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INDIRECT REQUEST COMPREHENSION ABILITIES
OF HEARING IMPAIRED CHILDREN

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INDIRECT REQUEST COMPREHENSION ABILITIES OF HEARING IMPAIRED CHILDREN

By

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ABSTRACT

INDIRECT REQUEST COMPREHENSION ABILITIES
OF HEARING IMPAIRED CHILDREN

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This study investigated young hearing impaired children's ability to comprehend various types of indirect requests. Subjects included 17 moderately-severe to profound hearing impaired children between the ages of 5 and 12 who were placed into one of four groups, depending on grade placement. Subjects each received a red and a blue crayon along with a response booklet that contained 40 sheets of paper. Each sheet had a blank circle drawn on it. The general design was one in which children were to listen to an indirect request and color the circle according to what they thought had been requested. Forty sentences representing a variety of syntactic forms were presented without supporting linguistic or nonlinguistic contextual information. Results indicated a significant developmental effect with older children exhibiting greater comprehension of indirect requests than the younger children.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

Language involves the comprehension and production of phonology, morphology, syntax, semantics and pragmatics. In general, development of these aspects is predictable across children, and those with normal abilities have little difficulty learning them early through exposure to their linguistic environment. However, at a time when they are most ready, children with hearing losses greater than 56+ dB HL (ANSI, 1969) typically miss effective oral language exposure. Consequently, differences between normal hearing children and this group of hearing impaired children are seen across the five components of oral language. Many of these differences are noted below.

GRAMMATICAL COMPETENCE

Phonology

Phonology concerns the specific phonemes and combinations of sequences of phonemes that are acceptable within a given language. With decreased auditory sensitivity, even children with hearing losses classified as moderate to mild can suffer deleterious effects in phonology. Ling (1972) reported that some children who have fluctuating conductive hearing losses experience spelling and reading fluency difficulties due to phonologic delays. Oller, Jensen, and LaFayette (1978) reported that hearing impaired children may employ phonological processes similar to younger hearing children. For example, the phonetic preferences of the hearing impaired child in their study included reductions of consonant clusters, deletions of final consonants, deletion or devoicing of final voiced consonants, avoidance of final velar plosives, fronting of consonants, and fricatives replaced by stops. All of these preferences have been viewed in normal children but at much earlier ages.

Morphology

As hearing children develop language, they learn to combine sounds into meaningful parts of words. Hearing impaired children have been found to be inferior to hearing children in their ability to generate morphological forms. Garber (1967) noted that while the

ability to use noun inflections was age related, verb and possessive inflections were not, thereby confirming the difficulties hearing impaired children have in learning verb forms of spoken English. When Laubscher (1969) analyzed spoken language samples of 5 through 10 year old hearing impaired children for the development of correct usage of determiners, plural inflections, occurrence of verb tenses and verb inflections, he found that the present verb tense was acquired earliest, followed by present progressive, past, and past progressive. Further data analysis revealed that the subjects infrequently used plural nouns or third person singular verb inflections and showed slow increases with age. He noted strong similarities in the developing morphological trends of normal hearing and hearing impaired youngsters but that the hearing impaired developed these features at a later age and took longer to do so.

Syntax

After the introduction of Chomsky's (1957, 1965) theory of generative grammar, research on syntax, or sentence structure, of hearing impaired individuals proliferated (Brannon & Murray, 1966; Sarachan-Deily & Love, 1974; Thomas, 1972; Goda, 1964). Simmons (1962) reported that hearing impaired children were restricted in their choice of words. By developing type/token ratios (TTR) for each part of the speech, she found that hearing impaired children's TTRs in all categories were lower than their normal hearing counterparts. Data revealed that the hearing impaired subjects used more determiners, nouns, and verbs but fewer conjunctions and auxiliaries

than hearing children. They also used fewer different words within each category. For example, the hearing impaired subjects almost exclusively referred to a child in one picture as "boy," whereas the hearing children employed synonyms such as "young man" and "the kid." Furthermore, Simmons (1962) found that hearing impaired subjects tended to use an inflexible word order, exemplified, for instance, by their consistent use of adjectives in a predicate-adjective form. She characterized this as the result of "rubber stamping" by teachers as children became overly dependent on phrases which were taught in a specific form.

Assessing the presence of 24 transformational rules in the spoken language of hearing impaired subjects, Holmes (1972) reported that hearing impaired subjects acquire the same syntactical rules by age 12 that normal hearing subjects do by age 4. By studying the acquisition and development of syntax in the spoken language of congenitally hearing impaired 5 through 13 year olds, Pressnell (1973) reported clear similarities between the hearing impaired and normally hearing in their order of syntactical acquisition in spoken utterances. Results she gained from the receptive and expressive portions of the Northwestern Syntax Screening Test (NSST) (Lee, 1969) revealed that older hearing impaired children performed somewhat better than younger hearing impaired children; however, syntactical development began at a later age for hearing impaired children than it did for normal hearing youngsters and continued well into adolescence. Additionally, they required a longer period of time than

hearing children did to complete a given stage of development. This was particularly true for the acquisition and usage of verb constructions. Pressnell postulated that these differences may arise from the fact that her hearing impaired subjects were typically taught verbs in a different order from hearing children and that their learning sequence was influenced by visual-auditory cues inherent in their more structured learning environment.

Semantics

Although the development of semantics has been widely studied among normal subjects, less attention has been given to it in the hearing impaired population. Applying a socio-linguistic approach to investigate the semantic component in spontaneous communication among hearing impaired preschoolers, Skarakis and Prutting (1977) reported that although their subjects' exhibited certain semantic functions in their spontaneous communication, they predominantly employed prelinguistic semantic behaviors found in younger hearing children. The most frequently occurring of these were performative, indicative object, and volition/negative volition. Of the linguistic functions noted, action/state of agent and action/state of object occurred most frequently. Since it can be argued that prelinguistic semantic functions are precursors to formal linguistic development and that they provide a basic foundation upon which later language develops, these researchers suggested a continuum for the hearing impaired that parallels the semantic development of normal children as reported by Greenfield and Smith (1976).

