THE COMMUNICATIVE PATTERNS OF PRESCHOOL HEARING-IMPAIRED CHILDREN A PILOT STUDY

by

TERRY PARSON-TYLKA

B.Hec., University of Manitoba, 1973

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS

in
THE FACULTY OF GRADUATE STUDIES (Department of Special Education)

We accept this thesis as conforming to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA
July, 1980

Terry Parson-Tylka, 1980
In presenting this thesis in partial fulfilment of the requirements for an advanced degree at the University of British Columbia, I agree that the Library shall make it freely available for reference and study. I further agree that permission for extensive copying of this thesis for scholarly purposes may be granted by the Head of my Department or by his representatives. It is understood that copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Department of **Special Education**

The University of British Columbia
2075 Wesbrook Place
Vancouver, Canada
V6T 1W5

Date **July 30, 1980**
ABSTRACT

A system for examining the functions of language and modes of communication used by preschool hearing-impaired children and their mothers was developed and pilot tested. Transcription and coding of video-tape interactions reveal the usefulness of the system. A functional analysis determined that mother-child dyads correlate highly in their use of functions, but not in their use of modes. Six minute time samples correlate highly with 15 minute time samples. Limitations and implications of this research are discussed.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF TABLES</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>vi</td>
</tr>
</tbody>
</table>

## CHAPTER

<table>
<thead>
<tr>
<th>I</th>
<th>INTRODUCTION</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>LITERATURE REVIEW</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>HISTORICAL PERSPECTIVE</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>PRAGMATICS IN CHILD STUDY</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>RECENT RESEARCH</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>A MODEL FOR APPRAISAL OF PRESCHOOL</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>CHILDREN' S USE OF LANGUAGE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PRAGMATICS AND HEARING IMPAIRED CHILDREN</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>RELATED RESEARCH</td>
<td>35</td>
</tr>
<tr>
<td>III</td>
<td>THE STUDY</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>DEFINITION OF TERMS</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>THE POPULATION</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>THE INSTRUMENT</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>FUNCTIONS</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>MODES</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>PROCEDURE</td>
<td>55</td>
</tr>
</tbody>
</table>
## CHAPTER

<table>
<thead>
<tr>
<th>IV. RESULTS AND DISCUSSION</th>
<th>58</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUITABILITY OF THE CODING SYSTEM</td>
<td>59</td>
</tr>
<tr>
<td>FUNCTIONS</td>
<td>60</td>
</tr>
<tr>
<td>QUESTIONS</td>
<td>70</td>
</tr>
<tr>
<td>MODES</td>
<td>74</td>
</tr>
<tr>
<td>SUITABILITY OF USING A SIX-MINUTE SAMPLE</td>
<td>84</td>
</tr>
<tr>
<td>V. SUMMARY AND CONCLUSIONS</td>
<td>89</td>
</tr>
</tbody>
</table>

### BIBLIOGRAPHY

| 95 |

### APPENDIX

| A. LIST OF TOYS                                | 104 |
| B. CODER'S TRAINING MANUAL                    | 105 |
| C. STUDY CORRESPONDENCE                       | 125 |
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>COMPARISON OF FUNCTIONS OF LANGUAGE FROM VARIOUS SOURCES</td>
<td>21</td>
</tr>
<tr>
<td>II.</td>
<td>HISTORICAL SURVEY OF PRAGMATICS IN EDUCATION OF THE HEARING IMPAIRED</td>
<td>31</td>
</tr>
<tr>
<td>III.</td>
<td>DEMOGRAPHIC DATA</td>
<td>42</td>
</tr>
<tr>
<td>IV.</td>
<td>FREQUENCY OF COMMUNICATIVE AND UNCODABLE ACTS AND PERCENT FREQUENCY OF INTER-CODER AGREEMENTS ACROSS MOTHER-CHILD DYADS</td>
<td>59</td>
</tr>
<tr>
<td>V.</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - 15 MINUTE SAMPLES</td>
<td>61</td>
</tr>
<tr>
<td>VI.</td>
<td>CORRELATIONS BETWEEN MOTHERS AND CHILDREN FOR USE OF FUNCTIONS</td>
<td>70</td>
</tr>
<tr>
<td>VII.</td>
<td>FREQUENCY OF USE OF QUESTION TYPES</td>
<td>72</td>
</tr>
<tr>
<td>VIII.</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF MODES</td>
<td>75</td>
</tr>
<tr>
<td>IX.</td>
<td>CORRELATIONS BETWEEN MOTHERS AND CHILDREN FOR USE OF MODES</td>
<td>83</td>
</tr>
<tr>
<td>X.</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - 6 MINUTE SAMPLES</td>
<td>86</td>
</tr>
<tr>
<td>XI.</td>
<td>CORRELATIONS BETWEEN 6 AND 15 MINUTE SAMPLES FOR USE OF FUNCTIONS</td>
<td>88</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CODING SYMBOLS</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - DYAD 1</td>
<td>63</td>
</tr>
<tr>
<td>3</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - DYAD 2</td>
<td>64</td>
</tr>
<tr>
<td>4</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - DYAD 3</td>
<td>65</td>
</tr>
<tr>
<td>5</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - DYAD 4</td>
<td>66</td>
</tr>
<tr>
<td>6</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - DYAD 5</td>
<td>67</td>
</tr>
<tr>
<td>7</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF MODES ÷ DYAD 1</td>
<td>76</td>
</tr>
<tr>
<td>8</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF MODES ÷ DYAD 2</td>
<td>77</td>
</tr>
<tr>
<td>9</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF MODES ÷ DYAD 3</td>
<td>78</td>
</tr>
<tr>
<td>10</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF MODES ÷ DYAD 4</td>
<td>79</td>
</tr>
<tr>
<td>11</td>
<td>FREQUENCY AND PERCENT FREQUENCY OF MODES ÷ DYAD 5</td>
<td>80</td>
</tr>
</tbody>
</table>
ACKNOWLEDGMENTS

To Dr. Truman Coggins for planting the seeds of this study; to the Staff of the Counselling and Home Training Program for Deaf Children for allowing it to take root; to Dr. Edgar Lowell, Dr. Susan Curtiss, Robin Bolin and Sandy Meyers for stimulating its growth; to my committee, Dr. David Kendall and Dr. Perry Leslie for guiding its development; to Dr. Mark Greenberg, for nurturing the project and encouraging me to grow as well; to my dear friend and research assistant, Lana Ruddick for involving herself totally in this study and for the learning we shared; to my advisor, Dr. Bryan Clarke for his dedicated support in seeing this project to its completion and for all that he taught me; to the parents and children who so kindly provided the data for analysis; to all my family and friends who lovingly supported me through this entire effort; and to my husband Tom, for always being there, my sincere thanks.
CHAPTER I

INTRODUCTION

The most important function of language is communication. For the majority of children, the ability to acquire language and use it as a tool for communication is a relatively effortless though prodigious task. For children who have a hearing impairment from birth or prior to the critical language learning period, estimated to be prior to the age of two (Lenneberg, 1965), the acquisition of language becomes a Herculean task. How one goes about acquiring language when the major channel for language learning, i.e. audition, is impaired, has been the subject of much research (Streng, Kretschmer, Kretschmer, 1978). The fact that some individuals do acquire a considerable level of mastery of the English language, despite a congenital profound hearing loss, increases the confusion surrounding language development in the hearing-impaired.

The major goal of most educational programs for hearing-impaired children and adults is the acquisition of language and communication skills, regardless of methodological philosophy. Educators are constantly striving to improve language assessment tools and teaching techniques but the "state of the art" at this time is far from satisfactory (Moores, 1978).

Rodgon, Jankowski and Alenskas (1977) view language as a multi-disciplinary entity involving symbolic and cognitive, communicative, and structural-linguistic aspects. Although each facet of language is
important, it is the integration of the individual components which is essential for language competence. A similar view is taken by Bloom and Lahey (1978) who propose that the intersection of form, content and use is language competence.

Language competence has been defined as the knowledge of language (Chomsky, 1968). Many language theorists equate language competence with linguistic competence. The distinction between the two terms, however, is not unimportant. Linguistic competence may be regarded as intuitive knowledge about grammar (Hopper and Naremore, 1978), that is, the rules of form (syntax) and content (semantics). Language competence, on the other hand, involves not only syntax and semantics, but also the notion of when and when not to speak, what to talk about and with whom (Hymes, 1968), that is, the social use of language or pragmatics. This ability to use syntax and semantics appropriately in conversation has also been termed communicative competence (Cazden and Hymes, 1972) and is seen as the framework in which linguistic competence occurs. Therefore, while language competence and communicative competence may be used interchangeably, linguistic competence is limited to the communicator's knowledge of grammar. Because the term communicative competence captures the essence of language, it will be used throughout this paper.

Communicative performance is communicative behavior used by an individual in speaking or listening which is subject to evaluation by others (Cazden and Hymes, 1972). Communicative performance does not necessarily reveal the total scope of a child's communication competency, but it does allow a degree of competence to be inferred.

The most commonly used mode of communicative behavior is speech. Non-verbal modes are also important however, particularly in the young
language-learning child. The characterization of children's early grammars and linguistic behaviors could gain considerably from the study of motor-gestural phenomena that accompany language during the early phases of acquisition and are eventually replaced by it (Mehrabian and Williams, 1971). Gestural behavior has been found to be important in the acquisition of communicative competence (Parker, 1976) and remains important at least during the preschool years. It appears that the process of learning to talk with others involves the acquisition of a complex interweaving of non-verbal and verbal behavior (Melson, 1977).

The implication of this phenomenon in relation to hearing-impaired children, is that any attempt to evaluate communicative performance should involve all behavior which is communicative. Restricting one's observations to "speech" will particularly limit information from the hearing-impaired communicator. Most hearing-impaired children are limited in their communication to some degree by their inability to hear speech clearly, even with the amplification of sounds provided by the use of carefully selected hearing aids or F.M. auditory training equipment. Visual cues afforded by speech reading are an inefficient substitute for audition (Ling, 1976). Hearing-impaired children may also have difficulty in producing phonemes in connected speech with sufficient intensity, duration and pitch to be clearly intelligible to their listeners. For these reasons, many hearing-impaired children tend to rely more heavily on non-verbal communicative behaviors during the communication process than hearing children do.

A system for observing the modes of communication used by school aged hearing-impaired children proposed by Collins (1970), includes eleven modes. It may be possible to propose a less extensive list of modes for observing communication in preschool hearing-impaired children,
which will cover the continuum from speech through gesture and action to sign language.

There are many problems inherent in observing the communicative performance of preschool hearing-impaired children. As with any young child, speech may be immature and not easily understood, and this problem is compounded when a hearing loss is present. If a sign system is being used by the hearing-impaired child, the observer must be familiar with that system (Pfuderer, 1968). The large variety of sign systems currently used in North America from Signed English to American Sign Language to "home-invented" signs makes this a difficult task. Another problem related to sign language and young hearing-impaired children is that immature fine-motor control may result in unintelligible or ambiguous signs. Researchers are often reluctant, therefore, to study language development in very young hearing-impaired children.

The task becomes less formidable if a contextual approach to languages is taken whereby context is viewed as the most important factor in interpreting communicative behavior (Bates, 1976; Bloom, 1970; Byers and Byers, 1972; Melson and Hulls, 1977). It has often been observed that what young children say is usually related to what they see and do (Bloom, 1970). Taken to the extreme, Austin (1962) says an utterance (communicative behavior) cannot be analyzed out of the context of its use, which includes both situational and linguistic context, i.e. people present, topic, the message given before, the goal of the communication, place and time (Hopper and Naremore, 1978).

An optimal account of language development must include a discussion of cognition and its relation to language growth. Most investigators are convinced there is a close relationship between cognition and language, but there is disagreement as to the precise nature of the relationship.
The most widely accepted theory is based on the work of Piaget. His theory postulates that language development is in part based on the early cognitive development of children during the sensori-motor period between 18 months and 2 years of age (Piaget, 1962). The view that early language development is intertwined with, if not dependent on, cognitive or intellectual functioning in children is supported in the literature (Kretschmer and Kretschmer, 1979).

Psychologists agree that there are forms of thought which are non-verbal, but that without language, thinking is limited (Lawton, 1968). Cognitive development for most adults has been influenced by language, both in communication and privately, within ourselves (Lewis, 1969). It appears that language becomes essential for thinking to develop beyond an elementary level (Wilkinson, 1970). That is, while language acquisition is based on early cognitive development, later elaboration of cognitive structures is dependent on acquired language abilities.

As in all human development, individual differences in the process of language acquisition must be considered (Bloom, 1970). It appears that some children use cognition more, while others tend to use linguistic input more in acquiring language, depending on the distinction learned, the language acquired and the individual child (Schlesinger, 1977).

That hearing-impaired children demonstrate a capacity for intellectual functioning (Furth, 1966; Lewis, 1968) supports the view that intellectual development is possible "without language" (Sinclair, 1975). It would be expected that hearing-impaired children should develop the pre-verbal cognitive skills of the sensori-motor period. However, the importance of language in the development of more elaborate cognitive structures, suggests that hearing-impaired children may be limited in
these cognitive skills, as well as communicative abilities, due mainly to their restricted language.

In addition to cognitive development, several other factors have been found to be related to language acquisition, though cause and effect cannot be determined. The influence of parent-child interaction is a major consideration, often related to the socio-economic status of the parents (Clezy, 1979; Greenstein, 1975; Hess and Shipman, 1965; Kretschmer and Kretschmer, 1979). The social development of the child, as well as motivation in acquiring and using language in communication are also important.

Much of the theoretical base in education of the hearing-impaired is adapted from normal child language research. Historically, child language study and its relation to hearing-impairment have focused on one aspect of language to the exclusion of the other components. Research over the past decade has been particularly concerned with the development of syntax both in normal children (Chomsky, 1965), and children with hearing-impairments (Blackwell, 1978; Quigley, 1976; Streng, 1972). The results of such research have contributed much needed information on this aspect of language development. More recently, semantics has become prominent as a subject for research with the hearing-impaired (Scroggs, 1977). The third major component of language proposed by Bloom and Lahey (1978), i.e. the use of language in a social context or pragmatics, has, however, received very little attention in research involving hearing-impaired children. This is not surprising in light of the recent research on pragmatics in normal child language, which has served to make the study of language even more complex (Oller, 1978).

For educators of the hearing-impaired, the challenge now is to
integrate knowledge of form, content and use in order to be better prepared to assist students in becoming competent communicators. The ultimate success of the attempt to include pragmatics or use in language development programs for hearing-impaired children will depend on the extent to which frameworks can be clearly defined, delimited and brought under interpretive control (Oller, 1978).

The essence of pragmatics is that language is used functionally (Hopper and Naremore, 1978; Moerk, 1977). Various researchers have proposed taxonomies of uses or functions which attempt to reflect the intentions of a communicator. Kretschmer and Kretschmer (1979) make a distinction between pragmatic functions which are socially oriented, and mathetic functions which are related to learning and do not require a response from a listener. Other researchers, however, fail to make this distinction with the results that the term pragmatics is generally used to refer to all functions.

The research of Halliday (1973), Dore (1974), and Bates (1976) have been most prominent in the role of describing functions or use in normal child language. A pilot effort with hearing-impaired preschool children has demonstrated that these children use the same functions in their communication as do very young hearing children (Curtiss, Prutting and Lowell, 1979). This research will be discussed in more detail in the following chapter.

An attempt to assist teachers in appraising children's use of language has been made by Tough (1977) based on an extensive longitudinal study with preschoolers. Tough proposes a list of 7 functions of language which are used by preschool children and necessary for successful later school learning. A more detailed discussion of her work will also be provided in the next chapter.
The focus of this pilot study will be to determine the usefulness of adapting Tough's system for appraising the use of language by preschool hearing-impaired children. The information provided may serve to suggest a means of assessing pragmatics, which when integrated with assessment of semantics and syntax, would specify a child's communicative competence.

In addition to discussing Tough's (1977) model for appraising preschoolers' language use, and Curtiss et al.'s (1977) description of pragmatics in hearing-impaired children, the succeeding chapter will trace the historical development of pragmatic study and examine research in these areas.
CHAPTER II

LITERATURE REVIEW

The study of the use of language in interactions with others is a branch of pragmatics. This chapter will review the historical perspective of this area of language study, and discuss the recent research of Dore (1974), Curtiss, Prutting and Lowell (1977), and Tough (1977), which provides the theoretical basis for the ensuing work.

Historical Perspective

The word "pragmatics" is derived from the Greek root, "pragma", meaning deed or behavior. Peirce (1932) coined the term "Pragmatism" to refer to the philosophical movement he founded. His doctrines included the following:

- The meaning of conceptions is to be sought in their practical bearings.
- The function of thought is to guide action.
- Truth is preeminently to be tested by the practical consequences of belief. (Peirce, 1932).

A more popular definition of pragmatics stemmed from Morris (1946) who described it as the relation between signs and their human users. Signs refer to the symbols used for communication. Others, however, feel that Morris lost sight of the important philosophical distinctions established by Peirce (Bates, 1976b). Bates proposes that pragmatics be defined as the study of linguistic indices which are signs that are interpretable only within the context of their use.

