacher. Children who have internalized the conversation rules of their culture well could be viewed as lacking the correct behavior in school. It may be, of course, that a child has genuine learning differences or cognitive/linguistic handicaps that require identification and management and, as a consequence, such a child may need help in identifying home versus school communication differences.

Classrooms for Hearing-Impaired Children

Unlike the research with general education classes, there has been little systematic effort to describe the organization and structure of classroom for hearing-impaired children. There is significant evidence from the available literature, however, to suggest that classrooms for hearing-impaired children may be like regular classrooms, only more so. Wood, Wood, Griffiths, and Howarth (1986), in an extensive study of teachers of hearing-impaired children in England, reported that classroom interactions were thoroughly controlled by the teacher. The frequency of questioning by the teacher was observed to be quite high, with literal questions predominating. Buckler (1977), in a study of question asking in a school for hearing-impaired children, did not find this strong tendency to ask literal questions. Her sample of teachers from a single residential school tended to ask inferential and procedural questions as well as literal questions. Newton (1985) found that teachers of hearing-impaired children tended to be quite literal in their presentations, with total communica-

tion teachers being more literal than auditory/oral teachers. Kluwin (1984) observed that his sample of hearing-impaired students looked exclusively at the teacher during instructional tasks and rarely turned to classmates, even when these same classmates were making a contribution to the discussion.

These studies do confirm that there are organized predictable event structures in classes for hearing-impaired children, structures which can be internalized by the students. It is not clear, however, whether this type of teacher-dominated communication pervades the entire educational system for hearing-impaired students. We have yet to learn what the similarities or differences are between general education and special education with regard to aspects such as signaling transitions from event to event, or determining the range and nature of linguistic/communication patterns. We do not yet have descriptions of the nature of school talk in self-contained programs for hearing-impaired children. We have not yet identified the rule negotiation process between teachers and hearing-impaired students. Most importantly, we do not clearly understand how schema developed in programs for hearing-impaired students do or do not map onto regular education classrooms. For example, Clarke (1986) observed that her severely hearing-impaired kindergarten subject had considerable difficulty locating transition phases during instructional events in a mainstream classroom. Since different rules of behavior were tied to lead-in, instructional, and termination phases of events, failure to recognize these shifts often resulted in his being described as "not paying attention."

As we have emphasized, even hearing-impaired students must learn the participant structures of school communication such as the rule that allows only one speaker at a time, or the idea that there are unequal rather than equal roles inside most classrooms. General education students also learn how to provide "factually correct academic content in the interactionally appropriate form." It is important but, for most hearing-impaired students from classrooms where literal rather than inferential questions predominate, may be difficult to learn (Wolff, 1977; Wood et al, 1986). In a classroom where students must reflect and infer, hearing-impaired students must be able to do more than respond only with facts. The ability to comprehend and answer questions about printed materials requires consideration of at least three sources of information (Weaver, 1986). One source is "right there" or explicitly stated in the text. A second source requires a "read and search" strategy or the ability to read and understand more than one sentence since the information is textually implicit. Finally, if all else fails, the student may be required to think about the script implicit in the reading, the identification of which depends on the reader's inferential ability as well as world knowledge.

Griffith, Johnson, and Dasoli (1985) reported that hearing-impaired students seemed to know how to ask questions for information, and how to respond to factual questions, better than how to respond to questions requiring more than memorized, factual answers. Further, their subjects were ob-

served to lack the appropriate interactional skills for small group discussion. Brackett (1983) discussed the need for increasing hearing-impaired students' ability to communicate in small groups, suggesting the use of reversal and confrontation training which places the student in a third-party observer role. Brackett pointed out that there are relatively fewer communication demands on a hearing-impaired student in the lecture format.