Curtiss, Prutting, and Lowell (1979) reported on 12 hearing impaired children ranging in age from 2 to 4 years that were expressing prelinguistic semantic functions through both verbalizations and made-up gestures. By expanding upon categories drawn from Greenfield and Smith (1976), these researchers found that although there was a general increase in hearing impaired children's expression of semantics as they grew older, specific semantic functions developed more slowly than normal hearing children across all age groups. Of 13 selected semantic categories, only locate/name and performative were expressed more than 2% of the time by five children in the 2 year old group, whereas eight such categories that included action or state of an agent, agent, aspect, locate/name, locative, object, performative, and volitional object were found in the 3 year old group. The 4 year old group expressed the same categories as the 3 year olds with the addition of negation. The hearing impaired children with a higher mean length of utterance (MLU) exhibited a wider range of semantic functions as they combined two or more categories into utterances that expressed semantic relationships between categories. While Greenfield and Smith's (1976) normal hearing children employed performatives ("the act that the speaker intends to carry out with his sentence"--declaring, commanding, promising, asking questions, etc., Bates et al. [1977]) as their first semantic expression these hearing impaired subjects did not. It is possible that since young hearing impaired children often use pointing gestures to supply a semantic feature missing

from a verbal utterance, they may pass through the normal stages of learning to speak using gestures for performatives instead of verbalizations. However, once performatives did emerge in their communication, the hearing impaired subjects used them much more frequently than any other category. They also relied on location more than Greenfield and Smith's (1976) normal hearing subjects. This might be explained by the fact that hearing impaired youngsters are tuned in to visual space and focus on location earlier developmentally or to a greater extent than hearing children (Curtiss et al., 1979).

Pragmatics

Again, as with semantic development among the hearing impaired, research into their pragmatic development is rare compared to that involving normal children (Bates, 1975; Halliday, 1975; Dore, 1973, 1974, 1975; Greenfield & Smith, 1976), Skarakis and Prutting (1977), in their socio-linguistic approach to describing the pragmatic component of four hearing impaired children's spontaneous communication, found their subjects using the same communicative intentions as Greenfield and Smith's (1976) and Dore's (1974) younger hearing subjects. The intentions request/demand, description, attention and response occurred most frequently in communication as these subjects expressed intentions with a multiplicity of behaviors that included motor activity, gesture, combined gesture and vocalization or verbalization and verbalization alone. Curtiss et al. (1979) analyzed the speech acts, comprised of simple gestures or one word utterances,

of 12 hearing impaired preschoolers. All were found to exhibit the 16 pragmatic intentions drawn from a modified version of Dore's (1973, 1974, 1975) categories (e.g., demand, command, question, labelling, response to a question, response to a summons, response to a command, imitation, repetition, summons, description, protestation, ritual, request for approval, request for confirmation, and acknowledgment). This ability to display a wide range of pragmatic intentions by age 2 is found in hearing as well as hearing impaired children, thereby making a strong case for the human need to communicate.

PRAGMATIC COMPETENCE: INDIRECT REQUESTS

Within the field of child language research, the shifting emphasis from syntax to semantics to pragmatics has created some important changes in how we view the nature and source of communication abilities. This view is especially important when we try to understand the communicative development of the hearing impaired, hence the need for more research in this largely uncharted area. The term "pragmatics" was originally used by American pragmatist philosopher Charles Pierce (1932) and elaborated further by C. W. Morris (1946, p. 217) who defined it as "the relationship between signs and their human users." The principles of pragmatic analysis were viewed as a means of explaining use of language in context by Bates (1976). Contemporary interest came through the realization that structural and semantic analyses of language could not provide an adequate account of language development.

Within the notion of pragmatics lies the identification and description of factors and rules that affect content and structure of the linguistic code. The first is that of function, or the intended purpose language serves (i.e., illocutionary force). Intentions fall into such general categories defined as declarative (tell), interrogative (ask), request (order), expressive (feel), and commissive (promise) (cf., Searle, 1969). Along with the intention

of the utterance, pragmatic analysis also looks at the locutionary form of the utterance and the effect that it has upon the listener (i.e., prelocutionary effect). In their pragmatic analysis of hearing impaired children's early communicative development, Curtiss et al. (1979) took form and effect into consideration by coding every identifiable communicative act performed by each child in their study. All communicative behaviors (e.g., utterance, gesture, facial expression, body movement, and vocalization) were able to be analyzed and placed into 16 categories (Dore, 1973, 1974, 1975) that were previously mentioned.

Another pragmatic factor is context. It refers to the environmental or individual factors that influence the form, content, and intent of language. Environmental factors may include the social and/or situational variables such as who the speakers and listeners are, what goal the communication is supposed to accomplish, roles of the participants, presuppositions the participants have, time and place of the communication, and the events that occurred prior to the communication (Hopper & Naremore, 1978; Hymes, 1967). Individuals change the content and form of language as influenced by these variables.

Indirect Requests

Learning the rules for the use of language in context constitutes a major task in the psycho-socio-linguistic development of children. In order to develop "communicative competence," children must be able to smoothly communicate their intentions to others and to

interpret communication directed toward them. There must be a shared understanding of certain conversational postulates. One such postulate involves comprehension of the difference between the syntactic structure of an utterance and what is meant pragmatically (Dore, 1977). The distinction between these two aspects of communicative competence is perhaps best illustrated by the difference between direct and indirect requests.

Direct requests reflect a surface structure that allows for clear interpretation of the speech act, whereas indirect requests reflect a situation where contextual cues such as intonational patterns of facial expressions are critical in the interpretation process. These cues are necessary because the surface structure of the sentence follows one form, but it is intended to be interpreted as another. An example of this would be the difference between the direct request "Open the door" and the indirect request "Wouldn't you like to open the door?" The surface structure of the second seems to suggest an illocutionary force of an interrogative or asking; but the intent, if one is wanting to air out the room, is rather an imperative or request that someone open the door.