Central to the pragmatic study of language, then, must be a unit of
analysis of linguistic indices. This issue has been approached through the notion of Speech Acts, a theory first introduced by Austin (1962). Austin described Speech Acts as utterances. The issuing of an utterance he termed a Performative, because it is the performing of an action. Austin specified three types of Speech Acts:

- **Locutionary** - all acts required for the making of speech, i.e. the actual production of the act.
- **Illocutionary** - the conventional social act, i.e. the use or function of the speech act.
- **Perlocutionary** - the effect of the speech act on the listener.

Searle (1969) elaborated on Austin's notion of Speech Acts, particularly the illocutionary act. For Searle, the Speech Act was the basic unit of communication. He felt that the analysis of illocutionary acts must capture both the intentional and conventional functions and the relationship between them. To this end, he determined that four types of conditions must be fulfilled for an illocutionary act to be performed successfully: propositional, preparatory, sincerity and essential. These conditions recognize the proposition and the internal states of the speaker that operate relative to the proposition.

Searle (1969) proposed the following hypotheses about illocutionary acts and these four conditions:

Whenever there is a psychological state specified in the sincerity condition, the performance of the act counts as an expression of that psychological state.

In the performance of any illocutionary act, the speaker implies that the preparatory conditions are satisfied.

There need not be an explicit illocutionary force-indicating device to perform the act: if the other conditions are fulfilled, implicit devices can perform the act.
The same utterance may constitute the performance of several illocutionary acts. (Searle, 1969)

Pragmatics in Child Study

The Speech Act has also been used as the unit for analysis in child language study by several investigators (Bates, 1976b; Dore, 1973). The definition of terms originally proposed by Morris (1946), Austin (1962), and Searle (1969) have been modified to account for early child language, particularly in relation to the communicative intentions expressed by young language learning children.

Bates (1976) related child language study to Speech Acts and Pragmatics. Bates, Camaioni and Volterra (1975) examined the onset of intentional communication prior to the onset of speech and traced its development up to the beginning of functions expressed through speech. They view every act that is involved in the construction of meaning as a pragmatic act in itself. Bates (1976) further proposes that "logically and ontogenetically, all of semantics and syntactics are derived ultimately from pragmatics."

Bates, et al. (1975) and Bates (1976a, 1976b) describe four pragmatic structures or rules of use. Unfortunately, they have chosen to use Speech Act terminology in reference to pre-speech behavior, which results in confusion for the reader who is attempting to conceptualize the model. The reader must bear in mind Bates' orientation to early pre-speech communicative behaviors.

Bates' four pragmatic structures are:

Performatives - These are developed prior to the onset of speech and are the intentions in using communicative behaviors.

Bates, et al. (1975) determined the following sequence in the
development of performatives:

perlocutionary phase - (from birth to 10 months) in which acts are often unintentional but serve to have an effect on their listener; for example, the cries of a hungry baby.

illocutionary phase - (from 10 months to 12-15 months) in which conventional social acts take place which call on others to affect the agent; for example, showing-off, showing objects, pointing-for-others.

locutionary phase - (from 12-15 months on) in which performative structures are used to carry propositions with referential value, i.e. word or word-like signals with no referential value, for example, "hi" or "bye-bye"; restricted usage of referential speech, for example, "doggie" in reference to all animals; or true referential speech, which depicts an object or event in a variety of contexts.

Propositions - This refers to the internal activity of speakers. Originally propositions are action schemes. Any pragmatic use of language can be turned into a propositional object. At the early stages, propositions describe things to be communicated. Propositions are marked by the emergence of true words or referential speech.

Presuppositions - Presupposing is a very early activity which makes assumptions about the context that are necessary to make an utterance verifiable, appropriate or both. Bates defines three types of presuppositions:

semantic presuppositions - are conditions deducible from the meaning of a sentence and which must be true for an
utterance to be a true or false proposition. For example, "John has a sister" presupposes "John exists". Semantic presuppositions are necessary to make an utterance verifiable.

Pragmatic presuppositions - are assumptions about the context, which are necessary to make the utterance appropriate. Pragmatic presuppositions vary according to the context and beliefs of the communicators. For example, "Do you want to go bye-bye?" presupposes that the listener is a small child. The pragmatic definition of presupposition subsumes the semantic definition.

Psychological presuppositions - a presupposition can be psychologically present as long as both the speaker and the listener share the act of presupposing, or as long as the speaker thinks the act is shared. Young children may presuppose information that they are unable to signal in the surface form of their utterances. There is some evidence that the "new" information in one-word utterances usually presupposes "old" information in the context in which it occurs (Greenfield and Smith, 1976). The element of the situation the child chooses to encode (say) is almost invariably the element undergoing greatest change or emphasis. For example, while putting objects into a bucket a child will say the names of the objects rather than "bucket". The new-old order at the two-word level can be seen as a continuation of this new-only rule. Psychological presupposition subsumes semantic and pragmatic presuppositions.
Presupposing is an integral part of every act of speech. Children seem to find it easy to assume information, and in the course of pragmatic development, they must learn what not to presuppose. This is related to the decline of ego-centrism in the child, as he learns to distinguish between his own and others' points of view. Bates uses presupposition in the same way as performatives, i.e. to describe the speakers' intention in using a sentence. Presupposing, then, is a cognitive activity.

Conversational Postulates - These conditions are a particular class of presuppositions about the nature of human dialogue in general. They were introduced by Grice (1968) and refer to the principle of cooperation in communication, i.e. truth, relevance, etc. The ability to predict whether or not a given assumption is shared by the listener, and to plan one's utterances accordingly is one of the highest achievements in pragmatic development. Research has concluded that children as young as 2 years of age can recognize a command that is implicit in subtle requests or statements of need made by mothers. For example, they respond appropriately to a command to "Eat lunch" even when stated implicitly as "Do you want your lunch now?" However, production of these various kinds of directives does not appear until 3½-4 years of age.

In all four pragmatic conditions, Bates (1976b) views context as an integral part of the structure of language. Meanings are conveyed through a creative combination of utterances and social settings, that
is, learning how to do things in context through the use of words and signals.

Bates (1976b) suggests that Morris' popular definition is limiting because human users are affected in their use of the signs of language by the context and the function of the message on the speaker, in relation to the context.

Halliday (1973, 1975) has also been concerned with a functional approach to the study of language. He states that language development is more than the acquisition of structure. Halliday chooses to relate function to the development of meaning, which, according to Bloom and Lahey (1978), is synonymous with content or semantics, rather than within a pragmatic framework.

Halliday takes the view that language for the child is a flexible, almost limitless tool for the realization of his intentions. He states two reasons for studying the functions of language; to establish general principles relating to the uses of language, and to establish the relation between functions of language and language itself.

From the functional point of view, as soon as there are meaningful expressions, there is language. The child has a linguistic system before he has any words or structures at all. The question becomes to discover "what has the child learned to do by means of language?" (Halliday, 1975).

Halliday (1975) proposes a tentative framework for the functional account of early language development, based on observations of young children and theoretical considerations about linguistic functioning, including essential linguistic theories and extra-linguistic theories regarding cultural transmission and the socialization process (notably the work of Bernstein, 1971). The three phases of his framework are:
Phase 1 - The Initial System - In phase 1 the child learns language as a system of meanings in functional contexts. There is no form, only content and expression through intonation and articulation. The beginning of the use of functions of language occurs in this very early phase. Each utterance serves one function.

Phase 2 - Transitional System - Vocalization, structure and dialogue are present in the beginning of phase 2. By the end of this phase the child can use two functions at a time and has mastered the linguistic system of the adult language. Language can now serve to effectively transmit cultural knowledge to the child. Functions are combined in utterances and are either pragmatic or mathetic.

Phase 3 - The Adult System - In this phase, functions are no longer equivalent to use but rather are ways of meaning. Content, form, and expression are all present. Each utterance is multifunctional and used in a specific social context.

In Phase 1 the child is capable of seven functions of language. These functions are:

Instrumental - the "I want" function. This is the function language serves of satisfying the child's material needs; of enabling him to obtain the goods and services he wants. The child has become aware that language is used as a means of getting things done. The child's intention is satisfied by the provision of the object or service desired.

Regulatory - the "do as I tell you" function. This is the use of language to regulate, control or manipulate the behavior of others. It is closely related to the instrumental function
but is directed towards a particular individual in a demand for company. It involves the language of rules and instructions.

Interactional - the "me and you" function. This is the use of language in interactions between the self and others, including greetings and responses to calls.

Personal - the "here I am/come" function. This is the use of language to express the child's own uniqueness. Language first allows the child to become aware of himself, and is then used to mold that self; that is, for the expression of feelings, of participation and withdrawal, interest, pleasure, etc.

Heuristic - the "tell me why" function. This is the use of language to investigate reality and learn about things. It allows the child himself to explore his environment and categorize objects of the physical world.

Imaginative - the "let's pretend" function. This is the use of language to create one's own environment. It later includes poems, riddles, etc.

Representational or Informative - the "I've got something to tell you" function. This is the use of language to communicate about something. This function emerges later than the others and requires that the child has grasped the principles of dialogue and communication.

The first four functions develop prior to the others in Phase 1 and all of the others precede the informative function. Halliday does not include practise forms of language such as imitation, chanting or repetition, because he says they are models of language acquisition.
rather than instances of language in use. This is in contrast to Rees, (1975) who feels that imitation may in itself be a communication function which teaches a child to "establish or maintain communication."

In the Transitional Phase 2, Halliday proposes that the child begins to combine functions and there are two major categories of functions:

Pragmatic functions - which arise from the instrumental and regulatory functions in Phase 1. These functions are signalled by rising intonation.

Mathetic functions - which arise from a combination of the personal and heuristic functions in phase 1. Mathetic functions become most important for learning potential in school, and are the major impetus for the ideational function of the third phase. Mathetic functions are signalled by falling intonation.

In Phase 3 all categories and terminologies combine to form three distinct functions:

Ideational functions - (representative, referential and cognitive)

The ideational function becomes crucial to the use of language as early all utterances come to have an ideational component, (i.e. language is used for learning).

Interpersonal functions - (expressive-conative, social, and evocative)

Textual functions - which provide conditions whereby other functions can be effectively served.

Halliday's functional account of language development has been widely quoted in the literature, and has made an important contribution to the field of pragmatics.

Dore (1974) has also contributed greatly to the study of language
functions in the preverbal child. Like Bates, he has related child language study to Speech Act theory. Unlike Bates however, Dore has chosen to describe a child's communication at the one-word stage in terms of Primitive Speech Acts. Dore's theory of Primitive Speech Acts assumes that the child possesses systematic knowledge about the pragmatics of his language before he has acquired sentential structures, and also that the child can linguistically represent a single concept and communicate the primitive force of his utterances (Dore, 1974).

A Primitive Speech Act (PSA) is an utterance consisting formally of a single word or a single prosodic pattern which conveys the child's intention. Single words may be either a rudimentary referring expression (i.e. names), or specific expression words (e.g. hi, bye-bye). A single prosodic pattern counts as a PSA if it contains a consistent prosodic feature produced without segmental phonemes of a word and communicates the child's intention.

Dore (1974) enumerates four types of behavioral evidence to characterize a PSA: the child's utterance; non-linguistic behavior such as gestures and facial expressions; the adult's verbal and non-verbal response; and the relevant, salient aspects of the context of the utterances. He suggests that all the linguistic utterances of the child at the one-word stage can be classified into eight, later revised to nine (Dore, 1975), distinct Primitive Speech Acts. These are: calling, practising, labelling, repeating, protesting, greeting, answering, requesting action and requesting an answer.

Primitive Speech Acts as formulated by Dore, do not possess all of the features of full Speech Acts. For example, PSA's do not contain a predicating expression and do not develop into Speech Acts until the child has acquired most of the grammatical structures of his language.
Dore (1974) has schematically represented this development at the one-word and two-word stages and beyond.

In this Speech Act model, linguistic intention is a cognitive-pragmatic structure, distinct from grammatical structures which express the intention. The speaker's intentions (to describe, acquire information and so on) are the functions of his utterances which are expressed through the speaker's use of grammar. The intention to communicate precedes the production of speech, hence the need for the concept of the Primitive Speech Act.

Although the terminology and the models for examining the intentions of the communication of young children are different, Bates, Halliday and Dore agree that the young child is capable of communicating his intentions before he has acquired the verbal ability to do so. Observation of linguistic and non-linguistic components provides clues to the child's intentions, and context plays a major role in determining the pragmatic functions which the child is choosing to express. A comparison of the functions proposed by Dore, Halliday and others is given in Table I.

The discussion will now turn to more recent research in pragmatics and child language study.

Recent Research

The area of pragmatics is currently the major focus in language study. Unfortunately, it seems to be a Pandora's box that, when opened in an attempt to solve certain semantic and generality problems, has introduced many new problems of definition and theoretical clarity (Oller, 1978).

The essence of pragmatics is that language is used functionally
TABLE I
COMPARISON OF FUNCTIONS OF LANGUAGE FROM VARIOUS SOURCES

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>request attention or object.</td>
<td>request</td>
<td>direct/ request</td>
<td>control/ persuade</td>
<td>directive</td>
</tr>
<tr>
<td>direct behavior</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>discuss non-present events</td>
<td>opinion statement</td>
<td>comment</td>
<td>inform</td>
<td>referential</td>
</tr>
<tr>
<td>discuss object</td>
<td></td>
<td>report</td>
<td></td>
<td></td>
</tr>
<tr>
<td>discuss behavior repeating</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>approving beh.</td>
<td>wish, promise</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>disapproving beh.</td>
<td>warn, judge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>question</td>
<td>imagining question</td>
<td>imagining</td>
<td></td>
<td></td>
</tr>
<tr>
<td>expressing feelings</td>
<td>express feelings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>rituals</td>
<td>ritualizing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>----------------</td>
<td>--------------</td>
<td>-------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>request show object</td>
<td>requestive</td>
<td>direct</td>
<td>regulatives</td>
<td>command/ demand</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>request confirmation</td>
<td>summons imitiation</td>
</tr>
<tr>
<td>comment give object</td>
<td>report</td>
<td>assertive</td>
<td>labelling description</td>
<td>declarative referential</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>repetition</td>
<td>oretic</td>
</tr>
<tr>
<td>show-off protest</td>
<td>self-maint.</td>
<td>performative</td>
<td>request for approval</td>
<td>cognitive emotive</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>response to protesting</td>
<td></td>
</tr>
<tr>
<td>reason predict project</td>
<td>responsive</td>
<td></td>
<td>response to summons acknowledgment</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------</td>
<td>----------------</td>
<td>--------------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>direct</strong></td>
<td>request information</td>
<td>regulatory</td>
<td>requesting action/answer</td>
<td>directive</td>
</tr>
<tr>
<td></td>
<td>request social</td>
<td>interactional</td>
<td>calling</td>
<td>contact</td>
</tr>
<tr>
<td><strong>metaling</strong></td>
<td>offer information</td>
<td>informative</td>
<td>labelling</td>
<td>referential</td>
</tr>
<tr>
<td><strong>comment</strong></td>
<td>offer information</td>
<td>informative</td>
<td>labelling</td>
<td>referential</td>
</tr>
<tr>
<td><strong>report</strong></td>
<td>offer information</td>
<td>informative</td>
<td>labelling</td>
<td>referential</td>
</tr>
<tr>
<td></td>
<td>offer information</td>
<td>informative</td>
<td>labelling</td>
<td>referential</td>
</tr>
<tr>
<td></td>
<td>avoidance</td>
<td>personal</td>
<td>protesting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>instrumental</td>
<td>imaginative</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Question</strong></td>
<td>expressive mono.</td>
<td>expressive</td>
<td>expressive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>routines</td>
<td>heuristic</td>
<td>greeting</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>answering</td>
<td></td>
</tr>
</tbody>
</table>
(Hopper and Naremore, 1978). One recent definition in the literature succinctly captures this role of pragmatics, and at the same time accounts for the interaction component stressed by Bates and the meaning component suggested by Halliday. "Pragmatics is a branch of the theory of meaning that describes the use that is made of expressions and especially their use in interactions" (Bartsch, 1979).

Use, according to Bloom and Lahey (1978), refers to the contexts in which language can be used and the functions for which it can be used. Context is the key to determining language function (Cazden and Hymes, 1972) and has been conceived as the stage set for an act of communication. Linguistic pragmatics is concerned with the description of this stage (Markova, 1978).

Context determines the verbal and non-verbal modalities which are appropriate behaviors for realizing the communicators' intentions in face-to-face communication (Byers and Byers, 1972).

The function of language as communication is intimately bound up with mental activity (Clark and Clark, 1977). Cognition determines the selection of behaviors in the use of language.

Kretschmer and Kretschmer (1978) and Leonard (1972) are two of the few child language theorists to maintain Halliday's distinction between pragmatic, or socially oriented, functions and mathetic, or learning, functions. Kretschmer and Kretschmer argue that the acquisition of a variety of uses is the incentive for the development of language forms.

This becomes the crux of the matter for hearing-impaired children. Do hearing-impaired children acquire a variety of uses of language? Nelson (1978) feels that as long as the child is satisfied with communicating pragmatically, there is little need to learn a conventional language system. Since pragmatic functions develop naturally in all
children prior to speech, hearing-impaired children should not be handicapped in their ability to acquire these functions. The mathetic functions arise out of these prespeech functions. This suggests that if hearing-impaired children are satisfied with communicating pragmatically, then this may result in the delayed use of mathetic functions and the limited or deviant language systems characteristic of many hearing-impaired individuals.

The next section of this chapter will explore the relevant research which assisted in formulating the research questions of this study.