Many hearing-impaired students may need direct feedback in order to identify needs and develop skills for use in small group settings. Specifically, they may need to learn when to say what, in what way, to whom, and how much in the school context (Hymes, 1974). Any student needs to have an opportunity to learn how classrooms work and the allowable variations therein. They need to learn how to identify the idiosyncrasies of any teacher and how that teacher's routine varies from the generic school schema. Interestingly, two studies of hearing-impaired students' communication in school have noted more initiation of communication in open as opposed to traditional classrooms (Craig & Holman, 1973; Collins & Rose, 1976). The freer structure of the open classroom, like free play with peers, seems to facilitate participation of hearing-impaired students in classroom discussions. Or, this less structured setting may force hearing-impaired children to be more communicative to maintain and/or ascertain their role within the classroom.

Whatever the particular situation, however, hearing-impaired students, like all students need to learn the distinctive features of their present classroom quickly. Within the first few weeks of school, in fact, after the "big picture" of particular classroom communication cues and participation rules are learned, it might be appropriate to work on specific skills such as those described by Brackett (1983). She argues that hearing-impaired students need to develop: (a) more flexibility in expressing their intents, (b) better attention to turn-yielding signals to avoid inappropriate overlaps and interruptions, (c) more appropriately timed topic shifts, (d) better ability to adapt messages to their listeners, and (e) increased complexity in language use.

Happily if the hearing-impaired child is integrated in the early grades, the typical kindergarten or first grade teacher excels in helping children notice the important aspects of routine at the beginning of the school year. These teachers usually make the routine very obvious ("Look children, I am in the magic circle. Pay attention!"), use large gestures to attract children's attention, and communicate more slowly to be sure youngsters understand. Teachers become more subtle, however, as they assume children have learned the basic student role. If students have not caught on to the rules of school interaction in the lower grades their transition to higher school levels may be difficult at best.

Diagnostic Questions — Class Routines

As one way of determining what the child has learned of classroom routines, a clinician, parent, or resource teacher might try, through observation, to answer questions such as the following:

(a) Does the child know the teacher's favorite teaching spot(s)?

(b) Does the child know what the teacher does / says to gain the attention of the class?

(c) Does the child know the class rules and reasons for them?

(d) Does the child know the regular (as opposed to extraordinary) routine?

(e) Does the child notice the transition signals for a change in events in the class?

(f) Does the child try to participate in small groups?

(g) Does the child take turns successfully (and appropriately) in small group or whole class discussion?

(h) Does the child answer inference or opinion questions as well as factual questions?

(i) Can the child explain or elaborate answers if asked to?

Diagnostic Procedures

An approach such as the following might be tried to determine what each student knows about the classroom. At the end of the third week of school, ask all the children to answer questions about classroom participation with the idea of creating guide sheets to be used to orient new students to the classroom. After all the children have answered the questions individually, have them discuss their answers in small groups and then compile one guide sheet per group. When a new student does enter the class, someone can use the guide sheet from his / her group to teach the new student about the classroom rules and routines. The teacher might use these guide sheets to assess the present students' knowledge of the classroom interactional rules and might reinstruct those who have not yet learned how to function in the class. The questionnaire in Table 1 has been used by the senior author in a fourth grade classroom.

As an alternative to the guide sheet for younger students, the teacher might ask various children to play teacher in order to assess their understanding of teaching signals within classroom structure. For older students, a more appropriate activity would be to assign various teaching responsibilities within small groups. As the student teachers attempt to initiate and terminate lessons, observe the results when they call on group members for answers. By both teaching and answering, children will reveal their understanding of participant rules within the classroom.

A third way to assess students' understanding of the classroom rules would be through a checklist:

(a) Does the child notice when class has begun or does the child need to be told directly each time?

(b) Does the child know how to ask or answer a question in class?

(c) Does the child know how to gain the floor appropriately?

(d) Does the child use the more formal language style of school or seem to confuse home and school talk?

(e) Does the child notice when activities are changed, or need to be told?

Table 1

A Guidesheet to Assess Students' Knowledge of Classroom Interaction

Instructions You know all about our class by now, but a new student might need some help Please answer the following questions We will use your answers to help new students learn about our class

1 Write down exactly what happens in this class on most days Be sure to explain what happens first, second, next, and so on

2 Write the important rules in this class and explain WHY we have each rule

3 Describe your teacher Tell what your teacher is like so the new student will get to know this person

4 Tell WHERE the teacher usually stands when he or she wants everyone to pay attention Tell WHAT the teacher usually says or does first to get the students' attention

5 Tell what makes the teacher mad so the new student will not get into trouble with the teacher.

6. Explain the homework system This will be helpful to the new student
   (a) How do you find out what the homework is?
   (b) How do you remember what books or papers to take home?
   (c) How do you remember to bring your homework back to school?