According to Searle (1975) and Gordon and Lakoff (1975), individuals comprehend indirect requests in the following manner. The listener constructs the literal meaning of the utterance, checks it for plausibility and, if finding it implausible, applies a rule of conversation to obtain the conveyed meaning. Using a sentence/picture verification format with ten basic sentence pairs

that represented a number of syntactic/semantic/pragmatic categories, Clark and Lucy (1975) explored this notion with adults. Given a sentence on the left and a colored circle on the right, subjects were instructed to regard each sentence as a request to color the circle a certain color and to consider the circle on the right as a response to that request. Then, they had to decide whether the circle on the right had been colored according to the request and indicate their decision by pushing a "yes" to "no" button as quickly as possible. Thus, the basic measure was response latency time or the elapsed time between the onset of the sentence/picture display to pressing the button. Error rate was used as a secondary measure. By this method, Clark and Lucy (1975) determined that the longer the elapsed time for a response, the more difficult the request was to comprehend. Not only did they find evidence to support Searle's (1975) and Gordon and Lakoff's (1975) theory, but they also discovered that certain syntactic forms were most easily interpreted than others for their conveyed, indirect request meaning. For instance, verification of the interrogative types took longer and were more difficult to process than declarative types; and negative requests were more difficult to interpret than their corresponding positive requests. Although Clark and Lucy's (1975) adults confirmed Searle's (1975) and Gordon and Lakoff's (1975) outline for comprehension of pragmatic meanings, developmental data from young children have not. Studies have shown that children seem to acquire the ability to comprehend indirect requests before the age at which

they are believed to comprehend the literal meanings of such (Bates, 1975; Shatz, 1974; Ervin-Tripp, 1977). Shatz (1975) reported children responded accordingly to indirect requests as young as 2 years of age. She argued that the children did so because they were following an action-oriented process in which they "act out or act on what can be identified from the speech stream" (p. 101) not because of actual linguistic-pragmatic comprehension. For example, since children begin actively manipulating the world around them early on, their first response, upon hearing someone say "Can you shut the door?" would be to act out the words they understand and shut the door, thus giving the impression of comprehending an indirect response. Shatz (1975) explains that this stragegy recruits action responses to language unless some linguistic or nonlinguistic element indicates not to do so. Shata (1978a) further tested this hypothesis by examining videotapes of five mothers and their normal children aged 19-24 months while they talked about a toy they were playing with in a natural setting. Results revealed that the children responded with action to their mothers' requests for action when expressed in both the direct imperative form and the indirect directive form. Later Shatz (1978b) examined the responses of normal 19-34 month old children to sentences containing more than one interpretation. In one instance, the sentences were spoken in as neutral a linguistic context as possible; that is, the experimenter presented the sentences in varied order so as to eliminate contextual cues. In the other experimental situation, contextual

information preceded the test sentences. For instance, the test sentence would be preceded by three or four direct imperatives to foster a directive interpretation or several informational questions or statements to support an informational interpretation. Although context did affect the subjects' responses to test sentences, action responses were still common even in contexts that supported informational interpretations. The more linguistically sophisticated subjects showed more sensitivity to context and produced less action "errors" that the less sophisticated subjects. The results of these studies support Shatz's view that children gain early entrance into communicative interactions by responding to language with action and that development progresses as they learn to recognize contextual markers to stop action and integrate them into the process of interpretation.

Using Clark and Lucy's (1975) procedures for the study of adult comprehension of different types of indirect requests, Carrell (1981) investigated how well normal 4 to 7 year old children understood the same requests. In a systematic, experimental approach, her study omitted any form of contextual cues and subjects relied only on linguistic forms for correct interpretation. As with adults in Clark and Lucy's (1975) report, Carrell found that children understood certain syntactic forms more easily than others. While the total percentage of correct responses (72.2%) indicated that children performed better than chance overall, closer inspection revealed that the above chance performance was not attained for all

of the indirect requests. Except for the request types "Can You?" and "Why not?", interrogative forms were more problematic for children than declarative forms such as "It doesn't need." Children correctly averaged 82.5% for declaratives as compared to 66.7% for interrogatives. Additionally, children were especially influenced and confused by the surface or literal polarity of a conveyed request. For example, when conveyed meaning differed from literal meaning (e.g., Must you?, Why?, Shouldn't you?, Should you?, Doesn't it need?, Does it need?), children's responses consistently fell below 75% correct into the 50-60% chance range. Furthermore, positively conveyed requests (Please do) were generally more easily interpreted than their negative counterpart (Please don't) through all grade levels; and certain request types produced a greater number of errors than others. For example, while the request "I'll be happy unlesss . . ." gave children the most difficulty, its counterpart request "I'll be sad unless . . ." was correctly interpreted far more often. While this confusion was obvious across the four grade levels involved, a general developmental pattern of acquisition was apparent as subjects' performances improved with age.

Indirect Requests and Language Impairment

While Shatz's (1975) study investigated normal children's comprehension of positive indirect requests (Can you shut the door?), Leonard et al. (1978) studied language impaired children's comprehension of indirect requests that were negative in nature (Can't you answer the phone?) and those with affirmative syntactic

construction but negative intention (Must you play the piano?). Sixty children ranging in age from 4 to 6 years who were judged to have language problems watched video taped interactions of indirect requests between two adults. After watching and listening to the interaction, the children were to decide whether the listener had acted appropriately according to the speakers' indirect requests. Results revealed that subjects had no more difficulty comprehending indirect requests involving negative syntactic constructions than those coded affirmatively. However, indirect requests using positive syntactic construction but negative intention did pose problems for the subjects. Judgments of 4 and 5 year olds were no higher than chance, whereas 6 year olds (who evidenced difficulties as well) seemed to better understand that certain indirect requests contained information in the predicate that specified an alteration in behavior.

Following a modification of Shatz (1978b), Shatz, Shulman, and Bernstein (1980) examined language impaired children's responses to indirect directives in varying linguistic contexts. Just as with the normal 2 year olds, language impaired children had a tendency to employ action responses to indirect request. Qualitatively, they followed the same course of development but quantitatively there were some differences. The language impaired children had more difficulty producing informing responses than action ones even when they knew that an informing response was called for. For example, by experimenting with a sequence of contextual sentences that preceded each

test sentence, these researchers determined that their language impaired subjects also had more difficulty than normals in utilizing prior linguistic context when deciding upon an interpretation. Because of the high proportion of primitive action strategies employed in response to an ambiguous context, it was hypothesized that this latter difficulty reflected problems in their ability to consistently process multiple input sentences over time.