A Model for Appraisal of Preschool Children's Use of Language

Tough (1977) has developed a guide for appraising preschool children's use of language which can serve as a useful tool for teachers of young children. Tough based her model on several theories of language function (Halliday, 1973; Inhelder and Piaget, 1964; Vygotsky, 1962; Luria, 1961; Lewis, 1951, 1957, 1968; Bernstein, 1971), as well as observation of young children's use of language. In her Language and Environment Project, Tough recorded the language of sixty-four 3-3½ year old children engaged in conversation with a chosen friend. One-half of the children in the project were considered "disadvantaged" in school learning because of the home environment provided them by their parents, who were unskilled or semi-skilled workers. The "advantaged" children were from homes where one or both of the parents were in professions reached through higher learning. To examine the effects of nursery education on language development, half of the "disadvantaged" and half of the "advantaged" groups were enrolled in nursery groups while the other half of each group had no nursery experience. Other factors,
including age, sex, IQ, family size, child's personality and mother's first language were controlled.

The child's talk and his responses to talk were observed and tape recorded. The hour-long language sample obtained for each child was analyzed in several ways, to determine what if any differences existed between the groups in their use of language.

A structural analysis revealed that the advantaged group tended to use longer utterances and more complex forms of structures. There were significant differences between the groups in mean score of all noun phrases, reference (i.e. use of pronouns), and verb complexity. Interpretation of the results confirmed the link between social class and the child's development of language, although the relationship cannot be termed causal.

Tough felt, however, that the problem was not that the children in the disadvantaged groups were not able to use complex language, because many demonstrated that they could. Other explanations were pursued to explain the differences shown to exist between the groups.

Tough then turned to an examination of the uses of language made by the children in the study, as a way of considering differences in meaning. Meaning was seen to reside within the child in association with a situation and to be reflected in the child's response to the situation through his general behavior and use of language (Tough, 1977).

In order to analyze the children's use of language in this way Tough proposed a model for the classification of uses of language. She first distinguished between the following four functions of language, which she defined as the means by which a purpose is achieved:

Directive Function - which is concerned with directing operations and actions of the self and others
Interpretive Function - which is concerned with communicating the meaning of events and situations that the child witnesses or has witnessed in the past.

Projective Function - which depends on drawing upon the imagination and using elements of known experience to project and explore situations.

Relational Function - in which language is used to convey the position the individual assumes towards others.

Within each function are uses of language which serve to realize the function. Tough originally proposed nine uses of language but later modified these to include the seven uses which follow (Tough, 1976).

Self-maintaining - the use of language to make others aware of the speaker as a person and to gain attention and recognition; a means of making needs explicit through language.

Directing - the use of language to direct the self (through a running commentary while performing actions), or directing the actions of others, or for directing the self in conjunction with others. This use of language can be readily identified in the talk of 3 year olds.

Reporting - the use of language to identify objects and events in present or past situations. Much of 3 year old's talk seems to serve this use.

Reasoning - the use of language to make a reasoned interpretation of experiences. This use seems to develop from reporting and is not used very much by 3 year olds.

Predicting - the use of language to project beyond the present experience and anticipate events in the future. Three year
olds do demonstrate capacity to use language for predicting, but do so rarely.

Projecting - (originally called the empathetic use of language) the use of language concerned with imagining and expressing feelings and reactions of other people to their experiences. Three year olds are capable of this use, although it does not appear often.

Imagining - the use of language to build a scene or incident through imagination. Three year olds frequently use language in this way.

A number of strategies were found to serve these uses of language. The results of Tough's analysis of the use of language by the groups of children in the Language and Environment Project are summarized below.

- The disadvantaged groups used language $2\frac{1}{2}$ times more often than the advantaged groups to secure attention and maintain their own status.

- The advantaged groups used language 5 times more often than the disadvantaged groups for directing or controlling others while the disadvantaged groups used language more often for self-directing.

- The advantaged groups used language almost 8 times more often to refer to past experiences and more than twice as often to contemplate the future.

- The advantaged groups used language more than 9 times as often for reasoning, more than twice as often to project, and 5 times as much to imagine.

- The disadvantaged groups exceeded the advantaged groups in total number of questions asked.
- Very few predicting, reasoning or projecting questions were asked, but those that were were asked by the advantaged children.

- The most frequently used type of question for all the groups was the reporting question.

Thus, the disadvantaged children used language more for monitoring an on-going situation in order to maintain their status in that situation, whereas, the advantaged children used language more for reasoning, projecting, predicting and imagining. "It would seem from this that there is justification for stating that these 3 year old children, coming from different home environments, had established different priorities for expressing meaning and different orientations towards the use of language" (Tough, 1977).

These same children were involved in two follow-up studies at 5 and 7 years of age, which investigated more closely the ways the children used language for particular purposes. Clear differences between the groups emerged in the kinds of strategies used. The children in the advantaged groups tended to elaborate a wider range of meaning on the tasks given. It seemed the children in the disadvantaged groups were capable of using all of the functions, but were lacking in motivation, awareness and experience in thinking in different ways. As reflected in their lower IQ scores and reading test scores, the disadvantaged groups were disadvantaged in later school learning.

Tough's framework appears to be a useful tool for discerning different uses made of language by young children. It identifies the uses a child may be lacking or not disposed to using, which may put him at a disadvantage in later school learning. When a child does not demonstrate performance of certain essential uses of language, the teacher should
foster such language growth in the child through curiosity-arousing, challenging activities. The child may thus be motivated to adopt ways of thinking and uses of language which will assist him in his learning and communication with others.

The disadvantaged children did not tend to use those functions which Halliday would term mathetic. Given the delayed performance of hearing-impaired children in later academic achievements, do young hearing-impaired children also show this tendency to not use mathetic functions of language? Could Tough's guide be used to determine the language functioning of hearing-impaired preschool children? These specific research questions helped to shape the design of this study.

Pragmatics and Hearing-Impaired Children

Pragmatics as a primary component of language programs for hearing-impaired children is not a new development. As early as the 1600's, many educators have encouraged the practical uses of language in direct experiences in sentences and discourse (see Table II, adapted from Truax and Edwards, Language Workshop, Vancouver, 1980).

As more insight into the development of pragmatics in "normal" children is acquired, the practical application of pragmatics in education of the hearing-impaired can become more effective. The tentative implications have been to encourage communication and use of language within meaningful context at a level appropriate to the child.

Dore (1974), Halliday (1975) and Tough (1977) have shed some light on the specific functions used by young hearing children. The research by Curtiss, Prutting and Lowell (1977) stands alone as an attempt to discover the functions of language used by hearing-impaired children and is based on Dore's analysis of Primitive Speech Acts.
<table>
<thead>
<tr>
<th>When</th>
<th>Who/Where</th>
<th>Primary Component</th>
<th>Basic Unit</th>
<th>Method/Instructional Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1600's</td>
<td>George Delgarno</td>
<td>Pragmatic,</td>
<td>Discourse</td>
<td>believed the deaf had the potential to learn language &quot;normally&quot;</td>
</tr>
<tr>
<td></td>
<td>England</td>
<td>Semantic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700's</td>
<td>Jacob Pereire</td>
<td>Pragmatic,</td>
<td>Discourse</td>
<td>encouraged children to produce connected language that grew out of action work.</td>
</tr>
<tr>
<td></td>
<td>France</td>
<td>Discourse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1700's-1800's</td>
<td>Joseph Watson</td>
<td>Semantic,</td>
<td>Sentences</td>
<td>practical use of connected language in meaningful situations</td>
</tr>
<tr>
<td></td>
<td>England</td>
<td>Pragmatic,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800's</td>
<td>Guilio Tarra</td>
<td>Pragmatic,</td>
<td>Discourse</td>
<td>children exposed to and helped to use oral communication in practical experiential ways</td>
</tr>
<tr>
<td></td>
<td>Italy</td>
<td>Discourse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800's</td>
<td>Friedrich Monitz Hill</td>
<td>Pragmatic,</td>
<td>Discourse</td>
<td>children were to learn language as normally hearing children do by participating in oral conversations</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>Semantics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800's-1900's</td>
<td>David Greenberg</td>
<td>Pragmatic,</td>
<td>Discourse</td>
<td>language practised in realistic natural settings; context held important</td>
</tr>
<tr>
<td></td>
<td>U.S.A.</td>
<td>Semantic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1800's-1900's</td>
<td>A.G. Bell</td>
<td>Pragmatic</td>
<td>Discourse</td>
<td>toys and play situations to help children learn language</td>
</tr>
<tr>
<td></td>
<td>U.S.A.</td>
<td>Discourse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1900's</td>
<td>Mildred Groht</td>
<td>Pragmatic,</td>
<td>Discourse</td>
<td>children can learn language naturally if it is acquired by repetition in meaningful situations</td>
</tr>
<tr>
<td></td>
<td>U.S.A.</td>
<td>Discourse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Curtiss et al. examined the verbal and non-verbal communication of twelve, 2-5 year old hearing-impaired children in an attempt to determine the semantic and pragmatic content of their communication. The subjects were all summer students at the John Tracy Clinic, an oral program which emphasizes the development of speech-reading and residual hearing. Hearing losses ranged from mild to profound. The children had no known additional handicaps. The children's communicative behavior in three different settings during the school day was video-taped and later transcribed and coded, in order to obtain the data for analysis.

Communication "acts" involving an utterance, gesture, body movement, facial expression or vocalization were described according to 16 pragmatic functions:

1. Demand - a request for an action or an object (e.g. I want glue.)
2. Command - an imperative (e.g. Look at me.).
3. Question - a request for information or elaboration (e.g. Who? Huh?)
4. Labelling - identification of a person, object or action (e.g. That's a chair.)
5. Response to a question - an act directly following a question posed to a child (e.g. head shake, change of topic, an answer)
6. Response to a summons - an act directly following a summons for the child's attention (e.g. head turn, eye contact)
7. Response to a command - an act directly following an imperative or request issued to the child (e.g. child follows directions, child changes topic)
8. Imitation (general) - an imitation of an act or an utterance performed by someone else
9. Imitation (repetition) - an imitation of a child's own act or utterance

10. Description - an act describing an event, a person or an object (e.g. He's tall.)

11. Summons - a request or demand for attention (e.g. a wave, tap, calling)

12. Protesting - an act expressing resistance (e.g. No, head shake)

13. Ritual - a greeting or other social ritual

14. Request for approval - an act requesting approval from another person (e.g. Is it O.K. for me to do this?)

15. Request for confirmation or acknowledgement - an act requesting another person to confirm or acknowledge the child's behavior (e.g. Do you understand?)

16. Acknowledgement - an act evidencing comprehension of a situation, event or message.

These functions were either taken directly or modified from Dore (1974), or added. As such, they are "lower level" functions and except for questions, are all pragmatic. Therefore, it is not possible from the results of this study to determine if hearing-impaired children show evidence that they are capable of "higher level" functions.

However, the study done by Curtiss et al. did reveal some interesting findings about the pragmatic functions used by hearing-impaired preschool children:

- The number of communicative acts per minute which a child produced increased with age.

- Hearing-impaired subjects in the study progressed more according to the norm for pragmatic functions than for semantic functions.
- All of the children used between 8 and 16 functions, and most used 10 or more functions.
- Protesting was used approximately the same amount across age.
- Imitation decreased with age.
- Two year olds produced more requests for confirmation or acknowledgment.
- Descriptions and labelling tended to increase with age.
- Responses to questions increased with age, but few questions were posed to younger children.
- Requests for approval were used infrequently, but increased with age.
- Rituals were used rarely and this appears to reflect limited social integration.

Curtiss et al. made several conclusions on the basis of their study:

Individual differences affect the study of trends in acquisition of communication. Degree of hearing-impairment appears to be one major factor. Children who are severely or profoundly deaf tend to begin using verbal communication later than those whose hearing impairments are less severe. Hearing loss in general retards the development of oral communication (up to 3 years for severe or profoundly impaired).

It appears that early enrollment in an intervention program results in more adequate communication in hearing-impaired children.

Mean Length of Utterance (M.L.U.) is an inadequate measure of linguistic development in hearing-impaired children. The older
children had M.L.U.'s approximately equal to the younger children, but the older children were more fluent and used more semantic and pragmatic functions.

Non-verbal communication in hearing-impaired children can be adequately assessed by determining the semantic and pragmatic content of these communicative behaviors. Verbal communication can also be assessed in this way and is a more adequate index of language performance than M.L.U.

Perhaps the communicative performance of hearing-impaired preschool children could be more adequately assessed by a combination of the models proposed by Tough (1977) and Curtiss et al. (1977) and this tool could be used to assess the communicative functions of young hearing-impaired children who are using a formal sign system in their communication at home.

Various factors might influence the development of language functions in these children. The last section of this chapter will explore some relevant research in related areas of language development.

Related Research

The main premise concerning language development is that formal language emerges from pre-linguistic social-cognitive-perceptual interaction with adults and peers (Moerk, 1975). Information regarding the most crucial variables in this interaction is inconclusive at this time (Clark and Clark, 1977). Some attempts have been made, however, to isolate the most critical factors.

Parent-child interaction appears to be one of the most influential aspects of child language acquisition, the assessment of which may ultimately guide the intervention strategies of early intervention
programs (Lowell and Lowell, 1979). The most significant figure in a young child's life is generally the mother. (though other adults are often called upon to provide the caretaking role). This "significant other" provides interaction practice from the child's earliest days, in a process which includes modelling, imitation and repetition.

The mother-child dyad is a self-regulating and relatively closed system, in which the amount, type and timing of the observed teaching/learning processes are sufficient to explain first language learning (Moerk, 1975). The mother's input to the child is termed "Motherese" and is characterized by: high pitch with exaggerated intonation; clear enunciation; slower rate of speaking with distinct pauses between the utterances; simplified speech sounds; repeated syllables; short, simple sentences and limited vocabulary (Kretschmer and Kretschmer, 1979). Motherese appears to be a natural inclination of those who speak to young children. The effect of Motherese on child language acquisition is questionable however (Nelson, 1978). We can only surmise that since language learning is a relatively effortless process for most children, the special input by mothers to their language learning infants provides an environment suitable for language development.

Several studies have been done in an attempt to determine if the communication environment provided by mothers of hearing-impaired children is similar to that provided by mothers of hearing children. Using Bales' Interaction Process Analysis Categories, Kenady and Proctor (1968) found significant differences in the language used by mothers of deaf and mothers of hearing children. They found that the mothers of hearing children asked for more information and opinions and talked less than the mothers of deaf children. The mothers of deaf children did not give
praise or show agreement as much as mothers of normally hearing children and used more antagonism and suggestions. Goss (1970) found similar differences between the mothers of deaf and mothers of hearing children. In his study, the mothers of deaf children used more suggestions and negative social-emotional language, while mothers of hearing children used more questions and opinions and positive social-emotional language.

Greenstein (1975) examined the differences between the language used by mothers of deaf children with better language skills, and mothers of deaf children with poorer language abilities. The mothers of the more competent language users were less coercive and more sensitive and accepting. The mother's ability to motivate the child without coercion provided one of the best predictors of the child's language competence. The use of questions, repetitions, directions, the child's name, and praise were unrelated to the child's acquisition of language. It appears that the major influences on language abilities of the child are the ease, warmth and closeness of the mother-infant communication. However, it was suggested that the warmth and sensitivity of the mother are possibly facilitated and reinforced by the child's attentiveness and responsiveness to the mother. That is, cause and effect cannot be determined.

Kretschmer and Kretschmer (1979) suggest that both the verbal and non-verbal behaviors of mothers influence the rate of children's language development. If this is true, than the differences shown to exist between mothers of deaf and mothers of hearing children may be responsible for the hearing-impaired child's delay in language performance.

Historically, hearing-impaired children have often been discouraged from utilizing non-verbal behaviors with the assumption that verbal behavior would be inhibited. However, research by Moores (1971) and
Moores, Weiss and Goodwin (1973) in the area of non-verbal communication by hearing-impaired children has demonstrated a positive relationship between non-verbal and verbal modes of language performance. Kretschmer and Kretschmer (1979) suggest that hearing-impaired children should be encouraged to use natural gestures in communication, because such behavior is a normal pre-requisite to the development of spoken language. The role of formalized sign language in this regard has not been thoroughly explored.

The importance of the child's cognitive abilities for the development of language cannot be overlooked. Piagetian theory postulates that language development is in part based on the early cognitive abilities of children (Best, 1975). The sensori-motor period of development, from 18 months to 2 years of age, is the basis for the cognitive abilities upon which language is built. Best (1975) has found that hearing-impaired children progress normally through this sensori-motor period and so approach the task of language acquisition during the pre-operational stage with the same pre-requisites as the normally hearing child.