7 Tell what is hardest for you in this class (It might be hard for the new student also)

8 Tell what YOU do when you do not understand something in this class

9 How is reading group different from whole class discussions? Tell as many differences as you can

10 Can you think of anything else the new student should know about this class?

(f) Does the child appropriately change contributions for various school activities (small group discussions versus large group)?

All of these techniques could also be used, with the teacher's permission, as observation tools by the audiologist, speech-language pathologist, tutor, or visiting teacher of the hearing impaired.

THE LANGUAGE OF TEXTS

The final section of this chapter deals with some unique aspects of school textbooks which should be considered to achieve fuller understanding of print communication. Throughout their school years, children are faced with textbooks which present new communication challenges. There are books that emphasize fiction or narration and books that emphasize nonfiction or exposition. Perera (1986), in comparing 25 passages from textbooks and 25 comparable passages from literature, both written for children ages 9 to 13, identified important differences in the two sets of materials:

1. Nonfiction is less personal than fiction. Discussion focuses on objects, process, or abstract concepts rather than people or animals. Pronouns are less frequently used in nonfiction passages than in fiction and, if they do occur, they are predominately impersonal pronouns such as "it" or "they." There is very little direct speech, and sentence types are almost exclusively complete statements rather than the commands, exclamations, or fragments found in fiction. The typical agent-action sentence order expected in conversation is regularly reversed in nonfiction to produce numerous passive constructions. Indeed, the agent often must be inferred by the reader in nonfiction passages, passages marked by few action verbs and more copulas in the first place.

2. Nonfiction has a weak structure without the dependable chronological ordering of fiction. Unlike fiction, in which the story line makes the information increasingly predictable, a nonfiction text is almost all equally difficult to predict. There is no dynamism to carry the reader forward in nonfiction text, so the child must have extensive prior information about the topic or very strong intrinsic motivation to read and understand nonfiction.

3. Nonfiction is more dependent than fiction on linguistic markers and organizing words such as "similarly," "therefore," and "nevertheless"; words that are often unfamiliar to children. Children rarely encounter "therefore" in early fiction reading as compared with the very common fictional organizers such as "then," "next," and "so." Subordinate clauses such as adverbial clauses of concession introduced by "although," nominal clauses functioning as subjects in sentences, and types of relative clauses introduced by "whom" and "whose" are also not typically found in fiction or for that matter in young children's conversation.

4. Nonfiction, unlike fiction, includes new and varied types of discourse structures such as definitions, evidence, examples, tests, conclusions, and summaries.

5. Nonfiction requires more information processing. There are more nouns representing more propositions per sentence. There is less redundancy through repetition or pronoun reference. Topic load and topic change create less coherent text so that the reader must work hard to identify the ties that bind sentences together.

6. There are significantly more interrupting constructions between the subject and the verb in nonfiction. Students who can readily understand basic, single-proposition sentences are confused by these interruptions.

7. Lastly, Perera notes that nonfiction texts use a substantial number of complex verb phrases. Twenty-five percent of fiction verb phrases were complex as compared with 43% in the nonfiction sample, which seems to be a particular characteristic of scientific writing.

As can be seen from this summary, there are distinct and substantial differences between fiction and nonfiction text. In Chapter 6 of this monograph, Laughton suggests that in order to process text meaningfully at least two conditions must be met. First, children must have sufficient background knowl-

edge to understand the specific information being presented in the text; second, they must possess the schema that organize the text. For instance, Laughton stresses the importance of the goal-resolution axis as the schema around which fiction is organized. If a story is about the southern United States, fluent readers must have knowledge about this geographic area, of course, but they must also have knowledge of narrative structure (the discourse organization of this particular genre) if the story is to be read, understood, and remembered.