Prinz and Ferrier (1983) focused their investigation on the requesting abilities of language impaired children between the ages of 3 1/2 and 9 years. Using a speech model that investigated purpose, directness and surface form, these abilities were examined under three situations: (1) a role playing dyad, (2) production of requests in an experimental procedure using hand puppets, and (3) perception of requests using hand puppets. The experimental procedure was designed to assess the comprehension, production and judgment of polite requests. For assessment of production, children were shown a small chest which contained candies and told that if they asked a puppet nicely, they would receive a piece of candy. Each time they made a request, they were asked to say it "even nicer" until a total of five requests were made to two different puppets. To assess judgment of polite forms, children were required to determine which of two puppets made the most polite request. Finally, to measure comprehension, the children's ability to understand and comply with a series of requests to tidy up test materials was assessed. Subjects revealed a predominant usage of direct forms

with the older group using indirect forms only somewhat more. Overall results determined that language impaired children's pragmatic and syntactic abilities are closely linked to each other in the comprehension, production, and judgment of polite requests. The majority of these subjects were unable to effectively vary their type of polite requests and there was only a slight increase in their production of polite forms across the ages. However, they seemed to compensate by frequently using structures they had already acquired. In this respect, they may have recognized the need to be more polite but lacked the means to produce more indirect forms. In general, they operated on a pragmatic level two or more years below chronological age.

As demonstrated by the previous review, young normally developing children demonstrate communicative competency with indirect requests at an early age. Similarly, language impaired children follow normal developmental language milestones albeit at an older age and over a longer period of time. Although a significant amount of research has been concerned with grammatical competency in hearing impaired youngsters and a few studies (Skarakis & Prutting, 1977; Curtis et al., 1979) have investigated their overall productive pragmatic competency, none have specifically focused on the subtle aspects of indirect request comprehension. The present study, as Carrell (1981) did with normally hearing children, was designed to focus on how hearing impaired children comprehend various types of indirect requests in a systematic, experimental mode,

relying only on linguistic forms and not on linguistic or non-linguistic contextual cues for information. Rationale for this approach was based on convincing data reporting that children's linguistic skills seem better than they actually are because of the naturalistic contextual cues provided in spontaneous communication (Bates, Camaioni, & Volterra, 1975; Shatz, 1974). The purpose of this investigation was to answer the following questions: How well do young hearing impaired children between the ages of 5 and 12 comprehend various syntactic forms containing indirect requests; and How does the polarity of indirect requests influence hearing impaired children's comprehension of them?

METHOD

Using the sentence protocol followed by Carrell (1981) and originally tested by Clark and Lucy (1975), ten different sentence pairs that represented a number of different indirect requests were presented to the children (see Table 1). The indirect requests varied according to sentence modality (i.e., declarative, imperative, and interrogative), as well as polarity of conveyed meaning (i.e., negative vs. positive).

Stimuli

From the ten basic sentence pairs shown in Table 1, 40 different sentences were constructed. Forty sentences were utilized in order to insert the word "blue" or "red" in each. This was done so that the children had equal opportunity to color a circle blue and to color a circle red, thereby ruling out any built-in systematic bias. These sentences were originally tested by Clark and Lucy (1975) and Carrell (1981). In terms of polarity of the conveyed meaning of each request, sentence pairs consisted of a positive and corresponding negative member. The first member, or (a) of the pair conveyed a positive request to color the circle the named color. The second member, or (b), conveyed a negative request to color the circle the opposite color. Rationale for choosing such pairs is based on data about explicit positive and negative English

Table 1

Pairs of Sentences Used as Experimental Stimuli with Polarity of Conveyed Meaning Noted

1(a)	Please color the circle blue. (red)	Positive
(b)	Please don't color the circle blue. (red)	Negative
2(a)	Can you make the circle blue? (red)	Positive
(b)	Must you make the circle blue? (red)	Negative
3(a)	Why not color the circle blue? (red)	Positive
(b)	Why color the circle blue? (red)	Negative
4(a)	I would love to see the circle colored blue. (red)	Positive
(b)	I would hate to see the circle colored blue. (red)	Negative
5(a)	You should color the circle blue. (red)	Positive
(b)	You shouldn't color the circle blue. (red)	Negative
6(a)	Shouldn't you color the circle blue? (red)	Positive
(b)	Should you color the circle blue? (red)	Negative
7(a)	The circle really needs to be colored blue. (red)	Positive
(b)	The circle doesn't really need to be colored blue. (red)	Negative

Table 1

Continued

8(a)	Doesn't the circle really need to be colored blue? (red)	Positive
(b)	Does the circle really need to be colored blue? (red)	Negative
9(a)	I'll be very happy if you make the circle blue. (red)	Positive
(b)	I'll be very sad if you make the circle blue. (red)	Negative
10(a)	I'll be very sad unless you make the circle blue. (red)	Positive
(b)	I'll be very happy unless you make the circle blue. (red)	Negative

sentences by Clark and Chase (1972). By including corresponding positive and negative indirect requests, it was possible to test for any differences in the children's response to the different polarity of conveyed meaning. With regard to syntactic form, (1a,b) and (5a,b) were imperatives; (2a,b), (3a,b), (6a,b), (8a,b) were interrogatives; and (4a,b), (7a,b), (9a,b), and (10a,b) were declaratives.

Subjects

Subjects included 17 moderately-severe to profound hearing impaired youngsters (i.e., 56 to 100 dB HL in the better ear; [ANSI, 1969]) as determined by hearing tests given within six months of the experiment. These children were placed into one of four groups, depending on grade placement. Group I consisted of four kindergardeners, Group II had three first and one second graders, Group III consisted of four third and one fourth graders, while Group IV had two fifth and two sixth graders. All of the subjects came from homes where English was the only language spoken, and while they were attending school all were required to wear FM auditory trainers. The subjects were enrolled in an oral education program of a metropolitan Michigan city which serves children from diverse socio-economic backgrounds. In order to be enrolled for the oral education program, the children were required to demonstrate normal nonverbal intelligence by their performance on a range of intelligence tests, including the Leiter International Performance Scale (Leiter, 1969) and the WISC-R (Wechsler, 1974).

This information was used to confirm the child's normal nonverbal intelligence for participation in this research project. Furthermore, subjects exhibited no additional known handicaps (e.g., visual impairment, cerebral palsy, learning disability).

For the purposes of obtaining current information regarding each child's oral language performance, the Test of Language Development (TOLD) (Newcomer & Hamill, 1982) was administered prior to participation in the study. The TOLD is a multifaceted language test from which a receptive language and an expressive langauge age can be derived. From the results of the children's responses to the TOLD, each child was assigned a receptive language age (LAR) and an expressive language age (LAE).

In addition to chronological age, hearing age was also calculated for each child. Hearing age was defined as the amount of time between the date the child received a hearing aid and the date of participation in the study. For example, Subject 1 had a chronological age of 4 years, 9 months (DOB 4-20-81). She did not receive her hearing aid until 2-85, thereby having a hearing age of 1 year as of the time of her participation in the experiment.