Furth (1966) proposes that thought is possible without language, and bases this hypothesis on his work with hearing-impaired children. Other research has concluded that while hearing-impaired children are capable of non-verbal cognitive tasks, their performance on these tasks shows retardation in comparison to hearing individuals (Oleron, 1957; Chulliat and Oleron, 1955; Vincent, 1957; Borelli, 1951; Heider and Heider, 1941). This conflicting evidence makes it difficult to ascertain to what extent hearing-impaired children are impaired in their ability to think. Furth (1973) has ascribed the deficit of hearing-impaired children on certain cognitive tasks to impoverished language experiences, rather than to limited language abilities.
At the early stages of the pre-operational period (2-4 years) it would appear that hearing-impaired children should be capable of using the functions of language proposed by Tough, given they possess "normal" intelligence and ability to think. It is hypothesized that while hearing-impaired children are capable of using higher level functions as well as the lower level functions found by Curtiss et al., they will not demonstrate this ability due to lack of awareness, motivation and experience in using these functions as was suggested by Furth. The ensuing chapters will describe this study in greater detail.
CHAPTER III

THE STUDY

Definition of Terms

Throughout this study, various terms will be used as defined below:

**bilateral hearing loss** - hearing loss in both ears

**communicative act** - the issuing of communicative behaviors to convey a complete thought

**communicative behavior** - any verbal or non-verbal behavior that is expressively communicated to oneself or to another person in the interaction process, including speech, vocalization, gestures, actions, or signs

**communicator** - mother or hearing-impaired child who demonstrates communicative behavior during the interaction process

**degree of hearing loss** - discussed in terms of average hearing thresholds expressed in decibels (dB) and equal to the arithmetic mean of the pure tone averages obtained at .5, 1, and 2 kHz for the better ear using the American National Standards Institute (ANSI) criteria.

The term **profound** refers to a hearing loss greater than 90 dB (ANSI)

**functions** - the intentions of the communicator in using communicative acts, as determined by a trained coder

**hearing-impairment** - a generic term encompassing all degrees of hearing loss, including the conditions known as hard-of-hearing and deaf

**mode** - the form of the communicative behavior used by the communicator, including verbal and non-verbal behaviors
pre-lingually hearing impaired - hearing-impairment existing at birth or acquired prior to the age of two

preschool children - children between the ages of 0 to 5 years

sensori-neural hearing loss - hearing-impairment due to abnormality of the cochlea, the auditory nerve, or both.

The Population

The 5 subjects for this study were selected from a British Columbian population which met the following criteria:

- 3.7-4.7 years of age at the time of the study
- prelingual, profound, bilateral, sensori-neural hearing impairment
- no known additional handicapping conditions, as determined by the assessment team at the Vancouver Children's Hospital Diagnostic Center
- parents and siblings who have no diagnosed hearing-impairment
- a system of sign language being used in the home
- at least one parent who has completed a formal course in introductory sign language
- involvement in a larger evaluation project of preschool services in B.C.

Parental interviews and audiological and psychological data revealed the following demographic information about the five subjects:
### TABLE III

**DEMOGRAPHIC DATA**

<table>
<thead>
<tr>
<th>Subject</th>
<th>Age</th>
<th>Etiology</th>
<th>Age at diagnosis</th>
<th>Age AIDS 1st obtained</th>
<th>Mothers age</th>
<th>Fathers age</th>
<th>Siblings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.6</td>
<td>rubella</td>
<td>6 months</td>
<td>8.5 months</td>
<td>32</td>
<td>34</td>
<td>1 female - younger</td>
</tr>
<tr>
<td>2</td>
<td>4.7</td>
<td>hereditary</td>
<td>13 months</td>
<td>16 months</td>
<td>34</td>
<td>37</td>
<td>2 females - older</td>
</tr>
<tr>
<td>3</td>
<td>3.9</td>
<td>possibly hereditary</td>
<td>11 months</td>
<td>12 months</td>
<td>35</td>
<td>45</td>
<td>1 male - older</td>
</tr>
<tr>
<td>4</td>
<td>4.8</td>
<td>unknown (adopted)</td>
<td>22 months</td>
<td>28 months</td>
<td>28</td>
<td>28</td>
<td>1 male - younger (adopted)</td>
</tr>
<tr>
<td>5</td>
<td>4.6</td>
<td>premature cancomysin</td>
<td>7 months</td>
<td>18 months</td>
<td>31</td>
<td>28</td>
<td>2 males - younger</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subject</th>
<th>Family income</th>
<th>Highest level of education</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&lt;15,000</td>
<td>grade 12</td>
<td>grade 11</td>
</tr>
<tr>
<td>2</td>
<td>10,000</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>29,000</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>14,000</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>5</td>
<td>24,000</td>
<td>12</td>
<td>B.A.</td>
</tr>
</tbody>
</table>
The Instrument

Functions

The main focus of this study was to develop an instrument which would be useful in determining communicative functions used by hearing-impaired preschool children. The process of the evolution of and the instrument which finally emerged are discussed herein.

Tough's (1977) model, which was described in Chapter II of this thesis, was initially selected as the instrument for this study. It was considered potentially suitable for this research for several reasons:

- It has been found to be useful for determining differences in the use of language functions by preschool hearing children.
- It was developed on the basis of sound theoretical models.
- It would be easily applied by the classroom teacher, due to its relative ease of use; only seven functions are involved and classroom observations are suggested as the source of the data.
- It encompasses pragmatic as well as "higher level" mathetic functions.
- It has been suggested as an appropriate tool for use by educators of the hearing-impaired (Tate, 1979).

In a pilot effort utilizing Tough's system as the research instrument, it became apparent that it was inadequate to assess the functions used by preschool hearing-impaired children. About 41% of the communicative acts used by the pilot subjects and 47% of the communicative acts of the subjects' mothers could not be coded with her system.

Other models were therefore explored which could supplement Tough's seven functions. Five additional categories suggested by Curtiss et al. (1977), namely imitating, repeating, acknowledging, ritual, and compliance,
were selected for inclusion in this study. These categories were considered appropriate for the following reasons:

They had been shown to be useful in examining the pragmatic functions used by preschool hearing-impaired children.

They are based on a strong theoretical model (Dore, 1974).

They were functions found to be missing from Tough's system that were characteristic of many of the communicative acts of young hearing-impaired children.

Although the original Curtiss system is relatively cumbersome with its 16 categories, it would seem that the system proposed here, which combines Tough and Curtiss, and collapses some of Curtiss' categories would be easier for classroom teachers to use (personal communication, Bolin, 1980; Curtiss, 1980).

Thus, the new instrument emerged with 13 functions and detailed operational definitions were formulated to increase inter-coder reliability. The final functional categories and their behavioral definitions are described below:

1. Imitating - (from Curtiss et al.)
   - an act imitating a communicative behavior performed by someone else

   e.g. mother says "chair"

   child imitates "chair"

   - expansion of another's communicative act.

   e.g. child says "sleep"

   mother imitates "the boy is sleeping"

   - reduction of another's communicative act

   e.g. mother says "that's a ladder"

   child imitates "ladder"
For a communicative act to function as an imitation, it does not have to be immediate but must occur within five communicative behaviors:

e.g. mother says "there are two beds"
   mother points to the beds
   child points to the dolls
   child imitates "two beds"

Rituals are excluded from this function

e.g. mother says "hi"
   child says "hi"

2. Repeating - (from Curtiss et al.)
   - an act imitating one's own communicative behavior. An act is a repetition if the original intention is retained, even though the mode of communicative behavior may be changed.
   e.g. child says "truck"
   child repeats "truck"
   e.g. child says "phone"
   child repeats by pointing to phone
   
   - expansion of one's own act
   e.g. mother says "table"
   mother repeats "that's a table"
   
   - reduction of one's own act
   e.g. mother says "what a long nose"
   mother repeats "long nose"

3. Ritual - (from Curtiss et al.)
   - a spontaneous greeting or other social ritual
   e.g. please, thank-you, bye-bye, sorry, oops
   - if a communicator has been directed to use the behavior, it is
not a ritual

e.g. mother says "say bye-bye"

child complies "bye-bye"

4. Acknowledging - (from Curtiss et al.)

- an act evidencing comprehension of a situation or communicative act;
  if the act is dual-function, the other function takes precedence
  e.g. yes, no, wrong, right, oh, mhm, nod

5. Complying - (adapted from Curtiss et al. - a type of acknowledging)

- an act which is a response in accordance with the intent of a direction
  e.g. mother directs "put the doll in the house"
      child complies with appropriate action
  e.g. mother directs "say long nose"
      child complies "long nose" (spoken)

6. Maintaining - (from Curtiss et al. and Tough)

- an act referring to physical or psychological needs and wants
  e.g. child says "I want a drink"
  e.g. child seeks approval by looking at mother before performing and action
- an act reinforcing, approving or disapproving another's behavior
  e.g. good, bad, you're silly, that's rude, good girl, fantastic, beautiful, good idea, oh alright, no (criticizing)
- an act protecting the self or self interests
  e.g. mother directs child to pick up phone
      child maintains by saying "no", "wait" or "later"

7. Ignoring - (addition)

- a special type of maintaining behavior in response to a direction
whereby the communicator protects his self interests by not responding to the intention of the direction; instead the communicator responds by giving a report or direction. The communicator must have sufficient notice and be aware that a direction has been given before it can be determined that he has chosen to ignore the direction. Caution is advised in that a communicator may appear to have ignored the original direction, but his response is actually due to the fact that the direction has been misunderstood.

e.g. mother directs "you phone mommy"

child ignores

child directs mother by pointing to a book

e.g. mother directs "put the T.V. in the house"

child points to real T.V. in the living room

In this instance the child did not ignore, he misunderstood the direction, and his "non-response" would not be coded.

8. Directing - (from Curtiss et al. and Tough)

- an act directing the behavior (action or attention) of the self or others including the direction "no" meaning "don't do that"

- directions may be given explicitly

  e.g. mother directs "give me the bed"

- directions may be given implicitly

  e.g. mother directs child to rub off the blackboard by saying "here is the brush"

  e.g. child says "girl" as he searches for doll

9. Reporting - (from Curtiss et al. and Tough)

- an act reporting on present or past events
- includes labelling
  e.g. child reports "bed" referring to bed
- referring to detail
  e.g. child reports "yellow" referring to bed
- making comparisons
  e.g. child reports "same" referring to two beds
- referring to incidents
  e.g. mother reports "we went to gramma's"
- referring to sequences of events
  e.g. mother reports "first we planted the seed and then it grew"

10. Imagining - (from Tough)
- an act developing an imaginary situation based on real life or fantasy
  e.g. child says "bird sleep" referring to a toy bird
  e.g. child says "tree" referring to imaginary Christmas tree
- developing an original story
  e.g. mother says "we went to the moon"

11. Reasoning - (from Tough)
- an act explaining a process
  e.g. mother says "we put the letter here, then a mailman takes it away"
- an act recognizing cause and effect relationships
  e.g. mother says "if you do that it might break"
- an act recognizing problems and their solutions
  e.g. mother asks child "how does it open"
  child examines the case, flips the handle over and opens it, i.e. the child reasoned how to open it
- justifying judgments
  e.g. child reasons "big" when mother tells him to put an
  oversize toy into a small house, and demonstrates that
  the toy will not fit

- drawing conclusions
  e.g. mother reasons "I think the plants need more water.
  It's so hot in here."

12. Projecting - (from Tough)
- an act which projects into the feelings or reactions of the
  self or others in experiences familiar to the communicator,
  or in situations never before experienced.
  e.g. mother projects "now the boy is happy" "the dog will be
  sad" "I'd be afraid of a lion"
  e.g. child projects "mommy mad"

13. Predicting - (from Tough)
- an act anticipating or forecasting events or problems and their
  solution
  e.g. child predicts "play there later"
- an act anticipating details and sequence of events
  e.g. mother predicts "maybe it will fit there"
- predicting the consequences of actions and behaviors
  e.g. mother predicts "if you do that you will have to go to
  your room"

14. Uncodable - (addition)
- an act which cannot be coded according to one of the other
  functions because it is unintelligible, interrupted, or serves
  a function not considered by this instrument.

Question forms are considered separately in terms of structure or
intonation and are coded according to the 13 categories just discussed on the basis of the type of response they anticipate. Each question form is, therefore, coded first as a question and then also coded as one of the 13 functions. The method of coding question forms, adapted from suggestions made by both Curtiss et al. and Tough retains valuable information about a speaker's intent.

Following are examples of the various question functions:

1. Imitating
   - imitation of another's communicative act, but with questioning intonation or structure
     e.g. child says "table" while holding a chair
     mother imitates "table?"
   - imitation of a question
     e.g. mother says "is that a ladder?"
     child imitates "ladder?"

2. Repeating
   - repetition of one's own communicative act with questioning intonation
     e.g. mother says "that's a table"
     mother repeat "that's a table?"
   - repetition of a question
     e.g. child says "what?"
     child repeats "what?"

3. Ritual
   - a communicative act that is a common ritual in the form of a question
     e.g. how are you?
     e.g. what do you say?
4. Acknowledging
   - a yes-no question which anticipates a "yes" response
     e.g. mother asks "do you want some candy?"
     e.g. mother asks "is that a bed?" while pointing to a bed

5. Maintaining
   - an act which seeks approval
     e.g. child begins to put a chair beside the table, stops and
     looks at mother for approval before proceeding with the
     action
   - an act which criticizes
     e.g. mother asks "are you being silly?"
   - an act which shows approval or disapproval
     e.g. mother says "do you want a spanking?"
     e.g. mother says "how come you're so smart?"

6. Directing
   - an act which seeks to direct the self or others, either
     explicitly or implicitly
     e.g. mother asks "do you want to phone mom?"
     e.g. mother asks "can you make a 'B'?"
   - a "where" question which anticipates a behavioral response of
     showing or pointing
     e.g. child searches for truck and asks "where?"
     e.g. mother asks child "where is your nose?"

7. Reporting
   - acts which seek a report
     e.g. "who?" "what?" "how many?" "what color?"
   - where questions that seek a report
     e.g. "Where is daddy today?"
- yes/no questions which seek a "no" response
  e.g. mother points to chair and asks "is that a table?"

8. Imagining
- acts which seek to develop an imaginary situation
  e.g. mother asks "Is cookie monster going shopping?"
- questions asked on behalf of imaginary characters
  e.g. child play acts one doll asking another "eat?"

9. Reasoning
- acts which seek reasoning responses
  e.g. "how?", "why?", "what would happen if . . .?", "what goes together?", "what else can you think of?"

10. Projecting
- acts which seek responses that project into feelings
  e.g. "how does he feel?" "how would he feel if . . .?"

11. Predicting
- acts which seek responses about the future
  e.g. "what will happen next?" "will something happen?" "when?"

Modes

Besides the function, the instrument developed for this study was designed to record the mode in which the communicative behavior occurred. Five modes were observed to be common in the communicative behavior of young hearing-impaired children and their mothers:

1. Speech - comprehensible utterances recognizable as spoken language by a naive listener, i.e. intelligible words, phrases or sentences.

2. Vocalization - sound production of a phoneme alone or in syllables but not in the form of, or recognizable as speech.
Examples: aaaaaaa; mmhmm; laughing; crying.

3. Gesture – a movement of the body or body parts that symbolizes or emphasizes an idea or feeling and conveys this meaning to another person. The gesture may supplement, replace, or contradict verbal behaviors.
Examples: shrugging the shoulders; waving; pointing; frowning; smile; pantomime; mouthing the words without using voice.

4. Sign – a gesture made by one or both hands that is a symbolic representation in:
   a. a conventional sign language system for the hearing-impaired, for example, Signing Exact English (S.E.E.), Ameslan (A.S.L.), or Signed English. The gesture must be recognized to be a sign by a person familiar with sign systems.
   b. a system devised and used by the child and/or his family and recognized to be such a sign by the mother.
   c. the manual alphabet, i.e., fingerspelling.

5. Action – one or a series of purposeful physical acts of the body or body parts which act upon another person or object so that physical contact is made. An action is determined to be communicative in the context of the communicative behavior which precedes or follows it. For example, putting a doll in to the doll house is communicative when it follows a directive, such as "put the doll in the house"; or when it precedes a directive, for example, the child puts one doll in the house and then directs the mother to "do the same".

The modes may be used independently, at the same time or in a sequence. When two or more modes communicate exactly the same message
and are used at exactly the same time, they are said to be simultaneous and are denoted by round brackets. For example, the mother says and signs \(\text{the boy is sleeping}\). When two or more modes are used at the same time \(\text{the boy is sleeping}\)

but do not convey precisely the same messages, they are termed overlapping modes and are denoted by square brackets. For example \([\text{the boy is sleeping} \text{boy sleep}\])

would indicate that the mother said "the boy is sleeping", but signed "boy sleep" as she said it. When two or more modes are used one after the other to convey one communicative act, they are called sequential and are denoted by large slashes. For example, if the child signed red, then pointed to the phone, it would be shown as \(/\text{red points to phone}/\).

In order to simplify the coding of the modes and the functions, a system of abbreviations was used (see Figure 1).

<table>
<thead>
<tr>
<th>Codes</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech------------------------</td>
<td>Imitating---------------</td>
</tr>
<tr>
<td>Vocalization------------------</td>
<td>Repeating---------------</td>
</tr>
<tr>
<td>Gesture-----------------------</td>
<td>Ritual-------------------</td>
</tr>
<tr>
<td>Sign-------------------------</td>
<td>Acknowledging----------</td>
</tr>
<tr>
<td>Action------------------------</td>
<td>Complying--------------</td>
</tr>
<tr>
<td>Simultaneous------------------</td>
<td>Maintaining-----------</td>
</tr>
<tr>
<td>Overlapping-------------------</td>
<td>Ignoring---------------</td>
</tr>
<tr>
<td>Sequential--------------------</td>
<td>Directing-------------</td>
</tr>
<tr>
<td></td>
<td>Reporting-------------</td>
</tr>
<tr>
<td></td>
<td>Imagining-------------</td>
</tr>
<tr>
<td></td>
<td>Reasoning-------------</td>
</tr>
<tr>
<td></td>
<td>Projecting-----------</td>
</tr>
<tr>
<td></td>
<td>Predicting-----------</td>
</tr>
<tr>
<td></td>
<td>Question-----------</td>
</tr>
<tr>
<td></td>
<td>Uncodable - due to the communicator-U</td>
</tr>
<tr>
<td></td>
<td>- due to the coding system-UU</td>
</tr>
</tbody>
</table>

**FIGURE 1: Coding Symbols**
The instrument thus described was used to examine the communication modes and functions of the subjects in this study.