As with fiction, the processing of nonfiction also involves these two aspects of knowledge. To understand the difference between slave and non-slave societies, readers must have some knowledge about slavery. But, just as important, they must have some understanding of the text schema being employed to convey this information. Meyers and Freedle (1984) suggested that nonfiction text can be organized in a variety of ways, each of which dominates certain academic disciplines and/or grade levels. They have identified at least five types of organization, namely: (a) comparison, (b) causation, (c) response, (d) enumeration, and (e) collection. Comparison text involves the contrasting of two sets of information such as in a science text which compares and contrasts mammals with birds. Causation text establishes a causal relationship between an antecedent and its consequence. Science texts might also use this device when showing how condensation results in the formation of clouds. Response organization involves the setting up and the solving of a problem. A social studies text might use such organization to explain how the formation of an internationally supervised food bank could solve world famine. Enumeration organization utilizes lists of facts that are present to lead the reader to a particular outcome. Recipe books fall under this category. Collection text has sets of facts tied together under one or more topic sentences. Geography or social studies texts that provide information about animals, plants, and living conditions in deserts, veldts (grasslands), or seashores use this format. Indeed, any of these text types can be used to organize the same information or the same information may appear in different text organizations depending on the subject area or stylistic preferences of particular publishers authors. A child must know the content as well as the underlying schema employed to fully process nonfiction.

A number of researchers (Armbruster, Anderson, & Ostertag, 1987, Bridge, Belmore, Moskow, Cohen, & Mathews, 1984) have suggested that improvement in comprehension skills does occur when children have access to these various textbook schema in addition to knowledge of the linguistic peculiarities of such books. Although there has been virtually no published work on hearing-impaired children's understanding of these various nonfiction schema, it is clear that they are expected to read textbooks just as normal-hearing subjects are.

Diagnostic Questions — Nonfiction Texts

A set of diagnostic questions is offered as a guide to assessing an older stu-

dent's ability to deal with textbooks.

(a) Can the student read the table of contents and discover the plan or organization of the book?

(b) Can the student describe the layout of the chapters such as whether there is a summary, review questions, and so on?

(c) Can the student read and adequately paraphrase a paragraph from the text?

(d) Has the student had experience with other nonfiction language such as that of newspapers and magazines?

(e) Does the student have strategies for comprehending the complex sentences in school texts?

(f) Can the student "decombine" a complex sentence?

(g) Can the student identify the referent for personal, demonstrative, and indefinite pronouns?

(h) Can the student recognize the same referent when different nouns are substituted ("car," "auto," "vehicle")?

(i) Can the student fill in the referent word that is omitted and assumed ("our president and theirs")?

(j) Can the student predict content using the organizer words typical of nonfiction?

(k) Can the student produce and comprehend written language using passive sentences, interrupting constructions, adverbial clauses introduced by "although," nominal clauses functioning as subjects, or passive constructions to match those found in texts?

Diagnostic Procedures

A variety of procedures that have been used by the senior author to assess students' knowledge of text devices and organization are listed to conclude this section.

Text overview. Give students short periods (2-5 minutes) to look over a nonfiction textbook and ask them to be prepared to report all that they know about it to their group or to the class. This loosely structured activity will reveal students' basic knowledge of textbooks. Their comments will reveal what they think is important to notice in texts.

A more structured text overview procedure is to give the students a series of questions to use in surveying their texts. Note the assumptions about texts that are inherent in their answers. For example, the list might include instructions such as:

1. Look at the Table of Contents and be prepared to explain the author's plan for the book. What was presented first, second, etc., and why?
2. Using the Table of Contents, decide where tests might be given and why.
3. Does the book have a glossary? An index? How will you use these sections?

Chapter overview. Ask the students to find out as much as possible about

one chapter in five minutes and then share what they have learned. Note whether they use the subheadings, the pictures and explanations underneath, the maps or graphs, the summary, or review questions to make their decisions. Children who have some idea of the structure or organization of the chapter will use these aids. Otherwise, they will probably start reading with the first paragraph or even randomly skim without apparent purpose.