A descriptive summary of the subjects is presented in Table 2. Specific characteristics of each group were as follows: Group I consisted of four children--two males and two females. All were enrolled in kindergarden and ranged in age from 4;9 to 5;11 with a mean of 5;3 (SD 6.29 month). The mean hearing age of the children in Group I was 2;8 (SD 21.39 months). Their mean receptive language

Table 2

Individual Subject Table and Data for the Following Variables: Grade, Chronological Age (CA) Hearing Age (HA), Unaided Hearing Level (UAHL), Aided Hearing Level (AHL), Langauge Age Receptive (LAR), Language Age Expressive (LAE), Positive Score in Experimental Task (POS), Negative Score in Experimental Task (NEG), and Total Score in Experimental Task (TOT) Per Group

Subject	Grade	CA	HA	UAHL	AHL	LAR	LAE	POS	NEG	TOT
					Group I					
1	K	4;9	1;0	80	40	3;7	3;1	20	0	20
2	K	4;10	2;4	56	25	3;2	3;3	10	8	18
3	K	5;9	4;10	85	45	3;7	3;3	19	0	19
4	K	5;11	3;6	90	50	3;2	3;3	16	7	23
$\bar{x}$		5;3	2;8	78	31	3;4	3;2	16.25	3.75	20.00
SD		6.29	21.39	13.04	26.95	2.5	.86	4.49	4.34	2.16
					Group II					
1	1	7;1	6;2	90	45	5;1	3;3	17	4	21
2	1	7;3	6;8	60	35	6;2	4;3	19	7	26
3	1	7;5	4;7	70	35	8;4	7;2	18	16	34
4	2	7;5	5;9	100	50	6;8	6;5	18	5	23
$\bar{x}$		7;3	5;9	80	41	6;6	5;3	18.00	8.00	26.00
SD		1.65	9.23	15.81	6.49	14.06	19.00	.81	5.47	5.71

Table 2

Continued

Subject	Grade	CA	HA	UAHL	AHL	LAR	LAR	POS	NEG	Tot
					Group III					
1	3	7;7	4;10	90	45	4;5	4;8	17	5	22
2	3	8;7	6;2	80	35	6;5	6;3	15	11	26
3	3	8;9	7;5	100	50	7;5	5;3	20	2	22
4	3	8;10	8;1	90	35	5;7	3;4	20	3	23
5	4	10;3	8;3	90	55	3;8	3;3	10	3	23
$\bar{x}$		8;9	6;11	90	44	5;9	4;2	18.39	4.80	23.20
SD		10.22	15.44	6.32	8.00	12.03	13.74	2.30	3.63	1.64
					Group IV					
1	5	11;5	9;6	90	40	7;2	6;1	18	13	31
2	6	11;5	9;11	90	36	7;6	5;6	17	10	27
3	5	11;9	7;10	75	25	8;3	6;9	17	11	28
4	6	12;8	4;3	60	15	8;1	8;3	19	18	37
$\bar{x}$		11;10	7;10	79	29	7;9	6;8	17.75	13.00	30.75
SD		6.13	26.80	12.43	9.77	5.24	12.31	.95	3.55	4.49

age was 3;4 (SD 2,5 months) and their mean expressive language age was 3;2 (SD .86 months). Group I children had a mean unaided hearing level of 78 dB (SD 13.04) and a mean aided hearing level of 31 dB (SD 26.95). Group II consisted of four subjects: two males, two females. Three were first graders and one was a second grader. Their ages ranged from 7;1 to 7;5 with a mean of 7;3 (SD 1.65 months). This mean hearing age of Group II was 5;9 (SD 9.23 months). The mean receptive language age was 6;6 (SD 14.06 months) and the mean expressive language age was 5;3 (SD 19.00 months). Group II subjects had a mean unaided hearing level of 80 dB (SD 15.81) and a mean aided hearing level of 41 dB (SD 6.49). Group III consisted of five children: three males, two females. Four were third graders and one was a fifth grader with ages ranging from 7;7 to 10;3 with a mean of 8;9 (SD 10.22). Their mean hearing age was 6;11 (SD 15.44). Group III had a mean receptive language age of 5;9 (SD 12.03) and a mean expressive language age of 4;2 (SD 13.74). Their mean unaided hearing level was 90 dB (SD 6.32) and their mean aided hearing level was 44 dB (SD 8.00). Group IV consisted of four subjects: two males, two females. There were two fifth graders and two sixth graders who ranged in age from 11;5 to 12;8 with a mean of 11;10 (SD 6.13 months). Children in Group IV had a mean hearing age 7;10 (SD 26.80 months). Their mean receptive language age was 7;9 (SD 5.24) and their mean expressive language age was 6;8 (SD 12.31). Mean unaided hearing level for Group IV was 79 dB (SD 12.43) and their mean aided hearing level was 29 dB (SD 9.77).

Procedure

Subjects were seen individually in a quiet, well lit area of the school audiologist's suite for two 30-minute sessions, approximately one week apart. In the first session, the experimenter administered the Test of Language Development (TOLD) (Newcomer & Hammill, 1982) in order to establish an oral receptive and expressive language age.

In the second session, subjects completed the experimental task. Each received a response booklet that contained 40 sheets of paper each of which had one blank circle drawn on it. The children were also given a blue and a red crayon and instructed by both verbal and visual cue to watch the experimenter, listen to the sentence, and then color the circle according to what they thought has been requested. There were told that each circle must be colored either red or blue. Using live voice and wearing an FM auditory transmitter synchronized with the subject's auditory trainers, the examiner read each sentence twice to insure that the children heard it correctly. Sentences were presented in randomized order to each child. Ten seconds were allowed for the child to make an initial response before moving on to the next trial. When the subject was finished coloring, the next sentence was read. Each subject's responses were recorded by the examiner on a score sheet as the subject colored the circle. Any response indicating comprehension of the request was considered correct. For instance, if the examiner said "I'll be sad if you color the circle blue," and the

subject said "So what, I want to color it blue," and did so, the trial was scored as correct.

Before beginning the test, subjects' understanding of the task was assured by the of two practice trials. For the first, they were asked which color they would use if they heard the request "Please color the circle blue." For the second they were asked which color they would use if they heard the request "Please don't color the circle blue." When subjects demonstrated that they understood the task, the experiment began.