**Procedure**

This study forms part of a larger evaluation project, which is currently investigating early intervention services to preschool hearing-impaired children and their families in British Columbia. The author has been involved in the evaluation project as the on-site research assistant, and is directly involved in all aspects of data collection. Permission to use video-tape recordings of mother-child interaction and information re: family background gathered for the larger study, was obtained for the present research from the project evaluator in Seattle, Washington and from the families involved.

The video-tapes consisted of 15 minutes of interaction between mother and child, in which the mothers had been instructed to play with their children as they normally would during the course of a day. The play materials were provided by the evaluator and so were held constant across subjects (see Appendix A). Parental interviews provided the family background information. All data were collected in the subjects' homes. The mothers and children had the opportunity of being exposed to the interviewer and the equipment prior to the actual video-taping sessions, and so interacted naturally and tended to ignore the set-up and the research assistant during the data collection.

Black and white video-tapes were obtained using a Sony Beta-Max Portapac video-tape recorder. A time display in minutes and seconds was superimposed on the upper left hand corner of each tape by technicians at the University of Seattle. The tapes were transferred to 3/4 inch videocassettes, to accommodate playback equipment at the
University of British Columbia. Code numbers were then assigned to each child and mother.

The procedure for examining the pragmatic and higher level mathetic functions used by the preschool hearing-impaired children in this study involved two steps:

1. formulating the coding system described in the previous section
2. transcribing and coding the video-tape recordings of the five mother-child dyads.

Two tapes were used as a pilot for Tough's coding system. The tapes were viewed and transcribed by the present investigator. The task of simultaneously controlling the play-back machine, viewing the tapes and transcribing the communicative behaviors proved to be extremely inefficient for one person to do alone. An attempt was made to increase the speed of the procedure by using an audio-cassette tape recorder to record verbally what was seen and heard on the video-tape. The cassette was later played back and the information transcribed and coded. This was satisfactory in the pilot effort to determine the effectiveness of Tough's system. However, it would not suffice for a detailed transcription as it was still time consuming and information was lost by not viewing the video-tape at the exact time of the coding. It was decided that a second person was needed to assist in coding the data. This strategy also would permit examination of inter-coder reliability.

Prior to recruiting a research assistant, the categories of pragmatic functions suggested by Curtiss et al. were incorporated into Tough's system and the new coding system devised, as previously discussed. Following a 5 hour training period in the use of the new instrument, transcription and coding of the interactions were done by the researcher
and assistant together. Conventions for transcription were adapted from Bloom and Lahey (1978) for use in this study (see Coder's Training Manual Appendix B).

One coder was responsible for operating the video play-back equipment and verbalizing the communicative behavior observed, while the other coder was free to write the transcriptions on prepared coding sheets. The mode and function were then coded independently by both coders. Agreements and disagreements were tabulated and differences were resolved by discussion and mutual consent. There were no disagreements that could not be settled by this procedure. The total time required to transcribe and code each tape was also noted.

The operational definitions of the functions were revised and expanded as the need arose for the first three dyads. After the third transcription was completed, the first three tapes were recoded to ensure that all communicative acts were coded using the same criteria. The final two tapes were transcribed, coded and checked with no further revisions of the coding system.

The coding manual was then rewritten for use outside of this study. Finally, letters of appreciation were sent to all the families who so kindly agreed to participate in this research.

The results of the study are discussed in the next chapter of this thesis.
CHAPTER IV

RESULTS AND DISCUSSION

Frequency and percent frequency scores of language functions and modes of communication used by mother-child dyads in this study provided the data for analysis. Most statistical procedures were inappropriate for examining the data due to the small sample size and because normality of the sample could not be assumed. Future practical application by classroom teachers was also considered in selecting the procedures for data analysis.

The results herein reported provide a concrete basis for the ensuing discussion, but any generalizations are highly tentative. The results may be interpreted in various ways depending on the philosophical orientation of the reader. This author acknowledges the fact that individual interpretation based on familiarity with the subjects provides the most useful information about the language functioning of a hearing-impaired child. Readers are invited to draw their own conclusions from the data, and use the information in a way most suitable to their needs. Observed aspects of the mother-child interaction may be the consequences or antecedents of the child's language acquisition (Greenstein, 1975). Thus although correlations are discussed, cause and effect cannot be determined.
Suitability of the Coding System

A total of 1500 communicative acts were examined during the five 15 minute videotapes. Mothers generally used more communicative acts than their children, although one mother used slightly fewer acts than her child. The more communicative acts a mother used, the more her child tended to use, except in the case of the one mother using fewer acts than her child.

Some acts were uncodable as to mode or function, but the majority of these were due to the communicator rather than the coding system. The only acts which were uncodable because the system did not accommodate for them, were 7 non-responses by children when directions went unnoticed. No mother's acts were uncodable due to the system.

Inter-coder agreements for both mode and function were very high, and as mentioned previously, all disagreements were subsequently mutually resolved.

These results are summarized in Table IV.

TABLE IV

FREQUENCY OF COMMUNICATIVE ACTS AND UNCODABLE ACTS, AND PERCENT FREQUENCY OF INTER-CODER AGREEMENTS ACROSS MOTHER-CHILD DYADS

<table>
<thead>
<tr>
<th></th>
<th>Child</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>Acts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>122</td>
<td>2</td>
<td>180</td>
<td>0</td>
<td>302</td>
<td>2</td>
<td>99.34</td>
</tr>
<tr>
<td>2</td>
<td>170</td>
<td>1</td>
<td>205</td>
<td>0</td>
<td>375</td>
<td>1</td>
<td>99.97</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>2</td>
<td>163</td>
<td>0</td>
<td>263</td>
<td>2</td>
<td>100.00</td>
</tr>
<tr>
<td>4</td>
<td>107</td>
<td>2</td>
<td>105</td>
<td>0</td>
<td>212</td>
<td>2</td>
<td>100.00</td>
</tr>
<tr>
<td>5</td>
<td>146</td>
<td>0</td>
<td>202</td>
<td>0</td>
<td>348</td>
<td>0</td>
<td>99.71</td>
</tr>
<tr>
<td></td>
<td>645</td>
<td>7</td>
<td>855</td>
<td>0</td>
<td>1500</td>
<td>7</td>
<td>99.73</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mode Function

91.39 92.80 91.64 93.87 89.94 91.80
The data suggest that the coding instrument designed for this study is appropriate for examining the functions and modes used by hearing-impaired preschool children and their mothers.

Functions

The communicator's intention in using a communicative act was classified using the coding instrument. Each act was assigned one communicative function. At times, multi-functional acts were used. In order to simplify coding, these acts were separated where possible into single function units, or coded according to the dominant function as described in Chapter III. Frequency and percent frequency of each function used were computed for each mother and child. (See Table V and Figures 2, 3, 4, 5, 6.)

Children's Use of Functions

As hypothesized, all children used the lower pragmatic functions of imitating, repeating, ritual, acknowledging, complying, maintaining, directing, reporting, and imagining, and 4 of the 5 children used ignoring, whereas the higher level mathetic functions were used much less frequently or not at all. Only one child used reasoning, one used projecting and two used predicting, and these functions were less than 2% of the total acts used by each of these children.

Mothers' Use of Functions

Again, as hypothesized, almost all of the lower level pragmatic functions were used by the mothers, while the higher level mathetic functions were used much less often and only by one or two mothers. Two mothers used projecting, one used reasoning and none used predicting.

No mothers used ignoring in response to any of their children's directions. Since almost all of the children demonstrated ignoring
TABLE V  
FREQUENCY AND PERCENT FREQUENCY OF  
FUNCTIONS - 15 MINUTE SAMPLES

<table>
<thead>
<tr>
<th></th>
<th>Subj. 1</th>
<th>N=122</th>
<th>Subj. 2</th>
<th>N=180</th>
<th>Subj. 3</th>
<th>N=170</th>
<th>Subj. 4</th>
<th>N=205</th>
<th>Subj. 5</th>
<th>N=100</th>
<th>Subj. 6</th>
<th>N=107</th>
<th>Subj. 7</th>
<th>N=105</th>
<th>Subj. 8</th>
<th>N=146</th>
<th>Subj. 9</th>
<th>N=202</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.46%</td>
<td>11.67%</td>
<td>12.35%</td>
<td>14.63%</td>
<td>4.0%</td>
<td>9.82%</td>
<td>2.80%</td>
<td>18.10%</td>
<td>10.27%</td>
<td>7.92%</td>
<td>11.67%</td>
<td>12.35%</td>
<td>14.63%</td>
<td>4.0%</td>
<td>9.82%</td>
<td>2.80%</td>
<td>18.10%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.10%</td>
<td>7.78%</td>
<td>10.59%</td>
<td>15.12%</td>
<td>2.0%</td>
<td>14.11%</td>
<td>13.08%</td>
<td>18.10%</td>
<td>6.16%</td>
<td>14.85%</td>
<td>7.78%</td>
<td>10.59%</td>
<td>15.12%</td>
<td>2.0%</td>
<td>14.11%</td>
<td>13.08%</td>
<td>18.10%</td>
<td></td>
</tr>
<tr>
<td>Ritual</td>
<td>(1)</td>
<td>(8)</td>
<td>(4)</td>
<td>(13)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(0)</td>
<td>(3)</td>
<td>(0)</td>
<td>(8)</td>
<td>(4)</td>
<td>(13)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.82%</td>
<td>4.44%</td>
<td>2.35%</td>
<td>6.34%</td>
<td>1.0%</td>
<td>0.61%</td>
<td>0.93%</td>
<td>0.0%</td>
<td>2.05%</td>
<td>0.0%</td>
<td>4.44%</td>
<td>2.35%</td>
<td>6.34%</td>
<td>1.0%</td>
<td>0.61%</td>
<td>0.93%</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.74%</td>
<td>8.33%</td>
<td>14.71%</td>
<td>21.95%</td>
<td>25%</td>
<td>17.18%</td>
<td>14.02%</td>
<td>14.29%</td>
<td>8.90%</td>
<td>9.90%</td>
<td>8.33%</td>
<td>14.71%</td>
<td>21.95%</td>
<td>25%</td>
<td>17.18%</td>
<td>14.02%</td>
<td>14.29%</td>
<td></td>
</tr>
<tr>
<td>Complying</td>
<td>(12)</td>
<td>(11)</td>
<td>(14)</td>
<td>(0)</td>
<td>(18)</td>
<td>(6)</td>
<td>(10)</td>
<td>(2)</td>
<td>(33)</td>
<td>(14)</td>
<td>(12)</td>
<td>(11)</td>
<td>(14)</td>
<td>(0)</td>
<td>(18)</td>
<td>(6)</td>
<td>(10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.84%</td>
<td>6.11%</td>
<td>8.24%</td>
<td>0.0%</td>
<td>18%</td>
<td>3.68%</td>
<td>9.35%</td>
<td>1.90%</td>
<td>22.60%</td>
<td>6.93%</td>
<td>6.11%</td>
<td>8.24%</td>
<td>0.0%</td>
<td>18%</td>
<td>3.68%</td>
<td>9.35%</td>
<td>1.90%</td>
<td></td>
</tr>
<tr>
<td>Maintaining</td>
<td>(19)</td>
<td>(3)</td>
<td>(4)</td>
<td>(4)</td>
<td>(7)</td>
<td>(8)</td>
<td>(2)</td>
<td>(6)</td>
<td>(10)</td>
<td>(10)</td>
<td>(19)</td>
<td>(3)</td>
<td>(4)</td>
<td>(4)</td>
<td>(7)</td>
<td>(8)</td>
<td>(2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.57%</td>
<td>1.67%</td>
<td>2.35%</td>
<td>1.95%</td>
<td>7.0%</td>
<td>4.91%</td>
<td>1.87%</td>
<td>1.90%</td>
<td>4.11%</td>
<td>4.95%</td>
<td>1.67%</td>
<td>2.35%</td>
<td>1.95%</td>
<td>7.0%</td>
<td>4.91%</td>
<td>1.87%</td>
<td>1.90%</td>
<td></td>
</tr>
<tr>
<td>Ignoring</td>
<td>(7)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(2)</td>
<td>(0)</td>
<td>(3)</td>
<td>(0)</td>
<td>(7)</td>
<td>(0)</td>
<td>(7)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(2)</td>
<td>(0)</td>
<td>(3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.74%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.0%</td>
<td>0.0%</td>
<td>2.80%</td>
<td>0.0%</td>
<td>4.79%</td>
<td>0.0%</td>
<td>5.74%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.0%</td>
<td>0.0%</td>
<td>2.80%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>22.13%</td>
<td>32.78%</td>
<td>16.47%</td>
<td>11.22%</td>
<td>12%</td>
<td>31.29%</td>
<td>13.08%</td>
<td>20%</td>
<td>15.75%</td>
<td>30.69%</td>
<td>22.13%</td>
<td>32.78%</td>
<td>16.47%</td>
<td>11.22%</td>
<td>12%</td>
<td>31.29%</td>
<td>13.08%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>29.51%</td>
<td>17.22%</td>
<td>21.76%</td>
<td>20.49%</td>
<td>17%</td>
<td>14.72%</td>
<td>23.36%</td>
<td>17.14%</td>
<td>20.55%</td>
<td>21.78%</td>
<td>29.51%</td>
<td>17.22%</td>
<td>21.76%</td>
<td>20.49%</td>
<td>17%</td>
<td>14.72%</td>
<td>23.36%</td>
<td></td>
</tr>
<tr>
<td>Imagining</td>
<td>(2)</td>
<td>(2)</td>
<td>(5)</td>
<td>(5)</td>
<td>(8)</td>
<td>(2)</td>
<td>(10)</td>
<td>(3)</td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
<td>(2)</td>
<td>(5)</td>
<td>(5)</td>
<td>(8)</td>
<td>(2)</td>
<td>(10)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.64%</td>
<td>1.11%</td>
<td>2.94%</td>
<td>2.44%</td>
<td>8.0%</td>
<td>1.23%</td>
<td>9.35%</td>
<td>2.86%</td>
<td>1.37%</td>
<td>0.99%</td>
<td>1.64%</td>
<td>1.11%</td>
<td>2.94%</td>
<td>2.44%</td>
<td>8.0%</td>
<td>1.23%</td>
<td>9.35%</td>
<td>2.86%</td>
</tr>
<tr>
<td>Reasoning</td>
<td>Projecing</td>
<td>Predicting</td>
<td>Uncodable</td>
<td>Questions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------</td>
<td>-----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N=122 Subj. 1</td>
<td>N=180 Mother 1</td>
<td>N=170 Subj. 2</td>
<td>N=205 Mother 2</td>
<td>N=100 Subj. 3</td>
<td>N=163 Mother 3</td>
<td>N=107 Subj. 4</td>
<td>N=105 Mother 4</td>
<td>N=146 Subj. 5</td>
<td>N=202 Mother 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reasoning</td>
<td>(0)</td>
<td>(0)</td>
<td>(3)</td>
<td>(7)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.76%</td>
<td>3.41%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projecting</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(3)</td>
<td>(1)</td>
<td>(1)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.46%</td>
<td>1.0%</td>
<td>.61%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predicting</td>
<td>(0)</td>
<td>(0)</td>
<td>(1)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>.59%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.87%</td>
<td>0.0%</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uncodable</td>
<td>(3)</td>
<td>(16)</td>
<td>(10)</td>
<td>(2)</td>
<td>(3)</td>
<td>(3)</td>
<td>(8)</td>
<td>(6)</td>
<td>(4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.46%</td>
<td>8.89%</td>
<td>5.88%</td>
<td>.98%</td>
<td>3.0%</td>
<td>1.84%</td>
<td>7.48%</td>
<td>5.71%</td>
<td>2.74%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questions</td>
<td>(2)</td>
<td>(33)</td>
<td>(14)</td>
<td>(54)</td>
<td>(4)</td>
<td>(38)</td>
<td>(2)</td>
<td>(36)</td>
<td>(6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.64%</td>
<td>18.33%</td>
<td>8.24%</td>
<td>26.34%</td>
<td>4.0%</td>
<td>23.31%</td>
<td>1.87%</td>
<td>34.29%</td>
<td>4.11%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TABLE V—Continued
Figure 2: Percent Frequency of Functions - Dyad 1
Figure 3: Percent Frequency of Functions - Dyad 2

- Imitating
- Repeating
- Ritual
- Acknowledging
- Complying
- Maintaining
- Ignoring
- Directing
- Reporting
- Imagining
- Reasoning
- Projecting
- Predicting
- Uncodeable
- Questions

Percent Frequency

n=205

n=170
Figure 4: Percent Frequency of Functions—Dyad 3
Figure 5: Percent Frequency of Functions - Dyad 4
Figure 6: Percent Frequency of Functions—Dyad 5
behavior, it seems unlikely that the mothers never use ignoring and the results are an artifact of the video-taping situation, i.e. mothers were aware that they were being observed and tended to maintain a positive communicative environment.