For a more structured chapter overview evaluation, provide instructions to direct students in examining the chapter structure. The students' answers should reveal the world knowledge and text schema that influence their comprehension. This list might include the following:

1. Read the title and guess what it will tell about. Write your guess.
2. Look through the chapter quickly. Read under the pictures.
3. Read all the subtitles.
4. Read the summary if one is included.
5. Read and guess the answers to questions at the end. Write your guess answers.
6. Tell all that you know about this chapter.

After the chapter overview, ask students to rewrite section subheadings as questions. This step will serve as an assessment of students' ability to restate information in new forms which can set up a purpose for reading each section. Note whether they create questions with one or more complex propositions, or not. Have them read, then answer, their own questions. Note whether their answers are responses to those questions. Have them "recite and review" by writing one sentence which summarizes the paragraph. Note whether they have recorded the gist of the paragraph, or simply details which do not capture the whole idea.

Pre-post vocabulary test. Ask the students to read only the title of a chapter. Then have them write all the content words they think might be in that chapter as an informal pretest of their knowledge of the topic. After students study the chapter, repeat this procedure and consider the differences in vocabulary and what those differences might represent about information learned.

Study guides. After students have used a study guide provided by the teacher for several chapters, ask them to create their own study guide for a new chapter. Notice whether they have used an organization similar to the teacher's and whether they have identified important information. This exercise will reveal whether students are merely answering questions or whether they are learning text organizational schema. Without this check, students may follow the teacher's study guide all year, but never really internalize this way of analyzing text.

Paragraph organization. Present paragraphs written in one of the text organization styles described by Meyers and Freedle (1984) and ask students to explain in one sentence what the author is trying to say. Their explanations should reveal their sensitivity to the cause/effect, collections around a theme, compare/contrast, enumeration, or response organizational schema.

Paragraph creation. Give isolated facts and ask students to write a paragraph which compares, tells all about, or explains the facts to see if they can use the various text organization schema appropriately. If not, try to describe the organizational schema they do use. Sometimes children reveal unusual schema which may contribute to their inaccurate predictions in deciphering print.

Cohesion. Underline pronouns in the text ("it," "this," "these," "they," "he," "she") and ask students to identify the referents. Underline similar words that are used to describe the same referent ("the star," "the athlete," "the competitor," "the front runner") and ask students to identify the person. Delete words ("Although most _____ stated that they supported slavery, many _____ privately disagreed with it.") and ask students to fill in the blanks to reveal how well they can tie information across sentence boundaries. The senior author has developed a series of diagnostic steps to assess students' attention o cohesion. First, all cohesive ties are underlined. Second, students are asked to identify the ties and their referents, with the instructor providing help for a quarter or third of the cohesive ties identified. Finally, students are asked to identify ties and give the referent with no help.

Complex sentence reading. Students can be asked to sign or read sentences aloud. Note where they pause as they produce the sentence. Ask them to paraphrase the sentence to tell what it means. If they are processing sentences effectively, they should pause at the end of each thought or proposition and/or include all the individual thoughts in their rephrasing.

Sentence decombining. Students are given a complex sentence from their text and asked to rewrite it, including all possible simple sentences. This is, of course, both a diagnostic and teaching strategy to focus students' attention on the meaning units within complex forms.

Question reading. Give students various test questions and ask them to paraphrase these questions. Questions about math story problems or directions have worked equally well. They could also be asked to circle the "doing" words ("tell," "list," "compare," "why," "who," "where,") and box the "what" words ("slaves," "South," "cause"). A third procedure is to ask students to read a question and then fill in an outline such as:

1. This question is about _____. (Limit 1-2 words to identify the topic.)

2. This question is telling me that _____ . (Note whether the facts are changed to complete sentences and whether all facts are noted.)

3. I have to _____. (Note whether the student correctly attended to the "doing" word. Some students read "who," then answer "what.")

Just as children must learn to identify and operate within the classroom communication structure, they must also learn to identify and operate within the structure of texts. Being ready for school, knowing what to expect in classroom conversations, and how to deal with the language and organization of

textbooks should enable any student to learn the information presented in school more effectively.

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