Temporal Reliability

In order to determine children's temporal reliability for performances across time, the experimental task was readministered seven days after the initial presentation to three children (i.e., one subject chosen at random from three different groups; one from Group I, one from Group II, and one from Group III). Children's performances on the readministered experimental task were compared to their performances on the initial presentation of the experimental task. Percentage of agreement between the results of the two sessions was then calculated. It was found to be 94%, thus demonstrating high temporal reliability.

RESULTS

Three separate Kruskal-Wallis one-way analysis of variances (Ferguson, 1976; Siegel, 1956) was computed for the subjects' total score, their scores on the positively conveyed stimuli, and their score on the negatively conveyed items. Follow-up testing of pair-wise comparisons between groups was accomplished via the Mann-Whitney test (Ferguson, 1976; Siegel, 1956).

The Kruskal-Wallis analysis revealed an overall significant difference for the children's total score across the four groups ($H = 10.12$; $df = 3$; $p < .01$). Follow-up inspection of the data via the Mann-Whitney demonstrated significant differences between Group I ($\bar{x} = 20.0$; $SD = 2.16$) and Group IV ($\bar{x} = 30.75$; $SD = 4.49$) ($U = 16$; $p < .05$); as well as between Group III ($\bar{x} = 23.2$; $SD = 1.64$) and Group IV ($\bar{x} = 30.75$; SD 4.49) ($U = 20$; $p < .05$). No other pair-wise comparisons on the basis of total score were significant.

The results of the Kruskal-Wallis test for the children's score on the negatively marked items were also significant ($H = 7.80$; $df = 3$; $p < .05$). Follow-up Mann-Whitney tests for the children's negative score revealed that Group I ($\bar{x} = 3.75$; $SD = 4.34$) was significantly different from Group IV ($\bar{x} = 13.0$; $SD = 3.55$) ($U = 16$; $p < .05$); and Group III ($\bar{x} = 4.5$; $SD = 3.63$) was significantly different from Group IV ($\bar{x} = 13.0$; SD 3.55) ($U = 18.5$; $p < .05$).

Analysis of the children's responses to the positively marked indirect requests demonstrated no overall significant difference across the four groups ($H = .99$; $df = 3$; $p < .50$).

Comparison of Children's Comprehension of Positively Conveyed and Negatively Conveyed Indirect Requests

Since the children were presented with two types of indirect requests (e.g., negatively conveyed, "I would hate to see the circle colored blue" and positively conveyed, "The circle really needs to be colored blue"), it was of interest to see if they responded differently relative to the polarity of the conveyed meaning of the indirect requests. To accomplish this, a Wilcoxon sign-ranks test for related samples was completed (Ferguson, 1976; Siegel, 1956). This revealed significant differences in the children's comprehension of positively versus negatively marked indirect requests ($Z = 3.62$; $p < .001$). Table 3 depicts the means and standard deviations of group performance for the positively conveyed, negatively conveyed items and total scores. Figure 1 illustrates group means for children's responses to positively and negatively conveyed indirect requests. The children tended to comprehend the positively conveyed indirect requests moreso than they did the negative ones. This was, for the most part, supported by a Chi Square (χ^2) analysis, with Yates' correction, of the individual groups' comprehension of positive versus negative indirect requests. The Chi Square for Group I was 30 ($df = 1$, $p < .001$); for Group II it was 49.61 ($df = 1$, $p < .001$); and for Group III it

Table 3

Means and Standard Deviations of Group and Combined Performance for The Positively Conveyed, Negatively Conveyed Items and Total Score

Group	Positive	Negative	Total
I	16.25	3.75	20.00
	(4.49)	(4.34)	(2.16)
II	18.00	8.00	26.00
	(.81)	(5.47)	(5.71)
III	18.39	4.80	23.20
	(2.30)	(3.63)	(1.64)
IV	17.75	13.00	30.75
	(.95)	(3.55)	(4.49)
Combined	17.05	7.23	24.88
	(3.00)	(5.30)	(5.21)