Two mothers did not use rituals, but these two mother-child dyads did not use the play telephones in their interactions, thereby limiting opportunities for ritual acts.

One mother did not show any compliance on the basis of the final tabulations. However, her child always used directions for attention and compliance to this type of direction was not coded.

Though all the mothers used imagining, they used it less often than their children. This may be a result of the inhibited creativity of many adults. The use of this function by mothers may need to be specifically encouraged.

Mothers' communicative acts were uncodable less often than their children's, and were most often uncodable because the communication was interrupted.

All of the mothers used repeating more than their children did. Repetition is a general component of Motherese directed to language learning children, and would appear to be appropriate for use by mothers of preschool hearing-impaired children. Four of the five mothers used imitations more than their children. Mothers of hearing-impaired children are encouraged to provide appropriate speech and language models for their children and to expand on their children's utterances, hence it would seem the frequency of mothers' imitations could be the result of early intervention and parent counselling. Whereas parent imitations have been found to substantially increase the probability of imitation
by children (Folger and Chapman, 1978), these data do not support that finding.

Dyads' Use of Functions

All of the children used compliance more often than their mothers, which is perhaps related to the fact that all of the mothers except one were more directing than their children.

The most directing child had the most directing mother who was also the most compliant mother, suggesting that a relationship exists between child and mother in the use of this function in communication, and that a complying mother may reinforce directing in her child.

The child with the least directing mother at no time used ignoring in response to his mother, while the child who ignored the most had the most directing mother. It appears mothers should be encouraged to direct less often and to relate their communication to their children's interests and desires in order to provide a positive communicative environment in which the child is motivated to attend to his mother or other communication partner.

Only one mother-child dyad used reasoning, and only one mother-child dyad used projecting. One other mother used projecting but her child did not. Though no mothers used predicting, two children did. It is suspected that in order for a child to use these higher level functions, mothers should provide the model. However this is not thoroughly substantiated by the data.

Table VI shows the results of Spearman's Rank Correlation Coefficients between the mother-child pairs for use of functions, which reveal that a high positive correlation exists between children's and mother's use of language functions.
TABLE VI
CORRELATIONS BETWEEN MOTHERS AND CHILDREN
FOR USE OF FUNCTION

<table>
<thead>
<tr>
<th>Child-Mother Dyad</th>
<th>Spearman's $\gamma$ (rho)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.6477</td>
</tr>
<tr>
<td>2</td>
<td>0.7235</td>
</tr>
<tr>
<td>3</td>
<td>0.7783</td>
</tr>
<tr>
<td>4</td>
<td>0.7816</td>
</tr>
<tr>
<td>5</td>
<td>0.8241</td>
</tr>
</tbody>
</table>

Questions

Speech acts were coded as questions if they were direct questions determined by structure or intonation, which anticipated certain responses, or when they were indirect speech acts which did not anticipate the responses suggested by the surface form. While indirect question forms are frequently used by adults, young children do not begin to comprehend these conversational postulates until about 3 years of age and it is not until seven or eight years that they are able to manipulate surface form and content to achieve communication goals (Miller, 1978). Adults' questions which seek responses directly in their surface forms are usually "artificial" in the parent-child or teacher-child communication situation in that the parent or teacher is seeking a response that is known. On the other hand, the young child will use a question form to seek unknown information. While it has been suggested that the use of questions by mothers is unrelated to a child's acquisition of language (Greenstein, 1975), its relation to a child's use of questions has not been explored. It is known that mothers of hearing children are more likely to use questions than are mothers of hearing-impaired children (Goss, 1970). An analysis of the use of questions may provide valuable
clues about the language functions of hearing-impaired preschool children and their mothers.

The frequency of mothers' and children's use of question types are summarized in Table VII.

Children's Use of Questions

All of the children used much fewer question forms than their mothers. Four of the five children used questions for directing, but all of these questions were "where" questions and anticipated that the mothers would respond by finding the searched for object, so that while it appears that the children were using implicit questions as directions, they likely do not recognize them as such, but use the question form because they lack the language of the explicit direction.

Only three of the five children used questions that anticipated reporting responses. This is somewhat surprising in light of the fact that the toys provided were unfamiliar to the children and many items were likely to be new to them, for example the soda fountain, news stand and bird's nest. This may suggest that the children are not used to asking questions of their mothers to acquire new information. Two tentative reasons are suggested:

Young hearing-impaired children are not accustomed to asking questions of their mothers in order to acquire new information. This would seem to be in contrast to young hearing children who constantly seek information from adults in their environment.

The hearing-impaired children have not found their mothers to be good sources for reporting information. This would seem likely in view of the fact that although all of the families were attempting to use sign language in addition to speech, they
### TABLE VII

**FREQUENCY OF USE OF QUESTION TYPES**

<table>
<thead>
<tr>
<th></th>
<th>child</th>
<th>mother</th>
<th>child</th>
<th>mother</th>
<th>child</th>
<th>mother</th>
<th>child</th>
<th>mother</th>
<th>child</th>
<th>mother</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>imitating</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>repeating</td>
<td>4</td>
<td>5</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>4</td>
<td>4</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>35</td>
</tr>
<tr>
<td>ritual</td>
<td></td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>
| acknowledging | 1  | 2      |       | 4      | 4     | 3      | 10
| complying |       |        |        |        | 0      |        | 0     |        |       |        |
| maintaining | 1   | 1      |       |        |        |        |        |        |
| ignoring  |       |        |        |        |        |        |        |        |        |        | 2     |
| directing | 1     | 2      | 1     | 4      | 11    | 2      | 3      | 5      | 8      | 37    |
| reporting | 1     | 21     | 3     | 26     | 12    | 15     | 1      | 27     | 106   |
| imagining |       | 3      | 1     |        | 1      | 1      | 8     |
| reasoning |       | 4      |       |        | 3      | 3      | 4     |
| projecting |       |        |        |        |        |        |        |        |        |        | 0     |
| predicting |       |        |        |        |        |        |        |        |        |        | 0     |
| uncodable |       |        |        |        |        |        |        |        |        |        | 0     |
| Total    | 2     | 33     | 14    | 54     | 4     | 38     | 2     | 36     | 6     | 52     | 241   |
generally reported their knowledge of signs to be "fair". When mothers lack the necessary sign vocabulary, and the children are unable to process auditory input alone, the communication process tends to breakdown. These young hearing-impaired children appear to have limited their use of the function of reporting questions, in adapting to the communication interaction with which they are familiar.

No children used questions for acknowledging or for the higher level mathetic functions of reasoning, projecting or predicting, and only one child used question forms for imagining.

Mothers' Use of Questions

Mothers used question forms often in their communication, with the frequency ranging from 18.33%-34.29% of their total communicative acts.

All mothers used questions for reporting, directing, repeating and imitating and four of the five used question forms in acknowledging. It appears that mothers use indirect speech acts with their young hearing-impaired children as they would naturally do if their children were hearing, although perhaps with less frequency.

Reporting questions were used most frequently by all of the mothers, possibly as a means of encouraging expressive language and checking comprehension. Asking a child to give a report is an often used technique for demonstrating or "showing-off" a child's language skills and the high frequency of reporting questions may have been due to the mothers' desire to demonstrate the children's comprehension for the researcher. Such questioning, however, is encouraged and used by many parents and teachers in lieu of real two way communication with a child who has limited language skills, and it is likely that the results
indicate that use of this function in interactions between young hearing-impaired children and their mothers is more common than would be normally expected in normally hearing mother-child dyads.

Imitations and repetitions in question forms were used fairly frequently, to reinforce language or to check comprehension, particularly when a child gave an incorrect report. Of the lower level pragmatic functions, only ritual and maintaining questions were used very infrequently.

None of the higher level mathetic functions were used in question forms, except by one mother who asked several reasoning questions. It appears mothers do not anticipate higher level responses from their children and do not provide opportunities for encouraging such uses of language.

Dyads' Use of Questions

The mother who used the most question forms and the greatest variety of question functions had the child who used the most question forms and the greatest variety of question functions. The child with the least number of questions and only two different question functions had the mother who used the least number of question forms and functions.

Only one mother used any higher level mathetic functions (reasoning) and it was her child alone who used reasoning responses. Cause and effect are not implied but the relationship, existing in this sample, warrants further exploration.

Modes

Table VIII and Figures 7, 8, 9, 10, and 11, give the frequency and percent frequency of mode use for the mother and child dyads. The use of modes appears to be a more highly individual matter than the use of
<table>
<thead>
<tr>
<th></th>
<th>Child 1</th>
<th>Mother 1</th>
<th>Child 2</th>
<th>Mother 2</th>
<th>Child 3</th>
<th>Mother 3</th>
<th>Child 4</th>
<th>Mother 4</th>
<th>Child 5</th>
<th>Mother 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Speech</strong></td>
<td>(0)</td>
<td>(6)</td>
<td>(44)</td>
<td>(64)</td>
<td>(0)</td>
<td>(41)</td>
<td>(0)</td>
<td>(2)</td>
<td>(0)</td>
<td>(58)</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>3.33%</td>
<td>25.88%</td>
<td>31.22%</td>
<td>0.0%</td>
<td>25.15%</td>
<td>0.0%</td>
<td>1.91%</td>
<td>0.0%</td>
<td>28.71%</td>
</tr>
<tr>
<td><strong>Vocalization</strong></td>
<td>(3)</td>
<td>(1)</td>
<td>(6)</td>
<td>(7)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(0)</td>
<td>(9)</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>2.46%</td>
<td>0.56%</td>
<td>3.53%</td>
<td>3.42%</td>
<td>1.0%</td>
<td>.61%</td>
<td>.94%</td>
<td>0.0%</td>
<td>6.16%</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>13.93%</td>
<td>5.56%</td>
<td>2.94%</td>
<td>2.44%</td>
<td>21.0%</td>
<td>.61%</td>
<td>17.76%</td>
<td>6.67%</td>
<td>6.85%</td>
<td>2.48%</td>
</tr>
<tr>
<td><strong>Sign</strong></td>
<td>(8)</td>
<td>(2)</td>
<td>(0)</td>
<td>(8)</td>
<td>(0)</td>
<td>(16)</td>
<td>(9)</td>
<td>(23)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>6.56%</td>
<td>1.11%</td>
<td>0.0%</td>
<td>8.0%</td>
<td>0.0%</td>
<td>14.95%</td>
<td>8.57%</td>
<td>15.75%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td>(16)</td>
<td>(31)</td>
<td>(10)</td>
<td>(17)</td>
<td>(8)</td>
<td>(13)</td>
<td>(5)</td>
<td>(28)</td>
<td>(23)</td>
<td>(11.39%)</td>
</tr>
<tr>
<td></td>
<td>13.11%</td>
<td>17.22%</td>
<td>5.88%</td>
<td>17.0%</td>
<td>4.91%</td>
<td>12.15%</td>
<td>4.76%</td>
<td>19.18%</td>
<td>11.39%</td>
<td></td>
</tr>
<tr>
<td><strong>Simultaneous</strong></td>
<td>(3)</td>
<td>(38)</td>
<td>(21)</td>
<td>(43)</td>
<td>(1)</td>
<td>(16)</td>
<td>(0)</td>
<td>(33)</td>
<td>(10)</td>
<td>(24)</td>
</tr>
<tr>
<td></td>
<td>2.46%</td>
<td>21.11%</td>
<td>12.35%</td>
<td>20.98%</td>
<td>1.0%</td>
<td>9.82%</td>
<td>0.0%</td>
<td>31.43%</td>
<td>6.85%</td>
<td>11.88%</td>
</tr>
<tr>
<td><strong>Overlapping</strong></td>
<td>(38)</td>
<td>(36)</td>
<td>(52)</td>
<td>(71)</td>
<td>(14)</td>
<td>(88)</td>
<td>(6)</td>
<td>(30)</td>
<td>(35)</td>
<td>(69)</td>
</tr>
<tr>
<td></td>
<td>31.15%</td>
<td>20.0%</td>
<td>30.59%</td>
<td>34.64%</td>
<td>14.0%</td>
<td>53.99%</td>
<td>5.61%</td>
<td>28.57%</td>
<td>23.97%</td>
<td>34.16%</td>
</tr>
<tr>
<td><strong>Sequential</strong></td>
<td>(27)</td>
<td>(40)</td>
<td>(22)</td>
<td>(13)</td>
<td>(33)</td>
<td>(5)</td>
<td>(41)</td>
<td>(13)</td>
<td>(19)</td>
<td>(19)</td>
</tr>
<tr>
<td></td>
<td>22.13%</td>
<td>22.22%</td>
<td>12.94%</td>
<td>6.34%</td>
<td>33.0%</td>
<td>3.07%</td>
<td>38.32%</td>
<td>12.38%</td>
<td>13.01%</td>
<td>9.41%</td>
</tr>
<tr>
<td><strong>Uncodable</strong></td>
<td>(10)</td>
<td>(15)</td>
<td>(10)</td>
<td>(2)</td>
<td>(3)</td>
<td>(11)</td>
<td>(6)</td>
<td>(12)</td>
<td>(4)</td>
<td>(1.98%)</td>
</tr>
<tr>
<td></td>
<td>8.20%</td>
<td>8.33%</td>
<td>5.88%</td>
<td>.98%</td>
<td>5.0%</td>
<td>1.84%</td>
<td>10.28%</td>
<td>5.71%</td>
<td>8.22%</td>
<td>1.98%</td>
</tr>
</tbody>
</table>
Figure 7: Percent Frequency of Modes - Dyad 1
Figure 8: Percent Frequency of Modes—Dyad 2
Figure 9: Percent Frequency of Modes—Dyad 3
Figure 10: Percent Frequency of Modes - Dyad 4
Figure 11: Percent Frequency of Modes—Dyad 5
functions, as few patterns emerged between dyads or across children or mothers. However the small sample size cautions against generalizations from the results, which seem to reflect the personal communicative styles of the subjects in this study.

Children's Use of Modes

All of the children used either overlapping or sequential modes most frequently in their communication. Since the children were involved in non-threatening, natural communicative interaction with their mothers, it appears they found using a combination of modes more comfortable and effective than the use of any single mode alone.

Simultaneous mode use was much less frequent. By its definition, simultaneous use of modes generally necessitates intelligible speech. Given that four of the five children demonstrated limited use of speech, and in no case used speech alone, it is not surprising that simultaneous modes were not used very frequently.

The same four children who did not use speech alone, seldom used vocalization alone, but used gestures, signs or actions alone quite frequently. These subjects seem oriented to non-vocal modes of communicative behavior.

Only one child used speech alone in his communication and used it fairly often. This same child did not use signs alone and used gestures and actions alone very infrequently. The two coders considered his speech to be intelligible with good rhythm and intonation. This child appears oriented to a vocal mode of communicative behavior. Not surprisingly, this same child used simultaneous modes more often than did the other children.
Mothers' Use of Modes

All mothers used a combination of modes more frequently than any single mode alone.

The most frequently used combinations of modes were simultaneous by one mother, sequential modes by another and overlapping by the other three. This illustrates the fact that most of the mothers did not use exact English syntax in their signing, but did attempt to combine speech and sign in communicating with their young hearing-impaired children.

Three mothers used speech alone as their second most frequent mode of communication but did not use signs alone. These results must be interpreted in relation to the differing motivational factors which influenced each mother's use of modes. Mother 2 used speech alone very naturally and spontaneously to great advantage. Her child responded frequently and appropriately to speech alone and the family placed strong emphasis on maximizing this child's oral-aural skills during normal communicative interaction. This mother's use of speech and non-use of sign alone appears to reflect her child's abilities and her desire to continue the normal flow of communication between herself and her child.

Mother 5 emphasized aural-oral skills in a deliberate way so as to encourage development of these skills in her child. This mother's use of speech and non-use of sign alone appears to reflect her desire to use their interaction together as an opportunity to teach her child these communication skills.

Mother 3 did not place particular emphasis on oral-aural skill development, nor did her child demonstrate good comprehension of spoken language. However, this mother chose to use speech alone often with her child and not to use sign alone. Her speech was often more complex in
length and structure than her signs and the results seem to reflect a limited sign language vocabulary which did not, however, interrupt the mother's normal tendency to communicate orally.

On the other hand, mothers 1 and 4 used both speech alone and sign alone infrequently and appeared to prefer combined modes of communication. This may reflect that these mothers have found speech alone to be a non-productive means of communication for interaction with their children, yet are cognizant of using speech with their hearing-impaired children and so use both together to enhance the communication process. Mother 4 was the most consistent at using speech and sign simultaneously, reflecting her desire to provide oral and non-oral modes of communication for her child.

Dyads' Use of Modes

Only one highly positive relationship is seen to exist between mother-child dyads as reflected in Table IX.

<table>
<thead>
<tr>
<th>Child-Mother Dyad</th>
<th>Spearman's ( \gamma ) (rho)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.5439</td>
</tr>
<tr>
<td>2</td>
<td>.8193</td>
</tr>
<tr>
<td>3</td>
<td>-.1891</td>
</tr>
<tr>
<td>4</td>
<td>.1590</td>
</tr>
<tr>
<td>5</td>
<td>.1513</td>
</tr>
</tbody>
</table>

In dyad 2 the child's high frequency of intelligible speech and ability to respond auditorally likely contributed to the high correlation. However, both mother and child gave the impression of being highly attuned
to each other's communicative style and used certain modes accordingly in their communicative interaction.