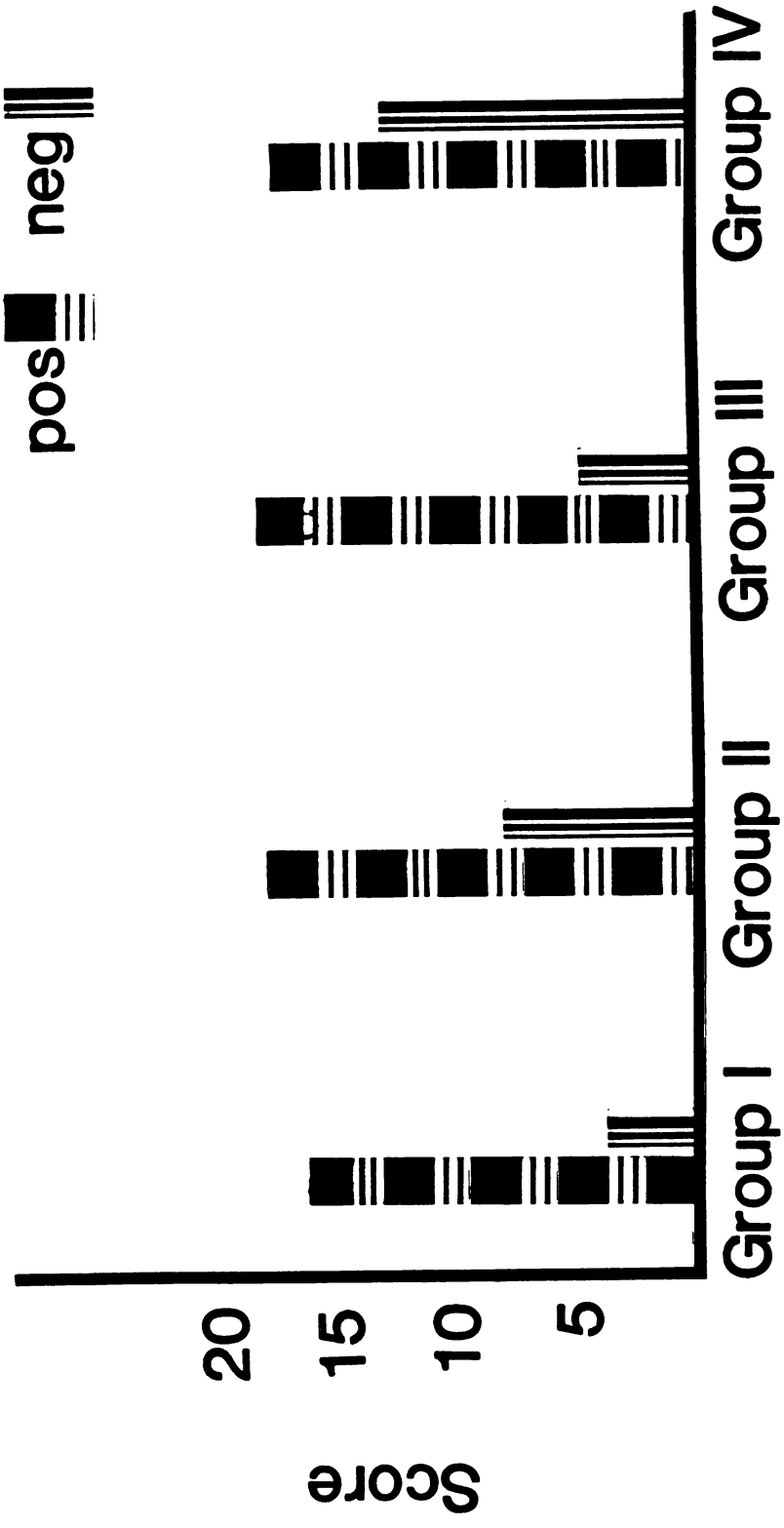

Figure 1. Group Means for Children's Responses to Positively and Negatively Conveyed Indirect Requests.

was 38.7 ($df = 1$, $p < .001$). Only Group IV revealed a nonsignificant difference in the children's comprehension of positively versus negatively conveyed indirect requests ($\chi^2 = 2.63$; $df = 1$, $p < .05$).

Children's Comprehension of Indirect Requests Expressed in Different Sentence Modalities

As previously mentioned, the sentence modalities of indirect requests used in this study were imperative, declarative, and interrogative. The following analysis was competed to investigate the children's comprehension of indirect requests relative to these sentence modalities. The results of subjects' comprehension of imperative, declarative and interrogative indirect requests are displayed in Table 4. In short, the children found imperative requests the easiest to comprehend (89% total), followed by declarative types (66% total) and finally by interrogative indirect requests (49% total). The individual groups followed the same pattern of comprehension.

Correlational Analysis

A Spearman Rank Order correlation was performed to investigate the relationships among the variables of chronological age, hearing age, unaided hearing level, aided hearing level, receptive language age, expressive language age, positive score on the experimental task, negative score on experimental task, and total score on experimental task. Results of these correlations are found in Table 5.

Table 4

Percentage of Children's Correct Comprehension of Indirect Requests Relative to Different Sentence Modalities

Group	Imperative	Declarative	Interrogative
I	56%	50%	45%
II	100%	71%	45%
III	100%	59%	47%
IV	100%	87%	58%
Total	89%	66%	49%

Table 5

Spearman Rank Order Correlations for Subject Variables

	CA	HA	UAHL	AHL	LAR	LAE	POS	NEG	TOT
CA	--	.67***	.15	-.22	.70***	.66***	.14	.48*	.73***
HA		--	.44	.12	.41	.21	.20	.04	.37
UAHL			--	.81***	-.10	-.13	.21	-.43	-.17
AHL				--	-.45	-.44	.24	-.61**	-.40
LAR					--	.91***	.01	.68***	.86***
LAE						--	-.16	.77***	.83***
POS							--	-.50*	-.02
NEG								--	.80***
TOT									--

*p < .05
**p < .01
***p < .005

The correlational analysis indicated that the relationship between chronological age and hearing age was .67 ($p < .005$). The relationship between chronological age and receptive language age was .70 ($p < .005$). The variables of chronological age and expressive language age demonstrated a relationship of .66 ($p < .005$). While the relationship between chronological age and negative score was .48 ($p < .05$) and the relationship between chronological age and total score was .73 ($p < .005$), there was a nonsignificant relationship of .14 between chronological age and positive score. These results indicate that of all the above-mentioned variables, only the subjects' score on the positively conveyed indirect requests was not influenced by advancing age. As previously noted, hearing age was not significantly related to any of the other variables, except chronological age. Of particular interest was the finding that hearing age was not significantly related to either receptive language age ($r = .41$) or expressive language age ($r = .21$).

Correlational analysis also demonstrated that the relationship between unaided hearing level, receptive language age, expressive language age, as well as the subjects' positive, negative and total score was nonsignificant. For instance, the relationship between unaided hearing level and subjects' score on negatively conveyed items was -.43 and -.17 for unaided hearing level and total score; neither were significant. Results did, however, indicate a significant positive relationship between unaided hearing level and aided hearing level ($r = .81$; $p < .005$). This relationship indicates that the improvement in hearing due to presence of a hearing aid is

dependent upon subjects' initial unaided hearing level. Results also indicated that a significant relationship existed between subjects' aided hearing levels and their score on the negative stimuli. This relationship was -.61 ($p < .01$). The relationship between aided hearing level and variables other than unaided hearing level was nonsignificant.

A positive relationship existed between receptive language age and the subjects' negative scores ($r = .68$; $p < .005$) as well as a positive relationship between receptive language age and the subjects' total score ($r = .86$; $p < .005$). However, a nonsignificant relationship of .01 was found between receptive language age and positive score.

The children's expressive language age was significantly related to both their score on the negatively conveyed indirect requests ($r = .77$; $p < .005$) and their total score ($r = .83$; $p < .005$). A nonsignificant relationship of -.16 was found between expressive language age and score on positively conveyed items.

The correlational analysis also found a high positive relationship between receptive and expressive language performance ($r = .91$; $p < .005$). Finally, the relationship between the children's negative score and their total score was .80 ($p < .005$), whereas it was -.02 (nonsignificant) for the positive and total score values.

DISCUSSION

This study was conducted to investigate young hearing impaired children's ability to comprehend various types of indirect requests. Although there was a small number of subjects, results indicate that there was a definite developmental effect, with the older hearing impaired children exhibiting greater comprehension of indirect requets than the younger ones. As a group, all 17 of the subjects tended to comprehend positively conveyed requests more readily than negatively conveyed requests. They also experienced greater difficulty interpreting interrogative indirect request forms than they did imperative or declarative forms.