Three separate studies (Crandall, 1978; Raffin, Davis and Gilman, 1978; Bornstein, Saulnier and Hamilton, 1980) have determined that the best predictor of a child's use of syntactical structures in sign language, is the mother's use of these structures. This is supported by the results of this study in that no mothers used suffixes or verb tense markers in their signing and neither did their children. Perhaps a larger sample would demonstrate a similar relationship between a child's and mother's use of modes. These data, however, suggest that children appear to have a certain propensity to use vocal or non-vocal modes alone or in combination, regardless of their mothers' use of these modes. Further research is needed to support or disprove these alternate hypotheses.

Suitability of Using a Six-Minute Sample

The task of transcribing and coding the fifteen minute samples for each mother-child dyad required an average of one hour per minute of videotape interaction. The amount of time decreased as the coders became more familiar with and adept at using the coding instrument. However, such a time-consuming process would prove inexpedient for a teacher striving to meet the needs of 5 or more preschool hearing-impaired children.

The possibility of using a shorter time span was tested by calculating the frequency and percent frequency of functions used by each child and mother over a 6-minute sample. Three 2-minute segments were selected from the beginning, middle and end of each 15-minute videotape. This analysis yielded a total of 596 communicative acts with an average of 50
acts per child and 69 acts per mother. The frequencies for each function are given in Table X.

Spearman's rank correlation coefficients between the 6- and 15-minute samples for each child and mother were computed, using the MIDAS program (see Table XI). These results show a very high positive correlation between the time samples indicating that a 6-minute sample will afford reliable information about the functions of language used by hearing-impaired preschool children, and would be suitable for use by teachers who do not have the time for a more lengthy analysis.
TABLE X

FREQUENCY AND PERCENT FREQUENCY OF FUNCTIONS - 6 MINUTE SAMPLES

<table>
<thead>
<tr>
<th>Subject 1</th>
<th>Mother 1</th>
<th>Subject 2</th>
<th>Mother 2</th>
<th>Subject 3</th>
<th>Mother 3</th>
<th>Subject 4</th>
<th>Mother 4</th>
<th>Subject 5</th>
<th>Mother 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imitating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>(6)</td>
<td>(11)</td>
<td>(8)</td>
<td>(2)</td>
<td>(2)</td>
<td>(3)</td>
<td>(7)</td>
<td>(7)</td>
<td>(12)</td>
</tr>
<tr>
<td>6.12%</td>
<td>7.79%</td>
<td>18.03%</td>
<td>11.43%</td>
<td>5.41%</td>
<td>3.85%</td>
<td>7.89%</td>
<td>15.22%</td>
<td>10.61%</td>
<td>12.0%</td>
</tr>
<tr>
<td>Repeating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>(5)</td>
<td>(5)</td>
<td>(11)</td>
<td>(1)</td>
<td>(9)</td>
<td>(5)</td>
<td>(9)</td>
<td>(5)</td>
<td>(15)</td>
</tr>
<tr>
<td>4.08%</td>
<td>6.49%</td>
<td>8.20%</td>
<td>15.71%</td>
<td>2.70%</td>
<td>17.31%</td>
<td>13.16%</td>
<td>19.57%</td>
<td>7.58%</td>
<td>15%</td>
</tr>
<tr>
<td>Ritual</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1)</td>
<td>(3)</td>
<td>(0)</td>
<td>(5)</td>
<td>(0)</td>
<td>(1)</td>
<td>(0)</td>
<td>(0)</td>
<td>(1)</td>
<td>(0)</td>
</tr>
<tr>
<td>2.04%</td>
<td>3.90%</td>
<td>0.0%</td>
<td>7.14%</td>
<td>0.0%</td>
<td>1.92%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.52%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Acknowledging</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>(8)</td>
<td>(10)</td>
<td>(14)</td>
<td>(9)</td>
<td>(9)</td>
<td>(6)</td>
<td>(8)</td>
<td>(8)</td>
<td>(10)</td>
</tr>
<tr>
<td>8.16%</td>
<td>10.39%</td>
<td>12.99%</td>
<td>20.0%</td>
<td>24.32%</td>
<td>17.31%</td>
<td>15.79%</td>
<td>17.39%</td>
<td>12.12%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Complying</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>(4)</td>
<td>(5)</td>
<td>(11)</td>
<td>(0)</td>
<td>(0)</td>
<td>(5)</td>
<td>(1)</td>
<td>(10)</td>
<td>(9)</td>
</tr>
<tr>
<td>8.16%</td>
<td>5.19%</td>
<td>8.20%</td>
<td>0.0%</td>
<td>29.73%</td>
<td>0.0%</td>
<td>13.16%</td>
<td>2.17%</td>
<td>15.15%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Maintaining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10)</td>
<td>(1)</td>
<td>(2)</td>
<td>(2)</td>
<td>(3)</td>
<td>(3)</td>
<td>(0)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>20.41%</td>
<td>1.30%</td>
<td>3.28%</td>
<td>2.86%</td>
<td>8.11%</td>
<td>5.77%</td>
<td>0.0%</td>
<td>4.35%</td>
<td>4.55%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Ignoring</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(1)</td>
<td>(0)</td>
<td>(2)</td>
<td>(0)</td>
</tr>
<tr>
<td>10.20%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.63%</td>
<td>0.0%</td>
<td>3.03%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Directing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(9)</td>
<td>(30)</td>
<td>(9)</td>
<td>(9)</td>
<td>(1)</td>
<td>(19)</td>
<td>(6)</td>
<td>(10)</td>
<td>(9)</td>
<td>(23)</td>
</tr>
<tr>
<td>18.37%</td>
<td>38.96%</td>
<td>14.75%</td>
<td>12.86%</td>
<td>2.70%</td>
<td>36.54%</td>
<td>15.79%</td>
<td>21.74%</td>
<td>13.64%</td>
<td>23.0%</td>
</tr>
<tr>
<td>Reporting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(11)</td>
<td>(11)</td>
<td>(14)</td>
<td>(5)</td>
<td>(7)</td>
<td>(7)</td>
<td>(9)</td>
<td>(19)</td>
<td>(26)</td>
<td></td>
</tr>
<tr>
<td>22.45%</td>
<td>14.29%</td>
<td>18.03%</td>
<td>20.0%</td>
<td>13.51%</td>
<td>13.46%</td>
<td>18.42%</td>
<td>19.57%</td>
<td>28.79%</td>
<td>26.0%</td>
</tr>
<tr>
<td>Imagining</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(0)</td>
<td>(1)</td>
<td>(2)</td>
<td>(2)</td>
<td>(4)</td>
<td>(1)</td>
<td>(2)</td>
<td>(0)</td>
<td>(1)</td>
<td>(0)</td>
</tr>
<tr>
<td>0.0%</td>
<td>1.30%</td>
<td>3.28%</td>
<td>2.86%</td>
<td>10.81%</td>
<td>1.92%</td>
<td>5.26%</td>
<td>0.0%</td>
<td>1.52%</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Subject 1</td>
<td>Mother 1</td>
<td>Subject 2</td>
<td>Mother 2</td>
<td>Subject 3</td>
<td>Mother 3</td>
<td>Subject 4</td>
<td>Mother 4</td>
<td>Subject 5</td>
</tr>
<tr>
<td>-------------</td>
<td>-----------</td>
<td>----------</td>
<td>-----------</td>
<td>----------</td>
<td>-----------</td>
<td>----------</td>
<td>-----------</td>
<td>----------</td>
<td>-----------</td>
</tr>
<tr>
<td>Reasoning</td>
<td>(0)</td>
<td>(0)</td>
<td>(2)</td>
<td>(3)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>3.28%</td>
<td>4.29%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Predicting</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(1)</td>
<td>(1)</td>
<td>(1)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>1.43%</td>
<td>2.70%</td>
<td>1.92%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Predicting</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(0)</td>
<td>(1)</td>
<td>(0)</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>2.63%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Predicting</td>
<td>(0)</td>
<td>(0)</td>
<td>(8)</td>
<td>(4)</td>
<td>(1)</td>
<td>(0)</td>
<td>(0)</td>
<td>(2)</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
<td>10.39%</td>
<td>6.56%</td>
<td>1.43%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>5.26%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Questions</td>
<td>(0)</td>
<td>(9)</td>
<td>(9)</td>
<td>(21)</td>
<td>(1)</td>
<td>(7)</td>
<td>(1)</td>
<td>(16)</td>
<td>(1)</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>11.69%</td>
<td>14.75%</td>
<td>30.0%</td>
<td>2.70%</td>
<td>13.46%</td>
<td>2.63%</td>
<td>34.78%</td>
<td>1.52%</td>
</tr>
</tbody>
</table>

<p>| N           | 49        | 77        | 61        | 70        | 37        | 52        | 38        | 46        | 66        | 100      |</p>
<table>
<thead>
<tr>
<th>Subject</th>
<th>Spearman's $\gamma$ (rho) Coefficient</th>
<th>Absolute Mean Diff.</th>
<th>Std. dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child 1</td>
<td>.9350</td>
<td>2.3729</td>
<td>2.1622</td>
</tr>
<tr>
<td>2</td>
<td>.9463</td>
<td>1.5493</td>
<td>1.6131</td>
</tr>
<tr>
<td>3</td>
<td>.8816</td>
<td>2.7807</td>
<td>3.4748</td>
</tr>
<tr>
<td>4</td>
<td>.9170</td>
<td>2.0314</td>
<td>1.8431</td>
</tr>
<tr>
<td>5</td>
<td>.9141</td>
<td>1.9200</td>
<td>2.6865</td>
</tr>
<tr>
<td>Mother 1</td>
<td>.9786</td>
<td>1.4186</td>
<td>1.8214</td>
</tr>
<tr>
<td>2</td>
<td>.9892</td>
<td>.8143</td>
<td>.9076</td>
</tr>
<tr>
<td>3</td>
<td>.9712</td>
<td>1.8214</td>
<td>1.9646</td>
</tr>
<tr>
<td>4</td>
<td>.9662</td>
<td>1.6364</td>
<td>1.7179</td>
</tr>
<tr>
<td>5</td>
<td>.9556</td>
<td>1.5164</td>
<td>2.2964</td>
</tr>
</tbody>
</table>
CHAPTER V

SUMMARY AND CONCLUSIONS

This research was concerned with the design and pilot testing of a system appropriate for examining the functions of communicative acts used by preschool hearing-impaired children and their mothers. Modes of communication were also considered. Five mother-child dyads involved in communicative interaction in a free-play situation provided the videotape data. The children ranged from 3.7-4.7 years of age, were prelingually profoundly hearing-impaired, and used a system of sign language as a component of their communication. All mothers were hearing and had completed at least one formal course in a sign language system.

Design of the coding instrument was based on relevant research from the areas of child language and communication of the hearing-impaired. A system emerged which combined the pragmatic functions used by preschool hearing-impaired children (Curtiss, Prutting and Lowell, 1977) with the higher level mathetic functions used by preschool hearing children and considered necessary for later school learning (Tough, 1977). The final coding system included the following 13 functions: imitating, repeating, ritual, acknowledging, complying, maintaining, ignoring, directing, reporting, imagining, reasoning, projecting and predicting. The few utterances which failed to fit the system, were unintelligible or interrupted, were coded as "uncodable". Questions were considered separately based on syntactic form or rising intonation, and were coded according to the functional response anticipated.
The 15-minute videotapes were transcribed and independently coded by the primary investigator and a research assistant, both of whom were experienced teachers of the hearing-impaired familiar with the communication of young hearing-impaired children.

Frequency and percent frequency of functions and modes used by each child and mother during the 15 minute segments were obtained. The frequency of functions used over 6-minute samples from the original tapes were also tabulated. Spearman rank correlation coefficients were computed between mothers' and children's use of functions and modes and between each child's and mother's use of functions for the 15 and 6 minute videotapes, using the MIDAS computer program.

The results suggest that the coding system devised for this study is suitable for examining the communicative functions of language used by hearing-impaired preschool children and their mothers. Further, it appears that there is a positive correlation between children's and mothers' use of these functions, whereas no distinct correlation exists for use of modes. As hypothesized, children and mothers generally used lower level pragmatic functions, whereas higher level mathetic functions were used rarely if at all. Correlations between subjects for use of functions during the 15 and 6 minute tapes yielded high positive correlations, suggesting that the shorter samples would provide sufficient data for analysis.

The implications of these results are affected by several limitations inherent in this study and in child language research in general.

The small sample size cautions against overgeneralization of the results regarding use of functions and modes by hearing-impaired preschool children and their mothers. Although results demonstrate certain
positive correlations, no cause and effect statements can be made. Functional language development may be related to factors not explored in this study.

The instrument itself may be insufficient or too extensive for optimum examination of the use of functions. Further research will be necessary to determine which pragmatic and mathetic functions are most relevant in this type of language analysis. The transcription and coding procedure suggested for data collection may not be feasible if videotape equipment or sufficient time are unavailable.

Learning to use the instrument is an ongoing process best realized when coding is a team effort. Such an approach accommodates discussion surrounding creation or clarification of the behavioral definitions of functions, and resolution of disagreements or misunderstandings. This optimal learning condition may not be possible in certain educational settings. Consequently, individuals interested in utilizing the system may at first feel confused or inadequately prepared.

Consideration for the practical application of this instrument by teachers, prompted attempts to maintain a simple design. Perhaps valuable information about the functions of language used by hearing-impaired children and their mothers is lost as a result. It is only through future use of the system that such a limitation can be confirmed or disproved.

Specific strategies associated with each function and used by the children and mothers were not analyzed in depth. Intra-function differences may exist which could provide greater insight and understanding into the use of function. These differences would be of concern to parents and teachers.
Despite these limitations, there are several implications from this pilot study in pragmatic-mathetic functioning of preschool hearing-impaired children and their mothers. The system has been so designed that it is easy to apply after an initial orientation (5 hours in this study). Since transcription and coding are a time-consuming process requiring one hour per minute of videotaped interaction, 6-minute time samples instead of the full 15-minute ones would be appropriate for teachers wishing to utilize this instrument but not having the time required for a more detailed analysis. The format proposed for transcription and coding allows the teacher to use these same data for other types of analysis, making it an even more useful procedure. For example, phonology, syntax, semantics, complexity, and length of utterances, as well as other pragmatic aspects of language such as turn taking, conversational postulates, and so on, can be assessed. Videotaping as a means of obtaining the data enables the teacher to do the analysis at any convenient time or place and a tape can be retained as a permanent record of a child's progress, or can be erased and made available for further data collection. Because it appears there is a correlation between children's and mothers' use of language functions, a first step in developing the functions in children would be to make teachers and parents aware of the various functions so that they may consciously provide the models needed. The system proposed in this research is a valuable guide for those interested in exploring this facet of communication or in a longitudinal study of language development.

Children who do not demonstrate effective use of pragmatic functions would appear to be functioning at a very low level and the language strategies they require would need to be programmed accordingly. These
children will require concentrated efforts to encourage, stimulate and reinforce such communicative intent in their spontaneous interactions.

The usefulness of mathetic functions applies to interaction in everyday life and should not be the exclusive domain of school related learning. As long as children are satisfied with communicating at lower level pragmatic functions, they will not see the need for higher level mathetic functions which serve to provide food for curiosity and relations with others beyond the immediate boundaries of space and time, into past and future events and even fantasy. For these reasons, higher level mathetic functions are crucial tools of communication, which must be stimulated and encouraged. Because higher level mathetic functions were very rarely used by the children and mothers in this study, awareness of these higher level functions need to be particularly explained and encouraged in parents and teachers so that hearing-impaired children have opportunities to learn and use these functions.

Future research in this very interesting and challenging area of language in hearing-impaired children should take several directions. The development of the most practical and relevant coding system must be studied.

Interactions involving both older and younger children and with various communication partners, such as siblings, peers, fathers and teachers, may well prove worthwhile areas of investigation. Individual strategies employed in the use of various functions and the use of modes and its relation to other factors also warrant further consideration. Finally, a less time-consuming but reliable method for screening the use of these functions would bring such an analysis into greater usage. The larger the body of knowledge that is generated by such practical
application, the more understanding will result. Hearing-impaired children can only profit from such determined efforts to improve their language learning and communicative competence.
BIBLIOGRAPHY


Chulliat, R., Oléron, P. "The role of language in transposition tasks." Enfance, 1955, 8.


APPENDIX A

Toys Provided for the Home Visit Video-Tape Sessions

I. 2 red telephones with moveable dials

II. 2 Richard Scary Golden Look-Look books

1. About Animals  
2. Nicky Goes to the Doctor

III. Fisher Price Play Family Sesame Street which includes:

- a plastic construction replica of Sesame Street which functions as a carrying case with handle when closed and opens to reveal 4 rooms and a blackboard in between - the rooms are designed as: 1) a store, 2) a livingroom/kitchen, 3) a bedroom, and 4) a livingroom.

- 8 Sesame Street characters - Bert, Ernie, Cookie Monster, Big Bird, Mr. Hooper, Gordon, Susan, and Oscar in his garbage can.