These findings are consistent with Carrell's (1981) normally developing, low hearing impaired subjects. Her data demonstrated that older children were better able to comprehend indirect requests than were younger children. This developmental trend was noted across the grade level span of preschool to second grade (approximate age range was from four to seven years), Carrell's subjects, however, exhibited greater comprehension at earlier chronological ages than did the hearing impaired children in this study. Whereas normally hearing children achieved a 78% comprehension level by Grade 1, the hearing impaired children did not reach a comparable level (76.8%) until Grades 5 and 6. The overall mean comprehension

score for the normal hearing subjects in Carrell's study was 77.2%, whereas it was 62.5% for the hearing impaired children of the present research. None of the groups of hearing impaired subjects ever reached the 92% comprehension level that Carrell's oldest group of second graders achieved.

A slightly different picture emerges when one compares the subjects of the present study to those of Carrell's on the basis of hearing age. While the mean chronological age for Group I was 5;3, their mean hearing age was only 2;8. This young hearing age may very well account for the group's low rate of only 50% correct on the experimental task as compared to Carrell's youngest group of subjects (CA = 4 years) who attained a correct response rate of 64.5%. This difference in percent correct between the hearing impaired children and Carrell's hearing children was 7.5% for Group II, 20% for Group II, and 16% for Group IV, thereby demonstrating a tendency for the difference to become greater as the hearing impaired children became older. However, even when one compares the results of the two studies on the basis of hearing age, the hearing impaired children yet performed below Carrell's normal hearing subjects.

The present finding that negatively conveyed requests are more difficult for hearing impaired children to process than are positively conveyed requests, compares favorably to other research. Quite recently Paul and Cohen (1985) demonstated a similar pattern in persistent developmentally delayed and mentally retarded subjects. Their investigation was also modeled after Carrell's who

reported that normal developing children also comprehended positively conveyed requests more so than they did the negative counterparts.

The correlational results of the present study support the view that the more difficult to comprehend negatively conveyed indirect requests are a more sensitive measure of children's ability to comprehend indirect requests. As noted earlier in the results section, the children's score on comprehension of positively conveyed indirect requests was not significantly related to other variables such as chronological age of language performance. However, their comprehension of the negatively conveyed indirect requests was significantly related to other developmental variables such as chronological age and language performance. The ability to comprehend positively conveyed indirect requests appears to be achieved quite early. Normal hearing, developmentally delayed and hearing impaired subjects tend to reach a ceiling of understanding of positively conveyed indirect requests early in development. On the other hand, effective comprehension of negatively conveyed requests requires a longer amount of time.

Similar to Paul and Cohen's (1985) developmentally delayed and Carrell's (1981) young normal subjects, the hearing impaired subjects of the present investigation also demonstrated a rank ordering of comprehension of indirect requests relative to different sentence modalities. Like the normal hearing and developmentally delayed subjects of the previously noted research,

these hearing impaired children found it easier to comprehend indirect requests that were of an imperative nature than those couched in a declarative form. Interrogative indirect requests presented the most comprehension difficulty for subjects.

In light of research into other areas of language abilities in hearing impaired children, the results of this study were not unexpected. Investigations have consistently pointed to evidence that hearing impaired children acquire language in a similar developmental pattern as normal hearing children but at a slower rate and over a protracted period of time. For example, Laubscher (1969) reported this finding in his study with hearing impaired children's developing morphological trends. Holmes (1972 and Pressnell (1973) also noted this phenomenon in their investigations into hearing impaired children's acquisition of syntactic rules. Finally, Skarakis and Prutting (1977) as well as Curtiss et al. (1979) noted that hearing impaired children's pragmatic abilities develop along normal patterns albeit at a slower rate.

Although it was expected that this research might find delayed comprehension of indirect requests as well as a developmental progression among hearing impaired children, it was, at first, somewhat puzzling as to why Group III (consisting of third and fourth graders) performed lower than Group II (consisting of first and second graders). Since the total mean score for Group II was higher than the total mean score for Group I and the total mean score for Group IV was higher than the total mean scores for Groups I, II, and

III, it did not follow that Group II would perform better than their older counterparts in Group III. Closer examination of the raw data revealed that scores for subject three in Group II might contain a clue. This child, whose chronological age was 7;5, had a receptive language age of 8;4. He achieved a score of 18 for the positively conveyed items and on negatively conveyed indirect requests, a score of 16. His total score of 34 on the experimental task. This total score was exceeded only by one other subject whose total score was 37. This child was in Group IV. His chronologial age was 12;8 and his receptive language age was 8;1. Upon consultation with the teacher of subject three in Group II, it was determined that this child was extremely bright and his presence in Group II seems to have contributed to the absence of a developmental progression between Group II and Group III. If one only considers the total scores for subjects 1, 2, and 4 in Group II, it is evident that there is a developmental pattern between Groups I, II, and III.

The results from this study have several implications. First, the data indicate that this type of experimental task is sensitive to the language growth and development of hearing impaired children; with the negatively conveyed indirect requests providing the most useful information. Speech-language professionals as well as educatores should be aware that many children, regardless of hearing ability, have difficulty comprehending certain types of indirect requests. These professionals may need to monitor their own production of indirect requests in order to assure that children are

comprehending the desired communicative intent. Carrell (1981) suggests that there may actually be too many teachers that give "coaching questions" or "gently reminder" questions (e.g., "why not work on your math?" or "should you be sitting there?") that are intended to keep students on task. These types of questions may actually be confusing to the children in their day-to-day classroom performance. Research is needed in which "teacher talk" is analyzed for the frequency and type of indirect requests actually used. This line of inquiry should also note children's comprehension of such indirect requests in context. This phenomenon needs to be investigated with classroom teachers of regular children as well as classroom teachers of the hearing impaired.

In conclusion, this research demonstrated that hearing impaired children's ability to comprehend indirect requests progresses significantly across the grades of kindergarden through six. However, it appears that their comprehension of indirect requests is not completed by grades five and six. In fact, they are not demonstrating comprehension of indirect requests as highly developed as normal hearing second graders. This result supports the need for further research into the indirect request comprehension abilities of older hearing impaired children. It would be of interest to discover how highly developed these abilities are by the end of their high school years. Finally, in comparing these data with that of Carrell (1981), it appears as if hearing impaired children between grades kindergarden through six are following a similar developmental

pattern as normal hearing children between preschool and second grade.

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