- Sesame Street lamppost with street sign
- a garbage truck
- a mail box
- a 2-story ladder
- a soda-fountain with 2 seats
- a newsstand
- a 2-seater couch
- a T.V.
- a dining table
- a coffee table
- 2 monogrammed beds
- 2 chairs
- Big Bird's nest
- a fire hydrant
- chalk and a chalk brush
APPENDIX B

A System for Coding Pragmatic Functions

Used by Hearing-Impaired Children

Terry Parson-Tylka

April, 1980

Special Education Department, Faculty of Education
The University of British Columbia

The research reported herein is in partial fulfillment of the requirements
for the Degree of Master of Arts at the University of British Columbia
INDEX

INTRODUCTION

GENERAL OVERVIEW

OBSERVATIONS OF INTERACTIONS

TRANSCRIBING THE TAPES

CODING THE MODE

CODING THE FUNCTIONS

REFERENCES

APPENDIX: SAMPLE TRANSCRIPTION
INTRODUCTION

Language has been defined as "a code whereby ideas of the world (content) are represented through a conventional system of arbitrary signals (form) for communication (use)" (Bloom and Lahey, 1978). A child becomes an effective language user and attains communicative competence when he is able to integrate content, form and use in his social interchange with others. Communicative competence is critical for the language learning child to function effectively in a social environment (Parker, 1976).

Communication is "the potential ability to influence another" (Melson and Hulls, 1977). From infancy, the child is able to communicate his needs and influence others (usually his parents) to attend to those needs. As the child develops, his need to be understood and to understand others remains a powerful force. Communicating his needs and desires becomes more complex as the variety of people, places and situations increase in the child's ever-broadening environment. The child must learn "who can say what, to whom, in what manner, by what means, and for what purposes" (Hymes, 1974). This knowledge, a vital element in linguistic competence, is the central subject matter of pragmatics, the branch of language study which relates the language to the speaker (Nelson, 1978).

Pragmatics can be defined as the function of language use in a social context (Bates, 1976). Language structure is considered subordinate to function by many linguists (Hymes, 1974; Searle, 1974). Bates strongly
supports this view. She says "We have just proposed that logically and ontogenetically, all of semantics and syntactics are derived ultimately from pragmatics, from language games that consist in the use of signals in contexts to carry out some function." (Bates, 1976).

Little is currently known about pragmatic knowledge. At present, pragmatics seems to be a "Pandora's Box". Ultimate success of the approach will depend on the extent to which pragmatic frameworks can be clearly defined, delimited and thus brought under control (Oller, 1978).

The purpose of this manual is to propose a framework for coding the pragmatic functions of language used by preschool hearing-impaired children. This system is based on relevant research in the areas of psycholinguistics and child language use.

Although the sample on which the system is being researched consists only of four year old profoundly hearing-impaired children, it is hoped that the usefulness of this system will extend beyond this limited age range. The sample data were collected in the home, but the researcher suggests this should not exclude the use of this system in classroom interactions. While this coding system was specifically designed to be used with a hearing-impaired population, its effectiveness in determining appropriate programming and teaching strategies for this population can only be tentatively implied from this pilot effort.
GENERAL OVERVIEW

The framework proposed for examining the pragmatic functions of pre-school hearing-impaired children involves four components:

1) observation of interactions
2) transcriptions of communicative behaviors
3) coding of mode use
4) coding of pragmatic functions

For the purpose of this research, communicative behavior is operationally defined as any verbal or non-verbal behavior that is expressively communicated to another person in the interaction process. The communicator may use any one of five modes alone or in combination.

The communicative behaviors of both the child and his communication partner will be transcribed and coded, since determining function is often dependent upon the context of the situation and the response of the partner.

The proposed system includes thirteen uses of language that have been found to be important for later school learning or are common in the early communication of young hearing-impaired children. A separate classification system for questions is suggested.

The total process is initially time consuming and tedious. It is suggested that observation, transcription and coding be done in teams of a minimum of two and maximum of three people who are familiar with the speech and language of hearing-impaired children. A knowledge of sign systems would be necessary if the children being observed are using a
sign system in their communication. As experience is gained in using the system, the speed and accuracy of transcription and coding will increase. Such efficiency will make it a much more useful tool for the classroom or home-visiting teacher.
ILL

OBSERVATIONS OF INTERACTIONS

Videotaping has been found to be the most successful means of capturing the essence of interaction in order to most effectively transcribe and code the communicative behaviors. Videotape playback allows for more detailed and precise analysis of all the data since none is lost in the complexity and speed of the normal communication process. Videotape also allows flexibility in scheduling time for transcription and coding.

The videotaping should be done as unobtrusively as possible to preserve the spontaneity of the natural interaction. The person doing the videotaping should not be a stranger to the child or the setting. This researcher has found that young hearing-impaired children are initially very curious about the videotape equipment but quickly choose to ignore it and concentrate on the activities and interactions taking place.

A minimum of 15 minutes of spontaneous interaction has been recorded for each child. A freeplay situation with toys provided by the researcher was set up in the home. Depending on the purposes for the analysis, a more structured or shorter or longer videotape session may be more appropriate for the classroom or home-visiting teacher.
TRANSCRIBING THE TAPES

All communicative behaviors should be transcribed along with the context of the interaction. One member of the team should operate the videotape playback and verbalize what is observed. The second person is then free to write the transcriptions onto prelined graph paper. It is often necessary to playback the same segment of tape several times until all of the communicative behaviors are transcribed. A break period is necessary and 3 hours appears to be the maximum length of time that a transcribing/coding session can continue.

A very simple format has been found to be the most useful way of transcribing the videotapes. A sample transcription is included in the appendix. It is important to note that at times communicative behavior will be occurring in two modes at the same time. When the communicative message is exactly the same, the behaviors are termed simultaneous and are enclosed in round brackets. When the behaviors occur at the same time but the messages are not precisely the same, they are termed overlapping and are enclosed in square brackets. If mother says "give me the bed please" and at the same time signs "me bed please" - the behaviors are termed overlapping; if mother says and signs "give me the bed please" the behaviors are termed simultaneous. If the behaviors occur one after the other to communicate the message, they are termed sequential and enclosed in slashes.

Contextual information that is not directly communicative is enclosed in squiggly brackets.
Space is allotted on the left for coding the functions and modes used by the child and space on the right of the transcription is allotted for coding the modes and functions used by the partner (in this case, the mother).

Conventions for Transcription
(adapted from Bloom and Lahey, 1978)

General Instructions

1. Pages should be numbered front and back with the number in the upper right corner.

2. A small diagram of the room and the subjects' positions relative to one another is drawn on the top of the first page of the transcription.

3. In order to make it easier to locate material on the tape, a number should be placed in the left margin approximately every time the counter on the recorder registers a multiple of 10.

4. All communicative behaviors (verbal and non-verbal), are fully transcribed. The communicator is identified by an initial. Information about the situational context is enclosed in squiggly brackets.

5. When communicative behavior occurs in two modes at the same time and the communicative message is exactly the same in both modes, the behaviors are termed simultaneous. The communicative behaviors are written on separate lines and enclosed in round parenthesis.

6. When communicative behavior occurs in two modes at the same time but the messages are not precisely the same, they are termed overlapping. The communicative behaviors are written on separate lines and enclosed by square parenthesis. When communicative behaviors occur in two or more modes one after the other to convey one message, they are termed sequential and are written on separate lines and enclosed in large slashes.

7. Differential use is made of verb tense in describing the situation:
   - progressive tense is used to describe communicative behaviors which are overlapping or simultaneous
   - simple present tense is used to describe behaviors that precede or follow other communicative behaviors.

8. An arrow is drawn from one line to the next when a communicative behavior is too long for the space provided, e.g. do you want to go to the zoo?/
9. When a communicator suddenly interrupts his own behavior, apparently leaving the communication unfinished, a line indicates the abrupt stop, e.g. put the man in the _____/

10. When a communicator interrupts his own behavior apparently to change or correct it, a "self-correct" symbol (s/c) is used, e.g. those are your s/c my toys/

**Abbreviations**

11. An X is used to show complete and exact repetitions or imitations. Any change must be indicated including changes in intonation, e.g. open/ X X

12. # is used to indicate that there is material on the tape that is not transcribed, i.e. interruptions

**Capitalization and Punctuation**

13. Names are capitalized. Initial letter of the communicative behavior is not.

14. The sign of a communication boundary is a slash, (/).

15. An exclamation mark may be used when appropriate, but should be followed by a slash.

16. Questions are indicated by a question mark or a rising arrow (↑) if it seems to be a question due to rising intonation, and followed by a slash.

17. A pause within a communicative behavior is indicated by a dot, e.g. oh . good/

18. A long pause between communicative behaviors within the same general situation is indicated by 3 horizontal dots across the line, e.g. it's a ... chair/

19. A long pause between behaviors where there is a change in the general situation is marked by 3 vertical dots on the line, e.g. the boy: the truck is red/

**Recording Unintelligible Communicative Behaviors**

20. An unintelligible communicative behavior is indicated by 3 dashes (---). If possible, a phonetic transcription is used instead.

21. Guesses about the form of unintelligible communicative behaviors are
enclosed in parenthesis above the behavior and followed by a question mark, e.g. \{read book?\} 

---/

22. An adult's misinterpretation of a child's communicative behavior is indicated with a check, e.g. \(\sqrt{want\ mine}\)
CODING THE MODE

Mode is defined as the form of the communicative behavior used by the communicator. Five modes commonly used by hearing-impaired children are included: Speech, Vocalization, Sign, Gesture, Action.

This approach is supported in the literature. It has often been observed that what young children say is usually related directly to what they do and see (Bloom, 1970). Melson and Hulls (1977) believe that all social communication is contextual and suggests that a more accurate and educationally useful means of understanding children's language development involves a scheme portraying verbal behavior, non-verbal behavior and situation characteristics as a communicative whole. This view is also held by Mehrabian and Williams (1971) who imply that characterization of children's early grammars and linguistic behavior could gain considerably from the study of motor gestural phenomena that accompany language during the early phases and eventually are replaced by it.

The following operational definitions are used for the five different modes:

Speech - comprehensible utterances recognizable as spoken language by a naive listener, i.e. intelligible words, phrases or sentences

Vocalization - sound production of a phoneme alone or in syllables but not in the form of or recognizable as speech, e.g. aaaaa, ii ii, mmhmm, laughing and crying are included

Gesture - a movement of the body or body parts that symbolizes or emphasizes an idea or feeling and conveys this meaning to another person. The
gesture may supplement, replace, or contradict verbal behaviors, e.g. shrugging the shoulders, pointing, waving, frowning.

**Sign** - a gesture made by one or both hands that is a symbolic representation in

a) a conventional sign language system for the deaf, e.g. S.E.E., A.S.L., Signed English. The gesture must be recognized to be a Sign by a person familiar with such systems.

b) a system devised and used by the child and/or family and is recognized as such by the mother

c) the manual alphabet of the deaf, i.e. fingerspelling

**Action** - one or a series of purposeful physical movements of the body or body parts which act upon another person or object such that physical contact is made. An action is determined to be communicative in the context of the communicative behavior which precedes or follows it.

For example, putting a doll in the doll house is a communicative action when it follows a directive "put the doll in the house", or when it precedes a directive "do the same".

The modes may be used independent of each other or may be used simultaneously (denoted by round brackets) or in an overlapping manner (denoted by square brackets). When two or more modes communicate exactly the same message at the same time they are said to be simultaneous. When two or more modes are used at the same time but communicate supplementary or reinforcing messages they are termed overlapping. Modes may also be sequential.

In order to simplify the coding of the modes, the following abbreviations are suggested:

1) Speech - Sp

2) Vocalization - V
3) Sign - Si
4) Gesture - G
5) Action - A
6) Simultaneous - ( )
7) Overlapping - [ ]
8) Sequential - / /
CODING THE FUNCTIONS

The most comprehensive reference to functions used by preschool children found in the literature comes from the work of Tough (1977). Tough developed a framework of seven uses of language which are somewhat developmental and are considered relevant for later school learning.

It is well documented that hearing-impaired children are often delayed in their acquisition and use of language structures. In the single study that has looked at the pragmatic functions used by preschool hearing-impaired children, the functions were based on Dore's categories which he developed for children at the one-word utterance stage (Curtiss, Prutting and Lowell, 1979). The researchers found that the hearing-impaired children were comparable to hearing children at the same stage of language development in terms of the pragmatic functions used. Most of the sixteen functions described by Curtiss et al. are at a lower developmental level than the functions proposed by Tough.

The system proposed in this research is a combination of the functions deemed necessary by Tough, and the functions found to be used by the hearing-impaired preschool children in Curtiss et al.'s study. In this way it is hoped that a profile can be made for each hearing-impaired child, demonstrating which functions the child is using and which need to be developed and encouraged by teachers and parents.
In order to expedite the coding process, letter abbreviations are suggested for each function. Operational definitions and letter codes follow:

Imitating - t - imitating a communicative behavior performed by someone else

Repeating - rr - imitating one's own communicative behavior

Ritual - u - greeting or other social ritual, including please, thank-you, hi

Acknowledging - a - evidencing comprehension

Complying - c - responding in accordance with the intent of a direction
e.g. child puts doll in house when mother says, "put the doll in the house"

Maintaining - m - referring to physical and psychological needs and wants, protecting the self and self-interest

Ignoring - g - not responding to the intent of a direction

Directing - d - directing the actions of the self or others

Reporting - r - reporting on events, including labelling, referring to detail, making comparisons, referring to incidents or sequences of events

Reasoning - e - explaining a process, recognizing cause and effect relationships, recognizing problems and their solutions, justifying judgments, and drawing conclusions

Predicting - p - anticipating and forecasting events, problems and their solutions, anticipating details and sequences of events, predicting the consequences of actions and events

Projecting - j - projecting into experiences, feelings, and reactions of others and into situations never experienced
Imagining - i - developing imaginary situations based on real life or on fantasy, developing an original story

Questions will be discussed separately.

Questions - Questions will be coded according to the thirteen functions previously discussed, on the basis of the type of responses they anticipate. For example, "Who is that?" is a question form anticipating a reporting response and would be coded as reporting. "Who will you pretend to be?" is a question form that anticipates an imagining response and would be coded imagining. It appears that useful information regarding the act of questioning would be lost in this coding system. In order to retain this valuable information, all communicative behaviors in the form of questions, or with questioning intonation, will be coded as to function and then designated as questions by the use of a circle around the code letter. The importance of coding question forms according to response anticipated by the communicator becomes more obvious in the case of questions such as "Do you want to put the toys away?" where the intention is clearly a directive to "Put the toys away." If such a communication was merely coded as a question, the intent of the communicator would be lost. By coding both the function and the form of questions, it is hoped no valuable data is lost.
<table>
<thead>
<tr>
<th>Mode</th>
<th>Function</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speech--------------</td>
<td>Sp</td>
<td>Imitating t</td>
</tr>
<tr>
<td>Vocalization--------</td>
<td>V</td>
<td>Repeating rr</td>
</tr>
<tr>
<td>Gesture-------------</td>
<td>G</td>
<td>Ritual u</td>
</tr>
<tr>
<td>Sign----------------</td>
<td>Si</td>
<td>Acknowledging a</td>
</tr>
<tr>
<td>Action--------------</td>
<td>A</td>
<td>Complying c</td>
</tr>
<tr>
<td>Simultaneous--------</td>
<td>( )</td>
<td>Maintaining m</td>
</tr>
<tr>
<td>Overlapping---------</td>
<td>[ ]</td>
<td>Ignoring g</td>
</tr>
<tr>
<td>Sequential---------</td>
<td>/ /</td>
<td>Directing d</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reporting r</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Imagining i</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reasoning e</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Projecting j</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Predicting p</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Questions - 0</td>
</tr>
</tbody>
</table>

Uncodable - due to the communication - U
-due to the coding system - UU
REFERENCES


APPENDIX

SAMPLE TRANSCRIPTION

NAME: A.B. 

AGE: 4.2 

DATE OF INTERACTION: 03/09/79 

<table>
<thead>
<tr>
<th>Child</th>
<th>Contextual and Communicative Behavior</th>
<th>Mother</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\xi$C. points to the ladder$\xi$</td>
<td>$\xi$C. takes doll down ladder$\xi$</td>
</tr>
<tr>
<td>[Sp]</td>
<td>${\text{Oh the ladder}}$</td>
<td>[Sp]</td>
</tr>
<tr>
<td>[A]</td>
<td>${\text{picks up the ladder}}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[Sp]</td>
<td>${\text{okay we'll put it there}}$</td>
</tr>
<tr>
<td></td>
<td>[A]</td>
<td>${\text{puts ladder against house}}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>${\text{says something unintelligible}}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>${\text{VU}}$</td>
</tr>
<tr>
<td>[S]</td>
<td>${\text{eat?}}$</td>
<td>[S]</td>
</tr>
<tr>
<td>[Sp]</td>
<td>${\text{eat}}$</td>
<td></td>
</tr>
<tr>
<td>[A]</td>
<td>${\text{touched doll}}$</td>
<td>[A]</td>
</tr>
<tr>
<td>[G]</td>
<td>${\text{nod yes}}$</td>
<td>[G]</td>
</tr>
</tbody>
</table>
Permission is given for Terry Parson-Tylka to use the video-tape and interview information of __________________________ (child's name) as part of her Master's Thesis on Communicative Functions of Hearing-Impaired Children in partial fulfillment of the requirements at the University of British Columbia. I understand that the information will be strictly confidential. Further, my participation is voluntary and I may withdraw from this project at any time.

Signed: __________________________

______________________________
(Parents or Guardians)

We do not wish to give our permission at this time.

Signed: __________________________

______________________________
(Parents or Guardians)